TELECOMMUNICATION TECHNOLOGY AND THE PROFESSIONAL DEVELOPMENT OF TEACHERS: CHALLENGE AND OPPORTUNITY

By

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B.Ed., M.Ed.

Submitted in fulfilment of the requirements for the degree of Doctor of Education

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I certify that this thesis entitled:

TELECOMMUNICATION TECHNOLOGY AND THE PROFESSIONAL DEVELOPMENT OF TEACHERS: CHALLENGE AND OPPORTUNITY

submitted for the degree of:

Doctor of Education

is the result of my own research, except where otherwise acknowledged, and that this thesis in whole or in part has not been submitted for an award, including a higher degree, to any other university or institution.

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ABSTRACT

The thesis explores an effective model for using the Internet in a distance training program for secondary school teachers. The professional development program, the dissertation, titled The Virtual University: Professional development for teachers, was initiated based on aspects of telecommunication technology and the professional development for Thai school teachers. The question of this program was "How could information technology be used in developing an appropriate professional development model for Thai teachers?"

Prior to the project, the four research studies were conducted to formulate the related base line information and supported framework for the program development. The four researches are: (1) Telecommunication Technology in Thai Schools, (2) The Role of University on Science Teachers Development, (3) Computer Education Curriculum for Student Teachers: Theory and Practice, and (4) Teachers' Perceptions of the Academic Link Project Between Schools and Universities for Teacher Professional Development. The first research study provides the information about the necessary basic factors for change in Thai secondary schools and the new insights and understandings about change in Thai schooling.

The major findings were the understandings about teachers' need for professional development, the available support in Thai school for professional development, and the limitations of professional development of teachers. The second research study provides the information about the roles of university faculty on initiation and operation of science teacher development programs, science teaching and learning resources centers, science instructional media design and production services, science teaching clinics, and science teachers' associations. The third research study provides the conceptual framework for both preservice and inservice curriculum development program for teacher development. The last research study provides a base of descriptive information about the perspectives of school teachers towards the academic link project between schools and universities and the partnership which can assist in its establishment. The findings of these four research tasks were used for the formation of the framework of the dissertation. The EDNET Project, an example of
teachers' professional development through the information technology based training, was developed and implemented with ten school teachers in Khon Kaen.
ACKNOWLEDGMENTS

Studying in the Ed.D. program is like taking a journey into the wide world of personal and professional development. The study gives me a chance to explore and improve my academic vision. It has been a long road of experience and exceptional personal growth that I have not travelled alone. There are many people who support and encourage my study so I would like to take this opportunity to express my sincere gratitude and thanks those have stood by my side.

I am deeply grateful for the knowledge and assistance that I received from all of the staff in the Faculty of Education, Deakin University during my period of study in Thailand and Australia.

I am very grateful to my major supervisor, Dr. Elizabeth Stacey, who offered advice, encouragement, assistance, and suggestions throughout my studying program. I wish to express my sincere appreciation to my doctoral committee: Dr. Terry Evans and Dr. Kingfa Sinthoovongse. I especially acknowledge the moral support, empowerment, encouragement, and advice provided by Associate Professor Rajit Treeputtarat.

I am very appreciative of all of those participants and interviewees who made this study possible. In addition, I am appreciative of the financial support provided by the University Mobility in Asia and Pacific (UMAP).
INTRODUCTION OF THE FOLIO

Paisan Suwanno

Education background

Paisan Suwanno was born on May 20, 1954 in Samutsakhon province, which located in the central part of Thailand. He is a Buddhist. He completed his secondary education at Samutsakhon Wittayalai School, which is a provincial school, in 1971. He received an Education Certificate from Nakomprathom Teacher College in 1973. He received a Bachelor of Education, majored in Biology and minored in Chemistry, from Srinakharinwirot University (Prasammitr Campus) in 1976. He started working at the Faculty of Education, Khon Kaen University in 1976. He taught Chemistry curriculum and instruction to undergraduate students. He enrolled in a full-time graduate certificate course in Research Techniques in Chemistry at the University of New South Wales in 1981. His research topic was Lignans and Fatty Compounds from Hernandia Peltata. He completed his Master of Education in Educational Measurement and Evaluation at Khon Kaen University in 1989. His thesis title was The Computerized Pyramidal Testing in Chemistry for Mathayom Suksa V. Now he is a doctoral student in education through the Deakin University and Khon Kaen University joint project.

Professional background

Paisan is an assistant professor in science education at the Faculty of Education, Khon Kaen University. His work is a mixture of teaching and research. There is some administrative work on which he has to spend a lot of time. Paisan teaches the Chemistry for Secondary School Science Teachers course and Teaching Science for Lower Secondary Schools course to undergraduate students. He teaches Science Instruction and Evaluation course and Computer Application in Educational Research course to graduate students. He also works as a supervisor for undergraduate students and thesis supervisor for graduate students.
Formerly, he acts as the Vice Dean for Student Affairs, Vice Dean for Planning and Development at the Faculty of Education, Vice Dean for Planning and Development, Vice Dean for Administration at Graduate School, Khon Kaen University, the Director of Education Service Department at Khon Kaen University. He also acts as an Assistant to Vice President for Personnel Development, Khon Kaen University. At present, he is a Vice Dean for Administration at the Faculty of Education, Khon Kaen University.

Paisan has been invited to be a guest lecturer at many professional development programs, conferences, and workshops at Khon Kaen University, several government organizations, and secondary schools in the Northeast of Thailand. He mostly gives lectures on training techniques, education evaluation, personnel administration, computer application in education, instructional media production, information technology application in education, and Internet application in education.

Paisan has conducted research on science teaching, educational evaluation, and educational computer software development.

Paisan’s folio

Paisan believes that the teacher is one of the most important factors that affect educational development. The education system needs to be developed because most factors effecting the education system always change. Within the context of education improvement, one thing is abundantly clear: staff development has become the vehicle of meaningful change. His interest on professional development for teachers has been cumulatively formed while he has been working with school teachers in the professional development projects. According to Thai education reform, the advancement of information technology, and his interest in professional development for teachers, when he engaged in the Doctor of Education program, Paisan focused his research tasks on the implementation of information technology in the professional development of Thai school teachers.
Paisan’s folio explores an effective model for using the Internet in a distance training program for secondary school teachers. He believes that it was timely to initiate the professional development program (his dissertation) titled The Virtual University: Professional Development for Teachers. The program was based on aspects of telecommunication technology and the professional development for Thai school teachers. The broad question of his work was:

How could information technology be used in developing an appropriate professional development model for Thai teachers?

In response to the above question, he formulated the related base line information from his four research tasks:

Research Task 1: Telecommunication Technology in Thai Schools
Research Task 2: The Role of University Faculty on Science Teachers' development
Research Task 3: Computer Education Curriculum for Student Teachers: Theory and Practice
Research Task 4: Teachers' Perceptions of The Academic Link Project Between Schools And Universities for Teacher Professional Development

These four research tasks provided methods and supported ideas used in his dissertation.

Research Task 1: Telecommunication Technology in Thai Schools

This research provides the information which is a basic factor necessary for change in Thai secondary schools. The data collected from many related documents, interviews, and a case study were analyzed to find out the answers of the four research questions:

- Do the teachers have realistic expectations?
- What would be helpful for teachers?
- What do teachers think about professional development?
- What is the relationship between technology and teachers professional development?

This first research task also provides new insights and understandings about change in Thai schooling. The major findings of this research were the understandings about teachers’ needs for professional development, the available support in Thai school for professional development, and the limitations of professional development of teachers.

Research Task 2: The Role of University Faculty on Science Teachers development

This research task attempted to survey the secondary school science teachers’ opinion toward the role of university faculty on science teachers’ development that support and promote education reform in Thailand. It argues that university faculty, as resource people in the community, should take their roles in the national education reform process reaching its goal. The researcher raises questions about university faculty at Khon Kaen University dealing with secondary school science teacher preparation:

What roles should the university faculty take in science teacher development?

In general, this study was aimed to survey the science teachers’ perceptions about the role of university faculty in the professional development of science teachers. The study had two specific objectives:

1. To undertake a study on the role of university faculty affecting the success of science teacher development to promote teacher reform.
2. To acquire appropriate guidelines for the development of the education development plan at Secondary Education Department, Faculty of Education, Khon Kaen University.
The expected outcome of this survey was a broad information on the role of university faculty in the professional development of secondary school Science teachers to promote teacher reform process. Such information will be useful for further development of guidelines for effective provision of science teacher training programs at the Faculty of Education.

The findings of this research task provide information about the roles of university faculty on initiation and operation of science teacher development programs, science teaching and learning resources centers, science instructional media design and production services, science teaching clinics, and science teachers' associations.

Research Task 3: Computer Education Curriculum for Student Teachers: Theory and Practice

The aim of this research was to examine the Information Technology Education program at the Faculty of Education Deakin University to answer the following questions:

- What is the typical course structure of Bachelor of Education at DU?
- How do the course team/unit chairs manage the computer education curriculum?
- What are the students' perceptions about Computer Education Curriculum for student teachers: course description and practice?
- What are the advantages and disadvantages of the computer education curriculum for teacher students?
- What can the Faculty of Education KKU learn about computer education curriculum from DU?

The Faculty of Education Khon Kaen University not only learned what happened, but can get the conceptual framework for future curriculum development from this experience. This also provides information about the preservice program of teacher development that will lead the researcher to think about professional development programs for teachers.
Research Task 4: Teachers’ Perceptions of The Academic Link Project Between Schools And Universities for Teacher Professional Development

The researcher has taken both quantitative and qualitative approaches to this study. Simply stated, this means that the researcher was not only interested in how many teachers have the same perceptions about school and university partnership for professional development but also in what they are thinking about in order to gather the information for future planning and developing the academic link project successfully. The purpose of this study, then, is to create a base of descriptive information about the perspectives of school teachers towards the academic link project between schools and universities partnership which can assist in its establishment.

These findings enable the researcher’s further work on the school-based professional development project in partnership with the Faculty of Education, Khon Kaen University. The researcher examined the following questions more closely:

(1) What are the teachers’ perceptions on the formats of the academic link project between schools and universities for professional development?

(2) What formats of the academic link project activities do teachers need?

(3) What types of the academic link project activities do teachers need for their professional development?

(4) In what ways may the partnership establish the foundations for a systematic partnership between practising teachers and university faculty that support the school reform?

The findings of these four research tasks were used for the formation of the framework of the dissertation, their relationships were in figure 1. The EDNET Project, an example of teachers’ professional development through the Information Technology based training, was developed and implemented with ten school teachers in Khon Kaen.
Research Task 1: Telecommunication Technology in Thai Schools

Research Task 2: The role of University Faculty on Science Teachers Development

Initiation and operation of science teacher development programs:
- Science teaching and learning resources centers
- Science instructional media design and production services
- Science teaching clinics
- Science teachers' associations

How could Information Technology be used in developing an appropriate professional development model for Thai teachers?

The Virtual University: Professional Development for Teachers
(The EDNET Project)

Understandings about:
- Student teachers' perceptions about Computer Education Curriculum
- The preservice program of teacher development
- Advantages and disadvantages of the computer education curriculum

Understandings about:
- Formats and Types of academic link projects
- Information technology application in academic link projects
- Establishing the partnership between practitioners, teachers, and university faculty

Research Task 3: Computer Education Curriculum for Student Teachers: Theory and Practice

Research Task 4: Teachers' Perceptions of The Academic Link Project Between Schools and Universities for Teacher Professional Development

Figure 1 Relationships of the four research tasks and dissertation
Paisan's dissertation proves that action research can be an effective means of improving the professional development process for Thai school teachers. The ideas of action research were applied to his own professional development model, The EDNET project. After the implementation of the EDNET in three cycles of action research: getting started, skills development, and maintaining skills, it was shown that the Internet could be used for teletraining, that promoted the development of information technology skills for teachers, and released the limitations of professional development of teachers. However, he is still working on the development of the EDNET to maintain the professional development activities and to extend the EDNET to other teachers and to his colleagues.
The Virtual University: Professional Development for Teachers

by

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Submitted in fulfilment of the requirements for
The degree of Doctor of Education

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This study results from a collaborative and participative study conducted in Khon Kaen, Thailand. It reflects the ideas of people who have influence the researcher’s intellectual growth over period of four years. It reflects his journey in such of a means of improving professional development process for Thai teachers with a group of secondary school teachers in Khon Kaen.

No one deserves more gratitude for the researcher’s intellectual struggles, than his supervisor, Dr. Elizabeth Stacey at the Faculty of Education, Deakin University. The researcher wishes to express his deepest appreciation for her valuable guidance, encouragement, suggestions, and critical editing as he faced the challenges of this cross-cultural study. Her belief in his ability to undertake an intellectual journey helped him to travel through the difficult phases of the study. Grateful acknowledgement is also extended to his co-supervisor, Dr. Kingfa Sintovongse at the Faculty of Education, Khon Kaen University, for her support and critical supervision throughout this study.

To other faculty members at the Faculty of Education, Khon Kaen University and Deakin University who provided useful discussion during the early development of the study, the researcher wish to express his sincere thanks. He also owes an intellectual debt to Dr. Terry Evans at the Faculty of Education, Deakin University, who gave him constructive suggestions.

Sincere appreciation is extended to those participants in his study: ten teachers from five secondary schools in Khon Kaen, Mr. Dome Chareonyos from a computer shop in Udornthani. Appreciation is also given to the Faculty of Education, Khon Kaen University for the generous financial support in this study.

To all the above who have generously contributed to this study, the researcher hope that the results is worthy of your contributions.
ABSTRACT

The purpose of this study was to improve professional development for Thai school teachers. This focused on the application of the Internet, as a medium for a virtual university, in the professional development process. The following question guided the study: How could Information Technology be used in developing an appropriate professional development model for Thai teachers?

Critical theory, communication technology, information technology, distance education, adult education, professional development, and action research provided the theoretical and methodological framework for an alternative model of information technology application in professional development project for Thai school teachers. The study was conducted in four phases. Firstly, there was an ethnographic study of present professional development in Thai schools to provide an understanding of the nature of professional development of Thai teachers. Secondly, a participatory workshop was conducted to develop the EDNET model and to plan the implementation of the action plan. Thirdly, managing change, the EDNET netserver was developed which consisted of email server, ftp server, Web server, the EDNET Web site, and a six-week teletraining course. Fourthly, the alternative EDNET model was implemented through three cycles of action research with a group of ten teachers from five secondary schools.

Through the method of school visiting for coaching and consultations, and email communication for interviewing and collecting participants’ diaries, the researcher kept diaries for recording the events. Reflective diaries were also written by participants and sent to the researcher via email. The data was then analysed on a weekly basis in order to understand what happened during the week and revised plans for further action. Final analysis was completed following one year of the implementation of the EDNET project.

The study has demonstrated that through the implementation of the EDNET project, participants were able to improve their Internet using skills and maintain the EDNET
project activities. Implications are elaborated for professional development for teachers in general and other education institutions.
A NOTE FOR CLARIFICATION

The names of participants do not appear in this report. Alternative names have been used to preserve participants' anonymity.

All of the quotes from participants were translated from Thai to English.
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CHAPTER 1

THE RESEARCH PROBLEM

1.1 Introduction

This chapter provides a rationale for the conduct of a study in the field of professional development for teachers. The study is concerned with an application of Internet technology in the professional development program which has been widely used in many sectors in Thailand.

1.2 Background of the study

Teacher professional development is a major component of educational development process. In Thailand, teacher professional development has been discussed and organised by many academic institutions for a long time. Many educators claimed that many problems of professional development for teachers needed to be solved. But there are very few works on finding the appropriate model of professional development for teachers. Especially, in the area of the advancement of information technology.

Unlike most professionals, teachers have traditionally had no time built into their work schedules for their own professional development. "No time", "Not enough time", "need more time" - these are verbal gauntlets that teachers repeatedly throw in the path of enthusiastic innovators (Hargreaves, 1994). Most teachers spend the entire work day with their students, with little time left for collective reflection, refinement, or even discussion with their colleagues or superiors. Considering such important workplace concepts as teamwork, networks, shared resources, mentorship, mutual respect, trust, and competition, how can teachers improve without opportunities for collaboration? And how can schools improve without teachers improving?

Schools are only as good as their teachers, regardless of how high their standards, how up-to-date their technology, or how innovative their programs. But if teachers are not
given adequate opportunities to learn, they may have little chance of meeting the ever-increasing demands placed upon them. For this reason, professional development for teachers is increasingly considered a critical component of improving schools.

For most Thai teachers today, professional development translates to formal workshops—"in-service" or "staff development" sessions during which colleagues gather in a conferencing room to learn about the latest hot topic—often determined by administrators or state legislators. But these one-shot strategy sessions, often delivered by professionals who are out of touch with the rapidly changing needs, interests, and composition of students and teachers, are out of sync with the reform agenda for schools. Educators are finding professional development an area ripe for some rethinking and redefining (Hargreaves, 1994).

The increased attention to professional development brings with it an emerging consensus about the principles of effective approaches to professional development (National Board of Employment, Education and Training, 1995). Firstly, teachers should be involved in planning their own learning experiences, rather than being passive recipients of knowledge. Secondly, they need to be linked to a larger "learning community" that can bring in expertise and ideas to complement their work. And thirdly, professional development must be better balanced between meeting the needs of individual teachers and advancing the organisational goals of their schools and districts.

Many schools are rethinking their use of time to enable teachers to engage in learning activities of their own, either by using block scheduling to create common planning time for teachers or by scheduling early-release days for students. The trend toward having students do community service and independent projects also holds promise for creating time for teachers to learn at work. In some districts, community volunteers have been trained to teach mini-units in an academic subject so teams of teachers can be released from their classrooms to work together. Teacher networks and school-university collaborative partnership are helping spur new ways of thinking about professional development. Teachers' unions are starting to play a vital role in advocating and providing for their members' continued learning. The Internet, with its
capacity for creating connections and sharing resources, may hold great promise as well.

As the reform movement continues in education, school systems are purchasing computers and related technologies often without the ability to incorporate them into the curriculum. Many papers clearly reflect that, as a field, we have moved beyond discussions of how to teach about information technology to how to incorporate information technology into the preparation of teachers and their professional development (Pairtrakul, 1985; Thitipoka, 1985; Panomwan Na Ayuhdithaya, 1987; Suwannakul, 1987). More importantly, these authors are critically reflective not only about what that means, but also about the implications it has for our responsibilities as teacher educators.

The world has recently gone through some particularly turbulent and demanding times. This is illustrated by such matters as: the rapidly changing international economy which is widening the gap between rich and poor communities; the development and widespread use of advanced technology in satellite communications and computers; the rapid rate of social and political change which creates feelings of helplessness and social dislocation amongst people. The social, economic and political developments that have occurred have important implications for the type of education system needed to best serve the needs of both society and the individual. The innovative and far-sighted changes required of education and schooling also have important implications for the role of the teacher, recruitment into the teaching profession and for teacher education, at both the pre- and in-service levels (Sinlarat, 1995).

The professional development of teachers is an interesting and important issue in order for the teaching profession to improve. At present, technology is progressing rapidly. The business sector is rapidly changing and using a high level of computer technology. On the other hand, in the education sector, especially in schools, there are very few teachers using new technology in their work. Sinlarat (1995) emphasised and realised the impacts of technology on teacher preparation and the training of educational personnel in the decade of rapid transition and globalisation. It also
imposes on educators at all levels of education a need to seriously engage in reorganising their educational endeavours and redefining their education goals. Sinlarat also suggests that the response to the changing characteristics of Thai society and thereby of education has required innovations to ensure that teachers are adequately trained and educated to cope with the changing and demanding roles in Thai society if they are to help education fulfil its role in national development.

Having been a guest lecturer in professional development programs for school teachers for more than five years, it became clear to the researcher that most teachers mentioned difficulties in participating in the professional development program. In addition, the researcher had an opportunity for EdD study through the joint doctoral degree program between Khon Kaen University and Deakin University. This provided an opportunity for him to look at the issues of professional development programs for teachers in more depth. The researcher began with the premise that most professional development programs for teachers failed because they were not properly implemented and appropriated for teachers' problems and needs. What support was there for such an argument? Was there a basis for it or was it only the researcher's perception? What was the right view of it? How could it be investigated? If this argument is true, how could professional development programs for teachers be improved?

In response to these questions the researcher suggested the use of information technology as a means of professional development for teachers. A preliminary study titled "Telecommunication Technology in Thai Schools" (section 2, p.240) was carried out in 1995 to survey the background of professional development for Thai school teachers. The researcher interviewed ten teachers from five secondary schools in Khon Kaen. A case study was also carried out at a secondary school in a sub-urban area of Khon Kaen. The findings show that Thai teachers have positive perspectives and attitudes toward their professional development. They all agreed that professional development is needed for improving their work. They need to refresh their knowledge and related skills to keep up with the change of subject matter and the advancements of science and technology. They expected to have opportunities for professional development, especially in the necessary skills for using and
implementing new technology in their work. They needed help from outside experts to lead them to reach their need. Although Thai school teachers had positive attitudes to professional development, they could not participate in the desired activities because of their limitations:

- their overloaded working hours
- their extensive nonteaching tasks
- the lack of budget support for professional development
- their low income.

In conclusion, the main limitations to professional development for teachers are lack of time and budget support.

To promote professional development for teachers in the North eastern part of Thailand, the Faculty of Education, Khon Kaen University needed to find an appropriate model of professional development for teachers, in order to provide school teachers with more opportunity to participate in professional development program for their work improvement. Especially in their teaching-learning tasks and for their promotion to higher academic positions. In the light of such concerns and developments, the researcher believed that it was timely to initiate the professional development program titled The Virtual University: Professional Development for Teachers. The program was based on aspects of telecommunication technology and the professional development for Thai school teachers. The research was designed particularly to find an effective model for using the Internet in a distance training program for secondary school teachers.

The study of a virtual university had potential significance for searching an appropriate model of professional development for teacher. However, because of the cultural context in which technology implementation is embedded, it seems that the results of any studies would be specific to the culture in which they may be conducted.
1.3 Statement of the problem

As the issue became sharper the researcher believed that the traditional professional development program did not encourage teachers to participate and did not respond to their problems and needs. Thus the following problem for the study was formulated:

How could Information Technology be used in developing an appropriate professional development model for Thai teachers?

Furthermore it was the researcher’s assumption that if there is a professional development program to which teachers can participate at anytime and any topic they want, then teachers can release their time and financial limitations to participate in a professional development program. It was also believed that the computer network might be used as a mean for delivering the program.

In response to the above problem and assumption, a complete picture of a professional development model would only be achieved through a systematic study of the problem in depth. It was an attempt to explore suitable methods of improving professional development program through the establishing of a teacher network via computer network.

1.4 The aim of the study

This study aimed to improve professional development for Thai teachers by changing the current processes and by learning from the consequences of such changes within the framework of a collaborative working model. It was not the aim of this study to show how particular ideas can be applied in the professional development process. The study aimed to make a response to some of the problems, needs, and processes already identified in the research literature of professional development for teachers and to those that emerged from the study. It aimed to answer the following research questions:
1. How can information technology be used effectively in a professional development program for Thai school teachers?
2. What happened in the implementation of this professional development model?
3. What factors help/inhibit the success of such professional development model?
4. What are the basic constraints to the implementation of such professional development model?
5. What are the processes and principles involved in the changes of professional development for Thai school teachers.

1.5 The significance of the study

By addressing the above research questions, the researcher aimed to make a contribution to theory in the following respects: Firstly, there was the potential to make a direct contribution to knowledge about construction of professional development for Thai teachers, to fill the gap identified in the findings from the preliminary study. Secondly, it was possible to make a contribution to the issue about appropriate methodologies to be used when investigating the implementation and monitoring of professional development models. Such issues were difficult to explore in-depth by means of quantitative methods, so qualitative methods were employed. Thirdly, the study had potential to provide an appropriate professional development model which took Thai teacher culture into account. This approach appeared to be novel in professional development for Thai teachers, since previous studies were generally focused on quantitative methods and had achieved limited success. In addition, the study had the potential to provide insights of wider interest into theories of educational development and participatory research.

1.6 The setting of the study

This study was a collaborative study among staff at the faculty of education, Khon Kaen University and ten teachers from five secondary schools in Khon Kaen, Thailand. These schools were government schools, two of them newly established.
Five of the teachers used computers in their work and possessed computer literacy skills, but the others had never used computers in their work. All five schools were operating under the educational policies which were proposed by the Ministry of Education. Some interesting policies were:

1. The students are the hearts of education management. The student centred approach is used for education management.
2. The school is a part of the community, so the school has to be beneficial to the community.
3. The school has the knowledge market for people who can select what they want to learn.
4. An emphasis is on teachers' and educators' development to reach the highest efficiency of education management.
5. An emphasis is on educational technology and innovative developments to keep up to date with advanced technology. Establishment of an instructional media centres in school.
6. The school has to improve the service atmosphere, academic atmosphere, and school environment for educational development.

(Department of Curriculum and Instruction Development, 1990)

1.7 Limitation of the study

This study had a narrow focus, being concerned primarily with the conduct of professional development program for school teachers via the Internet. It was conducted within the context of Thai school education and the findings are therefore pertinent to that context. However, because of the world-wide nature of the problem in professional development of school teachers and education development, and the increasing interest in the use of the Internet for professional development programs in a range of professions, the study may have some wider relevance.
1.8 Structure of the dissertation

The first chapter has identified a problematic situation concerning professional development of Thai school teachers. Arising from this problematic, it has been possible to define a set of research questions which are concerned with the improvement of professional development model for Thai school teachers. The study seeks to explore such an improvement through a participatory research method in the conduct of professional development programs via the Internet. Chapter 2 provides a socio-cultural and contextual story about Thai society and Thai schooling. The chapter starts by considering technology in traditional Thai society to see if there is any relationship between the technology being used in Thai society and Thai traditional culture. It also examines the effects of information technology on Thai schools' changes. The chapter also describes the professional development of Thai school teachers. Chapter 3 explores some theories and practical applications of information technology, the virtual university, which could fill gaps in professional development for Thai teachers. Chapter 4 describes the methodology of the research which is based on critical theory, professional development in Thai school context, adult education, and action research. Chapter 5 details the participatory workshop that was held with the aim of obtaining the perceptions and critical reflection of participants on the current professional development process in Thai schools. The chapter also describes the negotiation of participants to set up an alternative model for improving the professional development of Thai school teachers.

Chapter six details the story of the implementation of the EDNET project through three cycles of the action research. In this chapter the preparation for the implementation, process of changes in the three cycles of action research, and the outcome of the alternative model are discussed. Chapter 7 presents a re-conceptualisation of the study, the theoretical contributions which can be made to the fields of professional development for teachers, and action research. Some possible practical implications and the personal reflections of the researcher are described.
CHAPTER 2

THAI SOCIETY AND EDUCATION

2.1 Introduction

This chapter provides a socio-cultural and contextual story about Thai society and Thai schooling. The chapter starts by considering technology in traditional Thai society to see if there is any relationship between the technology we now use in our society and our traditional culture. It also examines the effects of information technology on Thai schools' changes. Furthermore, it attempts to examine the professional development of Thai school teachers. By focusing on such professional development for school teachers, the researcher was able to explore the extent to which the appropriate professional development program encouraged teachers to improve their work from the advance of information technology.

2.2 Thai society

2.2.1 Traditional Thai society

Thailand’s economic growth since the late 1980’s has been impressive. The country is also in a state of transition from a traditionally agriculturally based economy to a more industrially oriented one. Despite this economic success, however, there are still questions about the country’s long term ability to sustain economic growth while improving international competitiveness. This is particularly true for the country’s industrial sector.

Throughout Thailand’s industrial development, there has been a strong reliance on imported technology. Few firms have managed to raise their performance levels to international standards and to carry out significant improvements to their products and production systems. A large number of firms remain technologically static even though they have been operating for many years (Chanthamonklasri, 1986). In many large Thai and joint-venture firms, the innovative capabilities are still very weak (TDRI, 1992). At the same time, the industrial sector as a whole has not developed
into a coherent production structure, but has become an agglomeration of largely independent “islands” of manufacturing companies with no strong linkages between them or to other sectors of production. Except for some exports produced by foreign or joint-venture firms most of the country’s industrial products are not technologically sophisticated.

This situation suggests that, unless the country manages to upgrade and strengthen its industry, its chances of becoming internationally competitive are limited. Further compounded by the fact that at present there are new market economies with much lower wages and more abundant natural resources, Thailand’s traditional comparative advantages in terms of labour and resources may be rapidly eroded. As developed countries move toward more modern and automated production and make significant advances in new materials, certain exports from Thailand will become less competitive, and hence the survival of some industries may be at risk. It is possible that without substantial efforts to develop indigenous capability in science and technology to support industrial development, Thailand even face a major economic and social crisis at the present.

This has lead the researcher to examine what is causing Thai society to change from an agricultural into an industrial society and now, into an information technology society. The literature on indigenous technical knowledge is not as well developed as that available for other cultural dimensions. In Thai society as well as other traditional societies, the low levels of development suggests that indigenous technology did not develop much beyond subsistence level. Although it is believed (and is no doubt true) that farmers have a body of knowledge about their environment, this knowledge has not really been studied in any detail. Ethnologists have constructed plant taxonomies, they have studied methods of weather prediction and they have collected indigenous knowledge about soils and so on (Banpasirichote, 1988). Banpasirichote argued that in Thailand the issue of traditional agricultural knowledge has not had as much attention as modern ideas of appropriate technology. Appropriate technology focuses on current indigenous knowledge rather than on traditional indigenous knowledge. In the non-government sector, most of the technology that is introduced into the community is new. However, this is not always supported by good training programs and the ability of extension workers and farmers
to actually use the technology is a major concern. It is also unfortunate to find that not many community development workers have an educational background—particularly in technology education. As a result, community development workers do not also integrate technological development with community and social development.

According to Banpasirichote (1988), Thailand is in a state of transition from a traditional agriculturally based economy to a more industrially oriented economy. Despite our economic success however, there are still questions about the country's long term ability to sustain economic growth while improving international competitiveness. This is particularly true for the country's industrial sector.

How have schools have responded to and/or changed with the impact of information technology? Although we have some form of computer education in Thailand for twenty years (United Nations Educational, Scientific, and Cultural Organisation [UNESCO], 1985). As of 1990, fifteen universities and teachers colleges in Thailand provide computer courses for both graduate and undergraduate students. In 1983, some secondary schools in Thailand acquired micro-computers and began offering elective courses in microcomputers. In 1985, the Ministry of Education implemented a computer curriculum for the upper secondary school level throughout the country. Computer applications in Thailand are rapidly expanding at all school levels. The Institute for the Promotion of Teaching of Science and Technology in Thailand (IPST) initiated a pilot project in 1987 to encourage the integration of computers into the teaching of mathematics and physics at the upper secondary level. Topics in mathematics and physics were identified for which computer software was to be written. The institute has developed a number of computer programs in these two areas.

Another interesting issue concerning technology and culture is the question of cultural transition. The researcher has been examining the transition from muscles to machines in our culture. Khrmatana (1994) pointed out that, since 1961 the First National Economic and Social Development emphasised import substitution industries. However, the creation of import substitution industries did not reduce Thailand's trade deficit as expected. It merely changed the nature of our imports. The government
then altered its policy to promote export industries. The Third National Economic and Social Development Plan (1972-76) was the first plan to mention export promotion as a means of solving the chronic trade deficit problem and of helping the balance of payments and of reducing the unemployment rate. Later, the Fourth Plan (1977-81) proposed the development of basic industries. This Fourth Plan reviewed the many problems that had confronted Thailand’s industrial development in earlier periods. The Plan was regarded as a “big push” towards Thailand’s further industrialisation. The period from 1983 to the present (which covers the Fifth and the Sixth Plans) has been characterised as the period of transformation into a manufacturing export-led economy. Further export production, industrial regionalisation, implementation of the large scale industrial development programs, and expansion of basic industries, were emphasised along with active mobilisation of foreign investments, increased efficiency of the management and utilisation of resources, and increased international competitiveness.

Thailand’s industrial development has been dramatic, but the level of this success is probably not as high as that of the other newly industrialised countries in the region. However, some of these economies are rather older than that of Thailand. It was actually proposed in the Sixth Plan that Thailand would achieve the status of a newly industrialised country.

At the end of the sixth National Social and Economic Development Plan, the quality of life of the Thai people was assessed and it was found that the quality of life on the average was considered to be poor. Only Bangkok was graded as progressive and the provinces in the central region as average. But Muangman (1995) said that the evidence derived from his interviewing with rural Thai people, they considered their quality of life differently. All of them said they needed four important things as follows:

- Good income
- Safety to life and property
- Good health
- Good education (mostly for their children)
2.2.2 Technology in traditional Thai society

A society is technologically modernised to the extent that it employs tools and inanimate power sources. Power resources include every thing from gravity, wind, and water to electricity, stream, fuel machine, and nuclear energy. Tools run the gamut from primitive digging sticks to modern electronic computers. All societies make use of some tools and some inanimate power sources; yet it is obvious that the differences between those used by primitive, archaic, historic, and modern societies - and the ways in which they are used - are great.

Most of work in every sector in traditional Thai society depend on man and animal power with simple local technology. As an agricultural society, Thai farmers use both animated power -human and cattle power, and inanimate power -gravity, wind and water for the power resources in their fields. They use cattle to prepare the ground for plantation, human power and the simple scientific principle for seeding, watering the plant, and harvesting. The traditional water irrigation use only the fundamental knowledge about the land slope and the wind power. All home industries in traditional Thai society such as eareware and textile productions mostly use the family member's power with the primitive mechanic tools. For transportation, they mostly use the cattle power resources. In conclusion, the previous life styles of Thai rural people are closely related with natural resources.

Traditional Thai technologies usually have developed from indigenous knowledge in rural village. The indigenous knowledge or some time we called "Thai wisdom", or in some places "community wisdom". Thai wisdom is the knowledge of the Thai people, has evolved only in the past, culture and development. The holistic nature of indigenous knowledge brings to an awareness that most of the time indigenous technical knowledge always accompanied with some kind of knowledge about social organisation and beliefs. Because of the intimate relationship between culture and indigenous knowledge, the investigation on the activities related to indigenous knowledge in Thailand will be broader than the discovering of indigenous technical knowledge.
Buddhism is most frequently mentioned as a reference to Thai thinking and way of life. An attempt has been made to understand how Thai society is constructed by interpreting the concept of cosmology in Buddhism which deals with the concept of social hierarchy and classes. Buddhist monks are also beginning to have a greater role in reinterpreting Buddhist philosophy in the changing society. Buddhadasa Bhikkhu, who is widely accepted by Thai social scientists as a model of a Thai indigenous thinker, has added a new image to the Buddhist institution and ethics in Thailand.

At present, Buddhism, despite having high potential with reference to Thai knowledge, is not the only pattern of life in the village. Instead, Buddhism is combined with other parts of the community. The awareness of Buddhist ethics, village institutions and community culture as such has influenced the approach to community development at a certain level.

Information on indigenous technical knowledge is not as rich as those related to social organisations. In Thai society as well as other traditional societies, low levels of material development clearly indicates that indigenous technology has not been developed beyond subsistence level. Although it is believed that farmers have a certain set of knowledge about their environments, that knowledge has hardly been revealed, analysed, validated and made up-to-date.

In Thailand the traditional agricultural knowledge has not gained as much attention as appropriate technology which emphasises more on indigenous learning than technical indigenous knowledge. It is unfortunate to find that not many community development workers have some educational background on technology. As a result, community development works do not also integrate the aspect of technological development.

2.2.3 Relationship between technology and culture

There is a relationship between technical knowledge and social system, for example an irrigation and a resource management in the northern of Thailand. The northern traditional irrigation system is a distinguish indigenous knowledge. The introduction of new technology has been done without a recognition of the traditional system of
technology. Therefore, it is quite often found that the interface between new and traditional knowledge does not always compromise. This northern traditional irrigation system is now facing the problem of adaptation. Some communities are losing it due to the replacement of new technology, despite its ultimate benefit in water and resource management. The situation of re-introducing traditional irrigation system is at the very beginning of investigation. The concern is how this kind of system can be adapted to be more suitable in the changing socio-economic situations.

At present, the effect of technology on culture has been far and wide in all countries. In the past movies and television programs had the greatest inspiration on every life. However, their influences were easily curtailed since it is the government who chooses what the general public should hear or see.

The progress in technology has changed all that. Among all means, satellite broadcasting seems to possess the highest potential impact on cultural transfer among countries or even within the same country. In Thailand, almost every house in rural communities has a television set. People in our rural societies began demanding merchandise that they saw during television programs. The western culture from television programs such as music, movies, game show, news, and even commercial programs all affect Thai culture. Those outside cultures from a far away country or provinces could change attitude of our rural people toward living styles, standard of living, family and social activities, and the ways to work. One may argue whether direct broadcast satellite (DBS) reception should be allowed. But one has to accept the fact that all the countries in the world are moving closer and closer together. The "cultural flow" seems to be inevitable and difficult to avoid.

2.2.4 Causes of change to technology

Thailand's economic growth since the late 1980s has been impressive. As stated previously the country is also in a state of transition from a traditionally agro-based economy to a more industrially oriented one. Throughout Thailand's industrial development, there has been a strong reliance on imported technology. Few firms have managed to raise their performance levels to international standards and to carry out significant improvements to their products and production systems. A large
number of firms remain technologically static even though they have been operating for many years (Chantramonklasri, 1986). In many large Thai and joint-venture firms, the innovative capabilities are still very weak (TDRI, 1992). At the same time, the industrial sector as a whole has not developed into a coherent production structure, but has become an agglomeration of largely independent “islands” of manufacturing companies with no strong linkages between them or to other sectors of production. Except for some exports produced by foreign or joint-venture firms, most of the country’s industrial products are not technologically sophisticated.

This situation suggests that, unless the country manages to upgrade and strengthen its industry, its chances of becoming internationally competitive are limited. Further compounded by the fact that at present there are new market economies with much lower wages and more abundant natural resources, Thailand’s traditional comparative advantages in terms of labour and resources may be rapidly eroded. As developed countries move toward more modern and automated production and make significant advances in new materials, certain exports from Thailand will become less competitive, and hence the survival of some industries may be at risk. It is possible that without substantial efforts to develop indigenous capability in science and technology to support industrial development, Thailand may even face a major economic and social crisis in the near future.

2.2.5 Thai society today

The ease with which cultural technological and economic changes can be made in a culture depends to some extent on the nature of the culture. Traditional cultures were often process-based. The processes of interaction and change were more important than the specific outcomes. Many high-technology cultures seem to focus much more on the outcomes. Manufacturing economies are based on outcomes - products of some kind. Thai culture has elements of both cultural forms.

In order for Thailand to turn the economic expansion into an industrial driven economic, it must overcome constraints in several areas, namely infrastructure requirements, and saving-investment gaps, since the share of fixed investment in GDP will rise sharply in the industrial take-off phase. Thailand’s comparative advantage in
labour-intensive light manufacturing has been eroding at the same time as Indonesia and China are rapidly moving into those products. The ability of Thai manufacturers to increase their technological capacities to upgrade industrial structure is an important challenge. Lastly for the Thai economy to compete successfully in the 1990s, Thai industries need to gain competitiveness in the products that have higher skill content. Therefore, it is most urgent that the Thai government strengthen secondary school programs and encourage the private sector to provide vocational skill-specific training (TDRI, 1992).

Over time, advances in technology and their utilisation have revolutionised many services to the great benefit of consumers such as teleworking, telebanking, telehealthcare, home entertainment and even self-education and self-training or tele-education at home, irrespective of where one lives (TDRI, 1992). Office-automations and factory-automations with the use of diverse computer applications and robotics are going to relieve humans from many of the repetitive and even dangerous types of work, so that workers can spend more time on the more interesting and more challenging tasks, or that there will be more free time for people to learn and advance their intelligence or more time for leisure, for social activities, and for cultural enrichment (Dede, 1996). All these possibilities and opportunities are real and varied. With the realisation of future wireless communications networks the need for cities will diminish. A person may choose to live anywhere and still be able to work, learn and play with other people anywhere else.

But even without an advanced technology infrastructure as in many present day societies, the plain old telephone system improves the quality of life through its ability to overcome some of the disadvantages of distance. Telecommunications are primarily a means of reducing the cost of time and travel. Hudson (1981), among others, assert that the social benefits from improved quality of rural life are even more profound. To be able to keep in touch with friends and family, to order supplies from the city, and to get help in emergencies can help overcoming the disadvantages of rural isolation.

Overall, Thailand’s educational system is in a respectable condition. It needs to be reshaped or reformed somewhat to prepare for the country’s entry into the 21st
century on a sound footing. A closer match is needed between the output of the educational system and the needs towards greater industrialisation, calling for the promotion of science education at both secondary and higher education levels.

2.2.6 National character of Thais

Kornin (1990) studied patterns of Thai values and behaviours. She typified some of these values and behaviours as follows:

2.2.6.1. Ego orientation. Thai people are ego-oriented. They think of themselves as being independent and have high self-esteem. They do not easily tolerate any violation of the ego. Despite the cool and calm front, they can be easily provoked to strong emotional reactions, if the self or anybody close to the self likes one’s father or mother is insulted. This ego orientation is the root value underlying various key values of the Thai people such as face-saving, avoidance of criticism and a considerate attitude. Face is identical with ego and is very sensitive. Since Thais place tremendous emphasis on face and ego, preserving one another’s ego is the basic rule of all Thai interactions. This character make Thai weak in group-working which is important for industrialising the society.

2.2.6.2. Grateful relationship orientation. This value is highly valued. It is seen in “bunkhun”. Bunkhun is a psychological bond between someone who, out of kindness, helps another person, and another person who ready to return the kindness. Reciprocity of kindness, particularly the value of being grateful is a highly valued trait in Thai society. Thais have been socialised to value this grateful quality in a person.

2.2.6.3. Responsive to situations and opportunities. This character is an important element in process of “social smoothing”. This characteristic has perhaps been interpreted as unpredictable, non-committal, irresponsible, or even selfish and opportunistic. However, Thais prefer to describe themselves as flexible rather than truly honest. Because of this value, it is not surprising to find decision shifting behaviours such as vote-switching, position-switching or even switching of principles. This flexibility in response to new technology is evident in development processes.
But, on the other hand, it is often an obstruction to development because it often leads to short time, speculative, interest.

2.2.6.4. Fun-pleasure orientation. Thai people tend to characterise themselves as easy-going. They enjoy everyday routines and the pleasures of life, not letting troubles touch them easily. They view life as something to be enjoyed not endured. They would not do any thing that is not “sanuk” (to enjoy oneself and have a good time). They are easily bored, because repetitive activities are not “sanuk”. Therefore, they lack serious commitment, particularly to hard work. If this really is the case it would not facilitate the development of an industrial society.

It does seem that the Thai character is a factor that makes the change to an industrial society slower than in other countries. Nevertheless, the flexibility of the Thais helps them to adapt to new technology. It is interesting that Japanese managers apparently think that Thai workers are more patient than Japanese workers are (TDRI, 1992).

2.3 Thai schools

Education in Thailand is mainly a government function. Three government ministries, the Office of the Prime Minister, the Office of University Affairs, and the Ministry of Education, administer Thai education. The Office of University Affairs co-ordinates higher education institutions and the government. The Ministry of Education is responsible for elementary and secondary school education and, mostly, the teacher and vocational technical education. The National Education Commission, under the Office of the Prime Minister, is responsible for the Educational Development Plan (UNESCO, 1984).

2.3.1 Change in Thai schools

Thai people are anxious about our schools. Will young people be prepared for the demands of the future? Will they get jobs when they graduate? Graduates find that a college degree is no guarantee of gainful employment or a future as lucrative as their parents’. One challenge for schools is to prepare students with the technological skills
that businesses need and give young people the thinking skills for a new kind of workplace. Yet when technology is put into schools, it is thought that just putting it there means it will be used (Balajthy, 1991). More than ten years ago, computers had been put into classrooms and found that they became drill machines and were used as rewards for good behaviour. Now, teachers want to implement networking and hold their collective breath that it will be used well. However, a key to ensuring effective use is the knowledge of the person at the front of the room. But how can teachers be encouraged to use technology well? When teachers believe that technology addresses a need, solves a problem, makes life easier, or offers information they can't get otherwise (or as easily), they will use it. When it is easy to use (really easy), they will use it. How do Thai schools get the critical mass of teachers to give technology a chance in their classroom?

The answer lies in improving professional development. To begin with, they can't develop something that doesn't exist, and schools don't encourage teachers to be professionals: to read professional literature; to collaborate with colleagues who teach the same grade, subject, or students; or to think of themselves as professionals. They still offer the same one-day workshops and quick inservice courses (Hargreaves, 1994). So what should be done instead?

As teachers have learned that education is strongly influenced by currently prevailing economic, political, social, demographic, and technological forces. However, they must remember that education also plays an important role in shaping the world of tomorrow (Talisayon, 1983). There are some likely changes that have occurred in Thai schools and in teaching during the past five years.

The use of computers and related microtechnology in education continues to accelerate, and students, from elementary through graduate school, feel the impact of this trend (Talisayon, 1989). This technological revolution has moved education beyond the classroom walls, as students increasingly determine how, when, where, and what they learn.

While the school curriculum still place great emphasis on the basics of reading, writing, mathematics, and oral communication, the curriculum has been
reconceptualised to include the basic skills necessary for survival on an increasingly crowded planet: problem solving, human relations, creative thinking, and critical thinking (NEC, 1993).

Preparation for lifelong learning or self-education has increasingly been seen as the central purpose of schools. Career changes are the norm, and continuing education throughout one's lifetime will be necessary. As Thai's population becomes older, more and more people will look to education to help them make the transition from fulfilling careers to fulfilling retirement.

Teaching has become increasingly professionalised through such changes as the following: more lengthy and rigorous professional training programs; salary increases to put teaching on a par with other professions requiring similar education; greater teacher autonomy and an expanded role for teachers in education policy-making; greater recognition for high-performing teachers and individual schools through such mechanisms as merit pay plans, master teacher programs, and career ladders; and improvements in working conditions that contribute to teacher stress and burnout.

In an attempt to design schools so that are more responsive to students' needs in the information age, bold innovations in how schools are structured and how teachers teach will be implemented. The need for well-educated, skilled workers will result in new alliances between businesses and schools.

The teacher educator of the future will have extensive experience with such topics as brain development chemistry, learning environment alternatives, cognitive and psychosomatic evaluation, and affective development. The teacher's role for the future schooling may be learning diagnostician, curriculum development agency, instruction designer, instructional media producer, self-access centre manager, or there is no role at all.

However, to acquire the knowledge and skills necessary to meet the complex challenges of the future, one must become a thoroughly professional teacher. Such a teacher has a firm grasp of subject matter and is able to introduce students to the intellectual skills demanded for rigorous study of that discipline. The professional
teacher also has knowledge of child development theories and is continually alert for new, more powerful ways to analyse, with sensitivity and accuracy, the needs of students.

2.3.2 Computers in Thai Schools

Thailand appears to lag behind developed countries in its use of computers in the school system. Most teacher education programs in Thailand involve some learning or teaching about computers rather than teaching with computers or computer applications in education (Talisayon, 1989). Thai educators need to recognise that they live in a global information society. Teachers need to be able to use computers efficiently and effectively so that they can maximise the time that spend actually facilitating learning. It would useful to have detailed information about issues such as the availability of computers in schools for teachers and students; what purposes computers are actually used for? how interested are teachers in adapting modern technology for instructional purposes? These questions provide the focus for a survey study which is designed to gather information about the perspectives of Thai educators toward computer use in their classrooms (see folio section 1).

2.3.3 Advantages and disadvantages of computer use

The use of computers in Thai schools is widespread and there is some evidence to suggest that this use has had a positive effect on the efficiency of teaching. Schools have found computers helpful as an additional instructional tool, to be used as one among many approaches. If current trends continue, computers will be used primarily for written communication and as a supplemental learning tool. These uses include word processing as a tool for written communication, computer literacy and computer science education to prepare for the use of computers in the world of work, drill and practice and tutorial instruction, and an entertaining reward-for getting assignments done on time or for good behaviour in school.

At the present rate of integration of computers into the schools, a small number of students in a few innovative schools will benefit extensively from computer-based
learning tools and systems. However, students in the vast majority of schools will remain unaffected and will be technologically uneducated. Bramble & Mason (1985) predicted a rather gloomy future for the use of computers in schools. One current and widespread practice that they strongly disagree with is the use of computers for game playing as a reward for good behaviour. According to Bramble & Mason, if current practices continue, relatively few schools will go beyond the use of computers in a supplementary role. Comprehensive computer-based integrated learning systems (providing diagnostic testing, tutoring, simulated learning scenarios, and continuous record keeping and progress reporting) will continue to be an expectation rather than a practice. The basic design of the educational delivery system will remain unchanged, but computer technology will help facilitate the traditional approach to education and instruction in some schools.

They predict that for the next five to ten years the use of computers will be fashionable, and all schools will provide some computer-based instruction to demonstrate that they are up to date and progressive. Teachers will continue to be exposed to many hours of in-service training on such topics as bits and bytes, computer literacy, word processing, and techniques for evaluating courseware. Eventually, however, interest in computers across the curriculum will wane and perhaps even disappear. As has been the case with slide projectors, film projectors, tape recorders, overhead projectors, and to some extent television, computers will be used more extensively at other levels of training, such as business and technical training. In schools, however, the daily pressures and demands faced by teachers will preempt attempts to use computers in any comprehensive and significant manner. As a result, the researcher believed that instead of additional and more creative uses of computers in classrooms, less and less attention will be given to these machines.

2.4 Professional development in Thai schools

The preliminary study about professional development for Thai teachers by the researcher in 1996, found that Thai teachers have positive perspectives and attitudes toward concepts, beliefs, and techniques about their professional development (see folio section 1). Although the Ministry of Education and the Khon Kaen Provincial
General Education Department encourages teachers to attend many conferences and inservice training programs for their professional development, there are many limitations that inhibit their developments. Teachers all agree and believe that professional development and telecommunication technology have close interaction with one another.

All interviewed teachers had quite the same concept about professional development for teachers. They believed that once an individual becomes certified to teach, the effort to continue learning often stops. This phenomenon seems to be due to the prevailing image of teaching as an easy occupation, than to any personal lack of initiative. For professional development, Ekachai, a male English teacher, describes the motivation of professional development as:

... A key source of motivation for professional development is the anticipation of being intellectually challenged in order to enter and then to function effectively in work place. ...

Since teaching has yet to gain a reputation as an intellectually rigorous field, those who enter it must take the initiative to continue to grow professionally. Because of this, new teachers need to overcome certain inertia. This phenomenon often occurs in schools as a teacher, Chudapa, describes:

... not only teachers who work for long periods of time possess the inertia, but also the new teachers who work for a short period of time.......about after a year or two, I think, start decreasing their activeness in their work ...

To deal with the above critical task, teachers gave their ideas of the processes and techniques that should be used for professional development as followed:

- To become a member of professional organisations.
- Subscribe to one or more professional journals.
- Doing further study or continued learning which can be promoted by
  - teachers selecting to use their free time to observe reputedly talented and effective teachers in their own school;
  - ask trusted colleagues to observe and critique their teaching;
- use the evaluative questionnaires to tap the students' perceptions about their teaching;
- reading books in education and related field by the experts;
- attending conferences and workshop to strengthen specific skills;
- attending the other resources providing by their school system and universities such as inservice programs, teacher centres, graduate study, and acting as the supervisor of student teachers.

- Doing research for their instructional development.
- Writing articles or papers in their own subject areas and sending them to be published in related academic journals.

In describing their beliefs about the essential knowledge and skills for being a professional teacher, Thai school teachers expressed beliefs quite similar to one another. As one teacher, Boutong, points out that:

... I believe that there are three types of knowledge essential for teachers: content, educational theory, and teaching skills. For the first type of knowledge, teachers need to be knowledgeable in fields both inside and outside of their specialisation if they are to be considered learned people and also in the opinions of those who regard teachers as transformative intellectuals. Without knowledge of content teachers cannot affect change in others or assist others to become change agents themselves. ...

... the educational theory is another factor which can be used for effective and appropriate instructional design for a specific group of students. Lack of this knowledge will cause problems in teaching and will effect students' achievements. ...

... being a poor teaching skilled teacher is very dangerous for being a teacher. Although, teachers learned a lot of educational theories if they cannot put them into practice, they cannot reach their teaching objectives.... students also cannot learn what teacher want them to learn...then, ...I think, the low achievement students will be still in our education system. ...

Another teacher, Damrong, gave more details about his belief about the knowledge and skills that are necessary for being a professional teacher and also that they are considered as the areas that should be included in the professional development program. He explained that:
... with my experiences, I understand that being a good teacher is very complex and demanding. However, I believe that effective teachers use four kinds of knowledge, knowledge of self and students, subject matter, educational theory, and educational research, with highly developed teaching and interpersonal skills, to meet the challenges of the professional teachers. ...

From the viewpoint of a teacher who is also acting as a school administrator, he believed that apart from knowledge of content, research and instructional skills, the reflection and problem solving skill is another factor that will guide teacher to create optimum conditions for learning.

From the information above derived from Thai school teachers, it can be concluded that Thai teachers’ needs in their professional development are divided into two categories. They are essential knowledge and essential skills as shown in Figure 2.1. The essential knowledge includes knowledge of self and students, subject matter, educational theory, and educational research. The essential skills include reflection and problem solving skills, teaching skills, and interpersonal skills.

![Diagram of Thai Teachers' need for professional development](image)

Figure 2.1 Thai Teachers' need for professional development
2.5 Thai Teachers' expectations for professional development

The evidence of analysed information derived from the discussions described shows that most teachers expect to be a good teacher to continue working in their profession as they all express their awareness of the need for quality of education in Thai schools. They try to develop their work and that of their students to reach their education goals. They all agree that the teacher is one of the most important factors for the achievement of education. This teacher is a key factor in the efficiency of curriculum implementation. To keep education products meeting the social demand, they need to be reformed. And the key person to achieve this goal is the teacher. Thus, professional development is needed for improving teachers to be in the real world of education with the following specific skills:

1. Diagnose student needs and learning difficulties
2. Develop lesson plans that suit students
3. Motivate students and give them constant feedback about their learning
4. Negotiate interpersonal relations- teach conflict solution strategies and promote cooperative learning
5. Communicate with students, parents, and others
6. Utilise technological equipment
7. Judge appropriateness of instructional materials.

Although these specific skills are already included in the pre-service teacher training program, after working for a period of time, teachers need to refresh their knowledge and related skills to keep up with the change of subject matter and the advancements of science and technology. So Thai teachers expect to have an opportunity for their professional development especially in the necessary skills for using and implementing new technology in their work.

2.6 Teachers' needs for professional development

Interviewed teachers in the case study believed that every teacher needs to refresh his/her knowledge and skills to keep up with the change of subject matter and the
advancement of science and technology. They need to subscribe to one or more professional journals, read books in education and related field by the experts, attend conferences and workshops to strengthen specific skills, attend the other resources providing by their school system and universities, improve research skills, improve classroom and academic paper writing, establish teacher networks, publish their paper in an education journal, and consult with the outside experts for dealing with their education problems.

According to the above information, it is shown that teachers understand, that there are many activities they should attend for their professional development. They need to improve both essential knowledge and essential skills for being professional teachers. However, it is also found that teachers are faced with two difficulties, the lack of time and budget support for their professional development process. Thus, this information shows the relationship of teachers and professional development which could be drawn as a model shown in Figure 2.2.

All teachers' needs mentioned above are the necessary knowledge and skills for educational development. They need helping from outside experts to lead them to reach their need. Certainly, the Faculty of Education, Khon Kaen University is one institute that is ready to assist them. However, we need more collaborative work among other institutes concerned with education development.

2.7 The available supports in schools for professional development

In the researcher's preliminary study in 1996, Telecommunication Technology in Thai Schools (see page 240), it was found that each of five schools had at least two telephone lines, one fax machine, one satellite TV set, and more than twenty computers for computer courses and administrative work. The telephones and fax machines were mostly used for personal communication and administrative work.
The satellite TV was used for some courses. There was no modem in all five schools because teachers never use computer mediated communication (CMC) which is the method of using a computer for remote accessing to another computer unit via modem and telecommunication system. But they are interested in using CMC because they have no experience with this technology. All teachers can get a modem if it is possible to use CMC to access to a computer host. Apart from the technology for supporting professional development for teachers, budget support is another factor that could be a stimulus or inhibiting factor for teacher development. All five schools have little budget support for teachers to attend the conferences and workshops for their professional development. Thus it is possible to draw a model of the relationship
between the available supports for professional development and Thai school as shown in Figure 2.3.

![Diagram showing supports in Thai Schools](image)

Figure 2.3 The available supports in Thai Schools for professional development

2.8 The limitations of professional development for teachers

Although Thai teachers understand that there are many activities they should attend for their professional developments, they cannot participate in those activities. The major difficulties that inhibit professional development process are:

- Teachers' real working hours
- Extensive nonteaching tasks
- Working conditions
- Budget support for professional developments, and
- Low income

Almost every teacher interviewed by the researcher had similar ideas that overload of teachers' real working hours is one of the difficulties of professional development. Another inhibitor of professional development for teachers is the extensive nonteaching tasks which are time consuming. Teachers have to do this sort of work to present their professional discipline. They cannot reject this work because it is
considered that it is part of teachers’ work. Teachers have to spend more time on many associated nonteaching tasks. These time consuming tasks cause the lack of time for teachers to attend activities for their professional developments. They have no time to prepare a paper, to attend the conferences or workshops, and to attend the teachers’ clubs. So they lose their opportunities to extend and update their knowledge and experiences.

The inconvenient work conditions are also another reason that teacher have difficulty finding time for work and updating professional development. Because what they need to use for their work they have to find themselves or use their own. So many teachers neglect these strategies for improving their teaching.

There are many conferences organised by many academic institutes every year, especially during the summer period. Unfortunately, there are a few teachers who could attend these conferences because most Thai schools have too small a budget to support them. The majority of teachers in school have no chance to attend these valuable activities because they need more expenses for travelling, lodging, and the high conference fees. School administrators cannot find support for these high expenses.

The low income of Thai teachers is one of the significant factors that inhibit professional development for teachers. In discussions with teachers in all five schools, they all have the same idea that many teachers work in the tutorial schools after school hour to get extra income. Some teachers agree that doing this affects the image of a good teacher. As one teacher, Chawalit who works in a private tutorial school says:

... my students who attend my classes at one tutorial school in town think that they hire me to help them complete their courses. Because of this conception, some students do not show respect to me and also other teachers who work in tutorial school as me. They think it is business, it is not a school system, so it is not necessary to give respect to tutorial teachers. But I think such attitude exits mainly because of lack of ethics and poor moral standards in schools and family....
If there are many teachers who think so, it is very dangerous to Thai education and society do nothing about teachers' income. Certainly, we need to develop teacher quality, but firstly we should pay them more.

In conclusion, the main important limitations of professional development for teachers are the lack of time and budget support. It is educators' responsibility to deal with these problems. With the advanced technology and these limitations, the researcher thought an appropriate model for professional development program needed to be designed.

2.9 The reform of teachers

Education is the greatest power for human resource development and teachers are the essential factors which lead us to the desired goal of national education. The master plan for the present education development, the national scheme of education 1992, has advocated the reform of teachers and educational personnel training and development with focus on raising the standard of teachers' professionalism in terms of the teachers' ethics and academic skills as well as teacher's profession (Tunsiri, 1993). The National Education Commission (NEC) has thus started the Reform of Teachers and Educational Personnel Training and Development by appointing a sub-committee. The sub-committee prepared a report on the principles and strategies in the Reform of Teachers and Educational Personnel Training and Development. The report was approved by the Cabinet on December 14th, 1993 (Tunsiri, 1993). This report provides a conceptual framework for the implementation plans of the various departments concerned.

The National Scheme of Education 1992, serving as a general framework for educational management in the country, has a clear policy in reforming teachers training and developing in-service teachers. It aims at improving the people’s faith in the teaching profession, developing teachers conscience, raising the standard of both academic and professional abilities of teachers, and improving the status of the teaching profession (NEC, 1993). Changing the training procedure, continuously developing in-service teachers and educational personnel, as well as improving
welfare for educational personnel at all levels, and raising morale and security in the profession can carry this out.

2.9.1 The reform of teaching staff

In the reform of teaching staff, the NEC (1993) suggests the concept that teaching and learning methods at all levels of teacher training institutions should be changed in such a way that links teachers and students together, so that they are ready to adapt to the rapid change of knowledge and thoughts in the present and future. The teaching and learning should be interactive instead of the teachers provide-students receive approach.

In the reforming process, the NEC (1993) point out that further training and education should be done through various processes:

- intensive courses for teachers at all levels including education administrators in a continuing process with close cooperation between the Teacher Training Department and universities offering teacher training programs.

- curriculum management in the way which will make teachers realise the value and status gained through responsibilities in the society and the value of continuing developing oneself, resulting in continuing development among teachers without interruption from the change of administrators.

- education administrators should adjust and develop themselves before persuading teachers to join in the development process.

- recruiting staff of high calibre into the system. This can be done through transferring of staff among universities in Thailand and abroad creating a constructive movement leading to academic excellence.

- multiple effects of teacher reform process may be created at the level of key persons and then extend to most of the teaching staff in the system by selecting and providing opportunity for natural leaders rather than status leaders.

- seminars and workshops should be geared towards future development on the basis of understanding of the past and the present.
• the development of a training system should correspond with changes in information processing changes. It should facilitate the acquisition of information network systems in the globalise world.

• promotion of opportunities for teaching staff to acquire knowledge and broaden their perspectives concerning results in their work and their ways of thinking.

• the training of high-ranked administrators within the frameworks and principles to which the administrators can give support to staff development programmes which will be designed by teachers themselves.

• the development should be integrated with the culture of Thai teachers, that is, it will start within the groups that are ready to change or the active ones, and then let these staff gradually replacing the staff who don’t want to change. Radical changes may have negative results.

• promotion of visiting lecturers and/or staff from inside and outside the country in the form of exchanging programmes to stimulate movement, resulting in continuing staff development.

• the budget for staff development programmes should be adequate to run the programme effectively. The percentage of this budget in relation to the budget of teacher training should be clearly specified. And it should be continuously supported by the government.

2.9.2 In-service teacher development

For improving the in-service teacher development, the sub-committee (NEC, 1993) suggested that the budget should be provided with clearly defined objectives. The budget should be specified in percentages of the whole budget received. The supporting budget should be provided for specific professional associations such as mathematics, science, music, etc., to provide training for teacher members.

Regional teacher development centres should be set up to ensure that the training courses could be provided through out the year. Teacher training institutions, Rajabhat institutes and the faculty of education of the regional universities, should take part in teacher development centres and taking care of teachers on probation or induction status. Teachers in each subject area should be encouraged to form
specialised groups to develop themselves and provide training for each other. The expert teachers in the community should be identified to provide resources in training and set up learning networks. Sabbatical leave of staffs in universities should be modified to facilitate learning which can be used in in-service teacher development programmes. Schools, colleges and universities should closely collaborate in planning, implementing, and following-up the training programmes. Evaluation of quality and efficiency instruments should also be devised. Incentives for teachers to develop themselves should be encouraged. The criteria for teacher promotion should be related to the number of training courses which teachers have to undertake into consideration. Teachers should go for training courses at least once in 5 years or as agreed.

2.9.3 The formats of in-service training

The sub-committee also suggested the format of in-service training that should be established on two basic principles (NEC, 1993, p.24):

2.9.3.1 Objective-based in-service training

Objective-based in-service training which can be divided into three categories: (1) training courses to develop teachers’ efficiency, which can be the training in content and methodology according to subject area or increasing the efficiency of administration and service; (2) training courses to develop teachers’ capacities such as training for higher qualifications; (3) training courses to solve major national educational problems, such as training courses for solving the problem of low achievement certain subject area, or training courses to implement major educational policy.

2.9.3.2 Performance-based in-service training

Performance-based in-service training considering roles of trainers and trainees, can be divided into three categories: (1) expert-centred, trainers provide knowledge and experiences, trainees receive those knowledge and experiences; (2) media-centred, training with different kinds of media; (3) trainee-centred, emphasising on letting trainees perform with supports from trainers.
2.10 What would be helpful for Thai teachers?

To respond to teachers' needs and expectations, the Faculty of Education, Khon Kaen University, is a leader of education and pays more attention to the application of information technology in education development, and should take responsibility for this task. To cope with this situation the appropriate professional development for teachers program should be established in response to teachers' needs, the advantages of new technology, and the limitations of Thai teachers' professional development.

One of the appropriate technologies which may be used for professional development programs is telecommunication technology, in fact, computer mediated communication in the form of a personal computer bulletin board system (BBS) and/or the Internet should be used. The researcher's experiences in using the Internet, especially the World Wide Web (WWW), during his time as an EdD student for the last two years, has shown him that this technology could help teachers solve their limitations to professional development, especially the lack of time and budget support. This technology has many positive benefits for teachers such as:

1. Teachers can access a professional development program at anyplace and anytime they want to
2. They need not to travel to attend face to face conferences. By using the chat mode of the system, they can set up an interesting group for synchronous discussion about their interests
3. They need not to travel to see outside experts for academic counselling because they can use the email in the system for consultations
4. The BBS or Internet is the knowledge base that teachers can search and retrieve for their use, so they need not to go outside libraries for information searching and retrieving
5. The electronic journal set up in the BBS or WWW homepage is the place that teachers can publish their research and classroom papers.

(Anderson, 1994, p.9)

Moreover, on the basis of setting up the BBS or WWW homepage for this specific purpose, participating teachers in this program are encouraged to work together in a
collaborative way. Thus, they have the opportunity to improve their skills for working in groups as well as creating the teacher education network between schools in Khon Kaen which they would like to set up but there is no key person to initiate the network. If the Faculty of Education, Khon Kaen University, takes responsibility for this initiative, it will be very helpful for teachers. And lastly, it is also helpful for the Thai education development, especially in the northeast of Thailand.

2.11 Chapter summary

This chapter examined Thai society and education, with particular emphasis on professional development in Thai schools. This preliminary study showed that the effects of information technology changes Thai society and education. In addition, Thai school teachers face some limitations of their professional development. The NEC proposed the principles and strategies in the reform of teachers and educational personnel training and development, which was approved by the Thai Cabinet, to improve the standard of the teachers' professionalism in terms of the teachers' ethics and academic skills as well as teachers' profession. Furthermore, this chapter proposes that the lack of time and supporting budget for participating in the professional development program are the primary obstacles in professional development for teachers.

The next chapter explores some theories and practical applications of information technology, the virtual university, which could fill the gap of professional development for Thai teachers. As well it suggests an appropriate professional development model for Thai school teachers to improve themselves and Thai education.
CHAPTER 3

THE VIRTUAL UNIVERSITY AND PROFESSIONAL DEVELOPMENT FOR TEACHERS

3.1 Introduction

The purpose of this chapter is to present the advancement of information technology being used in universities, the virtual university, as well as further ideas about professional development models. By focusing on the merging of these two elements, the researcher was able to explore an appropriate professional development model which can be used for extending the opportunity to Thai teachers in their professional development. The literature and Internet sites discussed in this chapter were explored prior to the implementation of the research project to provide models for its development. More recent developments of Internet sites since 1998 have not been included in this review.

3.2 Technologies being used at the virtual university

A large number of virtual universities are already being developed by traditional universities. In addition, traditional universities often have long standing arrangements with institutions abroad to deliver courses. Many of these are now being carried out with the assistance of telecommunications technologies. The World Wide Web has spawned a huge pool of individual teachers delivering part or all of their courses via pages of resources and real and asynchronous communication systems. However, many traditional universities face many barriers to move to the virtual university (Mason, 1996):

- lack of appropriate staff training in order to teach with the new technologies;
- lack of an appropriate reward structure to attract staff to adopt new methods;
- lack of resources to fund the development of technology-based courses; and
a whole range of bureaucratic procedures, academic inflexibility and administrative inertia, which prevent a re-engineering of the institution.

The new educational providers have changed their roles and services to fill the undeniable demand for open, flexible, lifelong learning, corporate universities, virtual universities and organisations. Exploring the virtual university through the Internet, it was found that the current technologies for teaching and learning in the virtual university could be divided as follows:

- text based communication systems, including electronic mail, computer conferencing, real time chat systems;
- MUDS/MOO (Multi-user Object Oriented), and many uses of the World Wide Web for resource databases and communication;
- audio conferencing and audio extensions such as audiographics, and audio on the Internet;
- video conferencing, one way and two way, video on the Internet with products like CUSeeMe; and
- other visual media such as video clips on the web.

3.3 The virtual university: trends and strategies

Any institution offering virtual education needs to keep a balance between the cost of using a particular technology and the target students who will be able to access the course using that technology. Similarly, the educational value of using a technology has to be weighed against the quality of the course without technology. Appropriate strategic and implementation plans are needed for all virtual universities, and as a result policy makers for those institutions have to attempt to predict which of the trends will take hold and what their impact will be on the university. The prediction is not an easy task. Bill Gates of Microsoft, who has been the biggest financial winner to-date in the Information Age, explains:
The revolution in communication is just beginning. It will take place
er over several decades, and will be driven by new ‘applications’—new
tools, often meeting currently unforeseen needs. During the next few
years, major decisions will have to be made by governments,
companies, and individuals. (Gates, 1995: xii)

Changes are so fast and are of such a profound nature that they initiate several critical
questions about higher education. How can our universities evolve to survive and
flourish in such an uncertain world? How will faculty members as individuals in
society react to such extreme changes? Will they ignore the changes, while clinging to
what is familiar and attempting to return to a time when life was more predictable? To
achieve success our universities must evolve workable implementation plans for
Information Technology equipment, Information Technology training, and for
monitoring trends. Because we are entering an unknown landscape, we have to be
constantly alert and aware of movement, changes, threats, and the unknown. Today,
we require an understanding of our situation before we can transform traditional
learning and teaching models. There are some markers of the major trends and paths
to follow which could serve as guides through the unknown territory of the future. A
number of trends are emerging that are of outstanding significance: globalisation and
regionalisation, international marketing and trade, convergence, digitisation, the
World Wide Web, and intranets.

We can expect that the virtual university model will further intensify global
competition in the education market. Students will be able to access electronic course
materials through telecommunication technology from home, and use teleconferences
and listserves to collaborate on papers and projects across the world. In the future,
perhaps a measure of an university’s success will be the extent to which it can
provide virtual facilities.

3.3.1 International marketing. Marketing is a global trend in a world which is
becoming seamless. Borders have become increasingly fragile and hazy because of
the movement of information, goods, services, and capital at rates that have been
increasing more quickly than global production (Sprout, 1995). These changes have
forced business and industry in more countries to rapidly become more outward looking. The same forces are making universities change their focus. Greater telecommunications and transportation efficiencies reinforce this growth, since information and students from one country can be instantly transmitted to another. The dramatic decline in the cost, coupled with the dramatic improvement in the quality of international communications, has made a critical contribution to the advancement of the virtual university.

As the new technology spreads, one might think about what our society will look like twenty or thirty years from now on. Whatever it may look like, it will most certainly be interactive. Interactive meetings can be held online and documents can be jointly edited by persons across the world from each other. To prepare for the new reality, each university must start to learn how interactive communication differs from traditional communication, and determine how to use these differences to further their goals. The World Wide Web is a valuable place to gain that experience. However, the problems for individual countries in the field of interactive communication are greater and greater. The equipment and skills needed for the interactive communication via the Internet are economically out of the reach of less developed countries. The concern expressed in the electronic journal, G7 Live, published during the G7 Conference in 1995, is even more relevant today:

South Africa's Deputy President Thabo Mbeki, the only African invited to the event, urged the seven -- Britain, Canada, France, Germany, Italy, Japan and the United States -- not to exclude developing countries from their grand plan. "It's clear that bringing developing countries onto the information highway constitutes a colossal challenge, but we have to address this challenge if we are to promote economic growth," he told delegates (McEvoy, 1995).

The function of educators in third world countries will be to learn as much as possible about the trends in information technology, so that they can lobby the G7 nations for support for implementation in their home countries and so that they can inform their faculties of the most recent developments.
3.3.2 Convergence. Convergence is the name given to the merging of the entertainment, communications, and information industry into a single industry. It has major significance for the technology and telecommunication industry, and also for education institutions. To be prepared for the future educators must not only be familiar with and understand the consensus that experts have reached about convergence, but also they must see how these new trends will affect the higher education through communications. Experts believe that the convergence of the communications, information and entertainment industries will occur at a ever-quickening pace. Technological advances, market forces and a lessening of regulatory pressures will fuel this acceleration. Universities that do not want to be left behind should be putting significant time and effort into understanding the growth and significance of the World Wide Web. Many people believe that any educational institution that hesitates before it begins to reach out digitally will be too far behind to ever be effective. It will either fail or pay a premium for somebody else to come in and teach them how to do it correctly. Acadia University in Nova Scotia, Canada, has included a notebook computer in its tuition (Office of the Registrar, 1997). Each course will have its own Web site, with links, audiovisual materials, which are all interactive. This is a case showing how to implement information technology in higher education. Certainly, that institution is positioning itself to know what will work and what will not for the virtual university.

3.3.3 Digitisation. In the old communications and information transfer paradigm, the publisher, broadcaster, and instructor had total control over content, its delivery, the time of delivery, and to whom it was delivered. The consumer accepted what was placed in lecture notes, books, journals, magazines, newspapers, and other printed materials. With the digital model of information transfer, the publisher, broadcaster, and instructor will be the agency that develops and stores content on the server. The consumer or the user is the client. Students will be able to decide what they want and when. The student will be one who decides whether the information will be in text, audio, video, or multimedia form. As we have already learnt, digitisation has the effect of eliminating international borders, which is good from the point of view that it makes international marketing of universities easier. Unfortunately, it breaks down
national sovereignty over information entering the territory of a nation. Thus understanding how to effectively use this new tool interactively is going to be essential for all universities in the world. Universities that best understand the new rules of the market will profit most from the transition. Indeed those universities that take the time and effort to understand the changes will be the ones to reap the greatest benefit when these changes come to pass because they will be ready for them. Ayad (1996) suggests that:

Many universities will not be as successful because they are not following the trends and do not predict the right solutions. The potential losses to those universities that are not abreast of these changes could be devastating. In the past, technological advances were never embraced right away, and years would elapse before a major change was embraced wholly and wholeheartedly by a society. Although it is obvious that the acceptance of interactive digital technologies will be uneven, the rate of change in the world today dictates that it will be fast (Ayad, 1996: 95).

3.3.4 World Wide Web (WWW). The Internet will be a major force in digitisation. Today through the WWW, the Internet is easy to use and filled with readily accessible information in text, graphics, sounds, and video. Its interactivity, ease of use and ability to reach all part of the world ensure that it will continue to evolve. In some metamorphosed form it will continue to grow and become even more important (Ayad, 1996). Certainly, universities that become most familiar with the web and adept at integrating their courses, it will be the most successful.

3.3.5 The Intranet. The Intranet, a computer network within an institution, allows groups and employees to share information and collaborate on their work. The Intranet can allow employees or interesting groups to:

- use hypertext links to search for and access to text, graphics, audio, or video, all organised into colourful documents call home pages. At the most basic level, this means being able to easily find and read online internal documents such as policy manuals and phone books. Webs
also allow employees to call up internal data such as customer profiles and product inventory, information once hidden in databases that could be tapped only by technicians... Indeed, best of all, intranets connect the different types of computers on the network, be they PCs, Macs, or workstations... Furthermore, employees don’t have to worry about where the information is actually stored. Updating a spreadsheet that resides on a workstation in Hong Kong is almost as easy as working one on your desktop PC... The sensitive corporate data on intranets are protected from the outside world by software called firewalls (Sprout, 1995: 161-168).

As a result, it might be concluded that the WWW evolves within universities. Other organisations such as businesses, educational institutions, government agencies, and diplomatic missions will use the intranet to link internally. The capability of intranet tools is growing extremely fast. Cortese (1996), in her special report for Business Week elaborates:

More sophisticated intranets are coming. They will let employees fill out electronic forms, query corporate databases, or hold virtual conferences over private webs (Cortese, 1996: 79).

Organisations, including universities, will be able to choose which of their internal materials they wish to present to the outside world on the WWW, and which they wish to present internally on intranet. They will also choose how much information from the outside world that they want for their organisations. The implications of the intranet for universities and other organisations are immense. Use of the WWW is easy, so training costs are at a minimum. Intranets give individual members of an organisation instant access to the latest updated information, no matter where they are in the world. Universities will have to build their future development plans around the Internet and Intranet, because decisions regarding information, communication, relationships and all alliances will be determined by the new Digital Age paradigms.
3.4 The virtual university and professional development for teachers

The greater barrier to professional development too often is the classroom wall. Unlike professional in other fields, teachers' hectic schedules and working conditions seldom allow for thoughtful discussions with their peers in the next room, let alone colleagues within their own province or across the nation. As more universities and schools become wired for access to the Internet and telecommunication networks, and as the number of personal computers in schools and homes continues to grow, some promising new professional development programs are tapping into technology to provide teachers with a variety of electronic forums to discuss their classroom practices.

According to a recent survey, at least 1,200 partnerships have been established between schools and universities (Wilbur & Lambert, 1990). It might be useful to discuss current thinking and practice involving the use of information technology in collaborative projects between schools and universities. Most projects mainly concentrate on professional development for teachers via the university web pages or virtual universities. Many partnerships have been formed with the goal of infusing technology skills into the repertoire of classroom teachers. For example, Balajthy (1991) used a model of consultative consultation in which a team made up of a consultant from a college, a classroom teacher, and several teacher students worked together to create and implement lessons using technology. Kanapczyk (1991) used an audioraphic system and fax machines to deliver special education training.

Internet and WWW professional development resources are very plentiful at present, and they are growing in number and offerings. These resources generally fall into two categories: interactive structures, which are designed to promote collegial exchange and share information; and reference sites, which supply documents, announcements, and links to other sites.

The following WWW sites provide information on professional development and are examples of reference sites. Currently, the most extensive public access reference site is maintained by the Clinical Schools Clearinghouse (CSC), which also functions as the Adjunct ERIC Clearinghouse on Clinical Schools. Information includes:
professional development bibliographies, statistics, Internet resources, announcements, sample partnership agreements, and the professional development database data collection form. Links are given to text files on the clearinghouse's gopher site, which offers a list of CSC publications, a call for literature, and a statement of purpose. The web site provides links to other professional development-related Internet sites and addresses, as well as to full-text ERIC digests on professional development issues (http://www.aacte.org/menu2.html, June 1996).

The Regional Alliance Higher Education Reform Network maintains a public access web site, which posts professional development-related messages received by Alliance listservs. Messages thus far have ranged from short introductions to multi-page program descriptions (http://hub.terc.edu/ra/rns/cd-reform/postings/0423.html, August 1996).

Frequently searches of the WWW, using different search engines, turn up new Internet resources. In addition, Web sites frequently contain links to related Internet resources. Several universities in Australia have established partnership professional development projects via their web pages. The RICE project at Deakin University offers many interesting activities to schoolteachers and principles for their professional development. One of the projects is “RICE Curriculum Corporation Project - Using EdNA in the Curriculum: Teacher Professional Development on The Internet” (http://rice.cdn.deakin.edu.au/CurrCorp/Currcorp.html, 1998). This project was initiated by the Curriculum Corporation in cooperation with the National Schools Network, Australian Education Union and the Research in Computer Education Group, Deakin University. A successful application was made to the National Professional Development Project for funds to support this project. The aim of this project is to facilitate the use of the Internet in the primary and secondary school curriculum through the professional development of teachers. It is intended that the program of professional development for teachers be school based, and delivered totally on the World Wide Web, with the option of telephone, fax, and email communication. The focus of the content of the course will relate to the workplace, and attendance at the university will not be required. Teachers may enter the course at
any time and pace their own learning and involvement. Submission of final assessment will signify completion of the module. (RICE, 1998).

3.5 Communication technology and adult education

Communications technologies (CT) are developing at a rapid pace, carrying the potential to deliver education to more learners in more satisfactory ways. For adult educators, CT might overcome some of the barriers to student participation. Miller (1983) described some of these technologies and how they will influence education and the role of the educator. CT delivery modes include video (low-power, closed-circuit, and cable television; videotapes; interactive videodisks), audio and audiographic (audiocassettes; radio; electronic blackboards; telefacsimile; freeze-frame, slow-scan, or compressed video), and computer (electronic mail networks, bulletin boards, teletext, videotext). Integrated systems can link videodisks, compact disks (CD-ROM), and microcomputers with telecommunications devices such as satellites to allow the exchange of large amounts of information and interactive communication (Schamber, 1988).

Examples of CT uses in adult education include the following:

- The AgriData Network provides reports of news, markets, trends; collections of agriculture teaching plans; daily condensed listing of current agriculture news; and an electronic mail system. Developers plan to expand its use to adult evening classes (Reynolds, 1986).

- Instructional Television Fixed Service is used in the Silicon Valley to offer training to employees of computer companies. In the pilot project, stress management and chemical safety training were broadcast by Mission College in cooperation with the local Industry-Education Council. Off-campus sites committed $800 to the installation of receiving equipment (Rose and Capell, 1986).

- Ohio State University's Cooperative Extension Service uses microwave transmission to operate a TV classroom 15 hours per week. Average hourly cost for uplinking and satellite time is $846. Expenses are contained
by sharing costs of equipment, facilities, and personnel with research and instructional programs (Whiting, 1988).

- Electronic networks include AEDNET for adult educators, CAPS:HITECH for career counsellors, and ADVOCNET for adult and vocational educators (Schamber, 1988).

The variety of media and wide range of potential students prompt the questions: What is the best way to use a medium for a learning task? Is the way a medium is used more important than which medium is used? (Seaborne 1987). As with other forms of instructional technology, more research is needed about the effectiveness of CT. Norenberg and Lundblad (1987) offer matrices to aid in choosing technologies. One matrix examines learner, teacher, and instructional considerations for print, audio, audiographic, video, and computer technologies; the other compares costs. They suggest that the choice of medium be based on such factors as objectives, cost, personnel, users, anticipated use, level of interactivity, legal barriers, compatibility, and jurisdiction. Some findings are summarised as follows:

- At the University of Victoria (British Columbia), evaluation of continuing education telelectures found that instructors covered too much material, students were inhibited from interacting because of the broadcast format, and despite the potential of the medium, the presentation remained more verbal than visual (Collins and Murphy 1987).

- The teleconferencing experience at the University of Georgia's (1987) Division of Vocational Education prompted the following recommendations: (1) make instruction "high touch" and interactive, for example, demonstrations replicable by students at remote sites; (2) prepare students in advance with materials and agenda; and (3) remember that teleconferencing is different from face-to-face instruction and need not imitate it.

- The Ontario Institute for Studies in Education's computer conferencing system enables students to access adult education courses through their personal computers at any time of the day. Assignments, discussion comments, and requests for library materials can be sent online. Problems were encountered in accessing the system, understanding the instruction
sheets, and uploading or downloading materials. Participants expressed satisfaction with the convenience, the relationship of the course to the required readings, the quality of interaction with the instructor, and the sense of community among the students (Seaborne, 1987).

The examples given here illustrate some of the advantages and disadvantages of using CT. On the positive side, CT can increase access to learning opportunities, especially for learners in distant, isolated areas possibly lacking subject experts or for learners with limited physical mobility. It can increase access to more and better information resources, be individualised to meet student needs, and enhance the immediacy of inservice training while saving time and money. On the other hand, Zucker (1986) argues that CT can isolate students, undercut local autonomy and instructor control, reduce diversity and pluralism, and make students passive recipients of overstructured packets of knowledge. The capacity for greater interactivity in today's technology may have the potential to overcome some of these problems (Niemi and Gooler, 1987).

Many researchers suggest other concerns about the effects of CT include the following:

**Equity of Access**
- Are there "information haves and have-nots"? Are there gender differences in technology use? Who controls access and decides what types of instruction will be made available (Niemi and Gooler, 1987)?

**Ethics**
- How will competition and duplication of course offerings across geographical boundaries be resolved (Dean, 1986)?

**Quality of Instruction**
- Do all subjects work well in these formats? Will traditional instructional design methods remain effective? Does the design allow students to take responsibility for learning? How does the functioning of hardware and
software affect the choice of instructional technique (Niemi and Gooler, 1987)?

**Effect On Learning**

- How does technology alter the speed at which learning takes place? Does it affect the age targeting of educational institutions and the sequential organisation of curriculum? How does it alter the context of learning? What effect does it have on the topical organisation of instruction? What new skills or cognitive abilities are needed to use it (Fasano, 1986)?

**Learning Styles**

- How can differences in learning styles and strategies be accommodated in a manageable instructional delivery system (Niemi and Gooler, 1987)? Can cognitive styles be matched to appropriate methods of presentation (Collins and Murphy, 1987)?

The changing technological workplace, telecommuting, global competition, lifelong cycles of education, training, and work are some of the challenges facing adult educators. Because today’s people tend to take technology for granted, living in ever more high-tech electronic households, an enormous potential market exists for education delivered by means of communications technologies. Educators can take advantage of this opportunity by letting the machines do what machines do best and continuing to do what they do best: design instruction, manage learning, and motivate human beings to learn.

**3.6 Information technology and distance education**

The development of distance education has generally paralleled the development of technology. In fact, over the past twenty years, it has been one of the few areas in education where technology has been central to teaching task. However, familiar delivery systems such as telephone, radio, and television are rapidly changing with the addition of fiber optics, wide area networks, the World Wide Web (WWW), and a variety of other computer technologies. Distance learning students now can receive
assignments, take tests, and interact electronically with their instructor and classmates. Distance educators can now deliver instruction through one-way and two-way satellite video conferencing and computer telecommunication tools such as electronic mail, electronic bulletin boards, chats, computer conferences, and mailing lists called Listservs. Courseware can also be delivered all over the world with hyperlinks to documents, graphics files, sound files, and digital movies through the WWW.

Perhaps more than any other distance media, the Internet and the Web help overcome the barriers of time and space in teaching and learning. Educational uses of the Internet are burgeoning. The University of Wisconsin-Extension's Distance Education Clearinghouse lists numerous institutions offering online instruction and corporate training is featured on AT&T's Centre for Excellence in Distance Learning website. INTERNET WORLD's October 1995 issue gave examples of "The Internet in Education," including online degree programs offered by traditional institutions such as Penn State and Indiana University as well as nontraditional entities such as University Online and the Global Network Academy. Distance Learning on the Internet usually takes one of the following forms (Wulf, 1996): (1) electronic mail (delivery of course materials, sending in assignments, getting/giving feedback, using a course listserv, i.e., electronic discussion group); (2) bulletin boards/newsgroups for discussion of special topics; (3) downloading of course materials or tutorials; (4) interactive tutorials on the Web; (5) real-time, interactive conferencing using MOO (Multiuser Object Oriented) systems or Internet Relay Chat; (6) "intranets," corporate websites protected from outside access that distribute training for employees; and (7) informatics, the use of online databases, library catalogs, and gopher and websites to acquire information and pursue research related to study.

Examples of the use of these modes include the following. High school students with disabilities in Project DO-IT (Disabilities, Opportunities, Internetworking, Technology) connect with the University of Washington (UW) to receive instruction via e-mail, join worldwide discussion groups, and access online resources (Burgstahler, 1995). Also at UW, rehabilitation therapists learn about adaptive computer technology through videotapes and an Internet class discussion group (Burgstahler, 1995). The Distant Mentor project pairs workplace experts with school-
to-work "apprentices" online; they can also simulate work environments through desktop software with an audio channel connected through the Internet (Dede, 1996). At Carnegie-Mellon University, the Virtual Corporation simulates a work setting for business students (ibid.). A career counsellor offers group and individual online conferences, a listserv, and a database of resumes and resources for clients (Sherman, 1994). CUSeeMe software enables technology teacher education supervisors to observe student teachers using a desktop videoconference through the Internet (Agricultural Education, 1996).

Advantages of delivering distance learning on the Internet include the following (Bates, 1995; Eastmond, 1995; Wulf, 1996): (1) time and place flexibility; (2) potential to reach a global audience; (3) no concern about compatibility of computer equipment and operating systems; (4) quick development time, compared to videos and CD-ROMs; (5) easy updating of content, as well as archival capabilities; and (6) usually lower development and operating costs, compared to satellite broadcasting, for example. Carefully designed Internet courses can enhance interactivity between instructors and learners and among learners, which is a serious limitation of some Distance Learning formats. Equity is often mentioned as a benefit of online learning; the relative anonymity of computer communication has the potential to give voice to those reluctant to speak in face-to-face situations and to allow learner contributions to be judged on their own merit, unaffected by "any obvious visual cultural markers" (Bates, 1995, p.209). The medium also supports self-directed learning, as computer conferencing requires learner motivation, self-discipline, and responsibility.

As with any medium, there are disadvantages. At present, limited bandwidth (the capacity of the communications links) and slow modems hamper the delivery of sound, video, and graphics, although the technology is improving all the time. Reliance on learner initiative can be a drawback for those who prefer more structure. Learner success also depends on technical skills in computer operation and Internet navigation, as well as the ability to cope with technical difficulties. Information overload is also an issue; the volume of e-mail messages to read, reflect on, and respond to can be overwhelming, and the proliferation of databases and websites demands information management skills. Access to the Internet is still a problem for
some rural areas and people with disabilities. Social isolation can be a drawback, and the lack of nonviable cues can hinder communication. Although the Internet can promote active learning, some contend that, like television, it can breed passivity (Filipczak, 1995). The next section takes a closer look at distance learning processes.

Multimedia/hypermedia contexts such as the Web support constructivist approaches to learning, which are based on the belief that individuals construct their own understanding of the world as they acquire knowledge and reflect on experiences. Dede (1996) describes how carefully designed online learning can assist the construction of knowledge by showing learners the links among pieces of information and supporting individual learning styles.

When Wiesenber and Hutton (1995) conducted a continuing education program using computer conferencing, they found it necessitated two to three times more delivery time. Learners appreciated the convenience of asynchronous communication, but many were anxious about putting their written words "out there." The course was more democratic but less interactive than expected, and the instructors recommended giving learners a better orientation to the online learning environment, providing technical support, and fostering self-directed learning and learning-to-learn skills.

Eastmond (1995) highlights the ways that computer discussion both requires and facilitates learning-how-to-learn skills, such as locating and accessing information resources, organising information, conducting self-assessment, and collaborating. Adult learners in his study found the following strategies critical to success in electronic learning: becoming comfortable with the technology, determining how often to go online, dealing with textual ambiguity, processing information on or off line, seeking and giving feedback, and using one's learning style to personalise the course.

A common stereotype is "the loneliness of the long distance learner" (Eastmond, 1995, p.46). Learning at a distance can be both isolating and highly interactive, and electronic connectedness is a different kind of interaction than what takes place in traditional classrooms; some learners are not comfortable with it. Lack of non-verbal
cues can create misunderstanding, but communications protocols can be established and relationships among learners developed. Because humans are involved, social norms do develop in cyberspace, but they require new communications competencies (Eastmond, 1995). Online courses often feature consensus building and group projects, through which learners can develop skills in collaborating with distant colleagues and cooperating with diverse individuals. Such skills are increasingly needed in the global workplace (Dede, 1996).

Answering charges that computer learning environments cannot duplicate the community of the classroom, Cook (1995) argues that the assumption of a sense of community in traditional classrooms may be false, if community is defined as shared interests, not geographic space, electronic communities are possible. Wiesenborg and Hutton (1995) conclude that building a learning community is of critical importance to the creation of a successful virtual classroom. Dede (1996) agrees that "to succeed, distributed learning must balance virtual and direct interaction in sustaining communion among people" (p. 199).

Filipczak (1996) notes that distance learning on the Internet can be cheaper, faster, and usually more efficient than other learning modes, but not necessarily more effective. As Dede (1996) puts it, "access to data does not automatically expand students' knowledge; the availability of information does not intrinsically create an internal framework of ideas" (p. 199). To help learners make effective use of distance learning methods, skilled facilitation is essential. Rohfeld and Hiemstra (1995) suggest ways to overcome the challenges of the electronic classroom: (1) establish the tone early in the course; (2) to overcome the text-based nature of online discussion and to build group rapport and cohesion, introduce participants to each other, match them with partners, and assign group projects; (3) offer training and guidelines to help learners acquire technical competence and manage discussions; (4) provide a variety of activities, such as debates, polling, reflection, and critique; and (5) use learning contracts to establish goals for participation. The following strategies are intended to make distance learning more effective (Bates, 1995; Dede, 1996; Eastmond, 1995; Filipczak, 1995):
• Understand the technology's strengths and weaknesses
• Provide technical training and orientation
• Plan for technical failures and ensure access to technical support
• Foster learning-to-learn, self-directed learning, and critical reflection skills
• Develop information management skills to assist learners in selection and critical assessment
• Mix modes—e.g., combine e-mail discussion with audio/video methods to enhance the social aspect
• Structure learner-centred activities for both independent and group work that foster interaction

In conclusion, the word is still with us. The way it is transmitted and received is changing. Educators can play a role in the development of a "vital form of literacy" (Dede, 1996, p.200): the transformation of information into knowledge. The choices they make can also help determine which of these possibilities come to pass: (1) distance technologies as an add-on to existing institutions; (2) "knowledge in a box," impersonal, individualised, and socially isolating; or (3) a networked learning society that keeps human relationships at the centre of learning (Bates, 1995).

The literature about information technology and distance education suggested that the Internet could be used for courseware delivery in a professional development program. As we approach the 21st Century, taking a course of tele-training over the Internet is one way to keep current not only with education profession, but also with new technologies.

3.7 Professional development of teachers

Different from most professionals, teachers have traditionally had no time built into their work schedules for their own professional development. Most teachers spend the entire workday with their students, with little time left for collective reflection, refinement, or even discussion with their colleagues or superiors. Consider such important workplace concepts as teamwork, networks, shared resources, mentorship,
mutual respect, trust, competition (Liberman, 1998). How can teachers improve without opportunities for collaboration? And how can schools improve without teachers improving?

Schools are only as good as their teachers, regardless of how high their standards, how up-to-date their technology, or how innovative their programs. But if teachers aren’t given adequate opportunities to learn, they may have little chance of meeting the ever-increasing demands placed upon them (Hargreaves, 1994). For this reason, professional development for teachers is increasingly considered a critical component of improving schools.

Teacher networks and school-university collaborations are helping spur new ways of thinking about professional development. And teachers’ unions are starting to play a vital role in advocating and providing for their members’ continued learning (Wilbur & Lambert, 1990). The Internet, with its capacity for creating connections and sharing resources, may hold great promise as well.

3.7.1 Reform of teachers in Thailand

The current education reform in Thailand was launched by the Ministry of Education since 1996. Existing operational approaches are being revised and amended with the view to mitigating of eliminating problems and enhancing the quality of education until educational excellence is achieved in the year 2007 (Ministry of Education, 1997).

The goal of education reform is to realise the potential of Thai people to develop themselves for a better quality of life and to develop the nation for peaceful co-existence in the world community.

The objectives of the education reform are to create learning individuals, organisations and society. An educated person or the authentic learning outcome should possess the following abilities and characteristics which are based on Thai cultural heritage and appropriate level of education: good physical and mental health,
critical thinking, intellectual inquisitiveness, professionalism, sense of responsibility, honesty, self-sacrifice, perseverance, team spirit, adherence to democracy, and love for king, country and religion.

The education reform will be conducted in 4 areas:

1. school reform;
2. teacher reform;
3. curriculum reform;
4. administrative reform.

For teacher reform, the production, recruitment and development of teachers will be reformed urgently and comprehensively both in public and private schools. Educational administrators and personnel will be developed continuously by:

- Building awareness and professionalism in teaching, school administrators and personnel.

- Emphasising performance efficiency of authentic learning outcome in evaluating teachers of their promotion, development of teaching/learning activities.

- Providing training and skills development opportunities to every teacher continuously and comprehensively with the view to keeping them abreast with social and technological changes. A teacher should undergo some form of training at least once every two years. The training could be given by the Ministry of Education, and/or departments concerned, and training institutions, both public and private which are accredited, as well as by means of distance training. Participation in conferences, seminars and every form of self-development must be regarded as teachers' duties, to be assessed as part of their performance.

- Encouraging teachers to choose of develop lesson plans that suit learners and enable them to create and develop their learning in a truly life-long fashion.

- Allowing teachers under the jurisdiction of the Ministry of Education to teach with extra remuneration in more than a single educational
institution belonging to their own department or to others. This extra teaching will be subject to their superior's consent and to be considered part of their performance. Recruitment of new teachers must take into account their past experience in salary determination.

- Creating job descriptions and opportunities for local intellectual leaders, teachers/experts from the private and public sectors, as well as retired officials, to teach with appropriate remuneration in educational institutions under the Ministry of Education.

- Addressing the problem of teacher shortage by recruiting and appointing teachers to fill every available post as specified in the work-force plan of each educational institution which should be responsible for its own selection procedures and appointment of teachers according to ministerial rules and conditions, and should refrain from appointing teachers from private schools during an academic year. The teaching force should be proportionally and evenly distributed and the number of teachers on secondment minimised. Teachers who give instruction in subjects that lack qualified teachers will be given extra remuneration. Post-secondary institutions which are prepared to offer these much-in-demand subjects will be encouraged to extend to Bachelor's degree level.

- Restructuring the job description of teachers in Ministry of Education schools and educational institutions in order to separate the career ladder of teachers from that of administrators under a clearly specified career pattern of each category. However, teachers must be able to advance up the career ladder though their own performances and achievements as teachers. Both teachers and administrators will be provided with manuals for their professional practices.

- Standardising the teaching profession through the efforts of the Teacher Institute, the Teacher Civil service Commission and teacher-training institutions. Relevant legislation will be amended while the teaching profession will be developed through the issuance of teachers' licenses.

- Reforming the welfare and social securities for teachers of all types and jurisdictions with the view to raising their quality of life, boosting their morale and strengthening their job security. Teachers' salary structure
and welfare benefits will be improved, while teachers working in remote and underserved areas and those who take on an extra number of classes will be promoted and supported.

- Developing the selection system and admission mechanism of students to teacher-training institutions as well as developing the curriculum and teaching/learning process for teacher production, including teachers who can teach several subjects and those who teach major subjects with emphasis on practical aspects. The final product of teacher training will be a teacher of moral integrity who is equipped with analytical and synthetical skills and abilities.

- Stepping up the development of educational administrators by broadening their horizons, increasing their knowledge, their administrative and managerial skills, thus enabling them to develop quality schools and educational institutions in keeping with future changes.

- Encouraging teamwork among supervisors of all agencies who should join forces in supervising and monitoring academic and technical activities of educational institutions under every agency.

( Ministry of Education, 1997)

To reach the goal of education reform, Khurusapha, the Teachers Council of Thailand, developed the standards on teaching profession as a frame for teacher development. They are:

Standard 1: Being an active and productive member of teaching professional organisations. Professional teachers continually make their contribution to the betterment of all members. They belong to one or more of the teaching profession organisations. The ultimate contribution is producing knowledge especially on best practice in teaching. Usually classroom researches are conducted and the findings are reported, preferably in professional seminars or conventions. Professional teachers also serve as resource persons in various capacities.

Standard 2: Judging all practices on the learners' benefit. Professional teachers always make wise decisions with firm orientation toward learners' benefit. They express best
wishes and positive regards for the welfare of the learners, taking learners' needs and interest into consideration. In selecting any practice, professional teachers have to judge in terms of good effect on the learners with their own positive intention.

Standard 3: Aiming at learners' optimum development. Professional teachers set their teaching goal on well rounded learners' development. Considering the learner as a developing identity, teaching has to enhance physical, intellectual, social and emotional development, Spiritual and moral development have to be the aim of total development so that the learners always express balanced and adequate personality. Systematic practice on learners' potential assessment, responsive teaching and continuous improvement must be definitely assured. Individual progress monitoring is the most desirable practice.

Standard 4: Developing effective lesson plans in bringing about empirical learning outcomes. Professional teachers develop their own lesson plans with clear evidence of best instructional practices. The plans indicate critical learning activities for specified learning objectives. It is assured if the plans are utilised properly the learning activities will bring about desirable learning outcomes. The effective lesson plans also take resources and constraints of the schools and the learners into consideration.

Standard 5: Developing efficient and innovative learning materials responsive to learners' needs. Professional teachers develop their own learning materials. Various kinds of learning materials will be available for learners with different levels of learning capability, various learning styles, and individual interest. Good learning materials emphasise learning process, learners' hands-on experiences and using of local materials. It should be noted that innovation of instruction must be clearly seen in these learning materials.

Standard 6: Practising best instructional practices for learners' latent development. Professional teachers always emphasise human development in their teaching. Character development is a final outcome of learning. Habit formation, spiritual, moral and personality development must be aiming at in all learning activities.
Learners should be empowered to be able to construct knowledge, create strategic plan, and to anticipate future changes by making appropriate adjustment.

Standard 7: Presenting systematic reports on learners' development basing on objective and authentic measures. Professional teachers express their academic vision through a systematic report on learners' real learning needs, priority of needs, innovation responsive to real needs, evidence of learners' progress and intention of further improvement. Professional teachers always construct new knowledge through these procedures, adding effective best instructional practices into their innovation file for future use and dissemination to other teachers.

Standard 8: Being a good behavioural model for learners. Professional teachers conduct their day-by-day doing in such a way that their behaviour can be cherished by the learners. Professional teachers should be a human model for learners therefore, they must uphold all codes of ethical conduct that are necessary and essential in human modelling and moral education.

Standard 9: Being a cooperative and productive member in school. Professional teachers contribute to advancement of their organisation. They work cooperatively and productively with their colleagues, other teachers and school administrators for the benefit of the learners and the institutions so that the schools can become a learning organisation.

Standard 10: Being a cooperative and productive member in community. Professional teachers make their contribution to society and community around the schools. They take an active role in the society, working cooperatively and productively with all community workers so that the communities can become a learning society.

Standard 11: Being a competent member in informative and learning society. Professional teachers always look for ways and means in improving their practices. They are learning individuals who always follow world events. They are capable of
utilising information for new development and new practice. New knowledge is always acquired and utilised in new best instructional practices.

These standards of the teaching profession remind the researcher to rethink the framework of professional development programs—which could assist teachers reach these standards.

3.7.2 Professional development model for Thai teachers

In order to be of greater value to teachers and students, inservice professional development must be reconceptualised. Rather than seeing each stage of a teacher's professional life as distinct and separate, a more holistic view of the development of teacher from novice to advanced practitioner is needed. In order to establish a rich learning environment for teachers throughout their careers, a number of prevailing concepts must be abandoned. Smylie and Conyers (1991) suggest that we must recast inservice programs to reflect the following paradigm shifts:

From deficit-based to competency-based approaches in which teachers' knowledge, skills, and experiences are considered assets. Professional development organised according to this approach will, in Smylie and Conyers' view, shift teachers away from dependency on external sources for the solution to their problems and toward professional growth and self-reliance in instructional decision making. This concept has emerged as crucial in initial teacher education as prospective teachers become increasingly diverse in background, age, and experience. Such a model also helps teachers understand the diverse K-12 student population (Zimpher & Ashburn, 1992; Delpit, 1988). Well-designed case studies, which allow practising teachers to learn from and value the experiences of others, are becoming more common as training instruments.

From replication to reflection, in which practising teacher focus less on the transfer of knowledge and strategy and more on analytical and reflective learning. Smylie and Conyers suggest that this reflective approach will sharpen teachers' skills in problem solving, determining students' needs, and conducting action research that is designed
to develop new knowledge and skills related specifically to their schools and classrooms. Providers of inservice programs need to consider, however, that teachers have little time during the school day to pause, reflect on practice, or conduct research. Ways need to be found to provide practising teachers with such time.

Reflection has proven useful in the preparation of prospective teachers who are asked to maintain student journals and portfolios. Guided by seasoned professionals, beginning teachers use these tools to understand their own teaching strengths and weaknesses. Journals and portfolios also show promise for experienced classroom teachers and for college faculty to examine their beliefs, knowledge, and experiences over time.

From learning separately to learning together, in which practising teachers are jointly responsible for their work in classrooms, and their wisdom and experiences are perceived as professional resources. Smylie and Conyers (1991) note that this conception has important implications for how schools are organised, in other words, as places for teachers to learn as well as to teach. This paradigm shift addresses one of the most pervasive conditions of classroom --teachers isolation, or the inability to learn and communicate with colleagues in the place where it counts most-- the school. Perhaps one of the most popular mechanisms for learning together is the professional development or clinical school. These professional development sites offer practising teachers, prospective teachers, and university faculty the opportunity to exchange pedagogical knowledge and ideas at school.

In the past decade, scholars, prompted by education policy makers, focused much attention on reconceptualising the manner in which we teach prospective teachers and ensure the continuing learning of practising teachers. Genuinely new concepts have emerged from these deliberations so that today teacher education is talked of as a lifelong experience that extends from program admission to retirement. A number of new formats for such development have also emerged, not the least of which are professional development, partner, or clinical schools that are designed to train prospective, nurture novice, and refresh seasoned teachers on the school site (Darling-Hammond, 1994).
Societal issues such as crime, drug and alcohol abuse, poverty, homelessness, and child abuse have also influenced how teachers practice and the nature of their training. It is becoming increasingly evident to many educators that greater collaboration among social service providers is necessary in order to meet the goal of education reform.

It is important, therefore, to conceptualise professional development as multidimensional, a dynamic interplay between different teachers’ stages of biographical and situated experience, environmental factors, careers, life, and lifelong learning phases. In-service education and training provide one means of planned intervention to accelerate growth, but should, ideally, take account of critical moments in this interplay. It will be clear then, from a range of research world wide, that there is a recognition that professional development must take account of where teachers are in their lives and careers, that the kinds, levels and intensities of professional development opportunities available must relate to these, and that resources should be targeted accordingly. Together with attention to the conditions for professional development and quality and kinds of intervention available in support of professional development (Day, 1991, 1993), these will form factors contributing to its effectiveness.

3.8 School-University partnership

According to one recent study, at least 1,200 partnerships have been established between schools and universities (Wilbur & Lambert, 1990). Understanding current thinking and practice involving the use of educational technology in collaborative activities between schools and universities, assist the researcher design more appropriate activities of the professional development program. It is intended to be a pointer to conceptual overviews and cases. The features of successful partnerships and the categories of partnerships involving educational technology will be discussed.

For a variety of reasons the relation between universities and schools has been characterised as "a fickle romance" (Wiske, 1989, p.3). In defiance of the differences
between schools and universities in reward systems, schedules, roles, many working partnerships have been created. The most successful projects have been those in which both parties planned and prepared themselves well before starting the partnership, adequate resources were allocated to develop and maintain the activities, and mutual respect between the partners was consciously and systematically nurtured. Among the specific recommendations derived from successful collaborative projects are:

- Project goals should be jointly conceived and agreed upon (Allum, 1991; Knapczyk, 1991).
- Teachers should be actively involved, not just passive recipients (Allum, 1991; Knapczyk, 1991).
- If teachers are to be involved as equal partners, they must be involved for as much time as the other actors must (Wiske, 1989).
- Exchanges should be reciprocal, each partner should gain something (Wiske, 1989).
- Education should be mutual, each party must develop an appreciation of the other’s contribution (Wiske, 1989).
- Leadership should rotate among partners as appropriate to their skills (Balajthy, 1991).
- Outcomes should be mutually owned (Balajthy, 1991).
- The university must be committed to the collaborative ideal and provide financial support if necessary, including stipends or load credit for faculty members (Hillman, 1987).

Many partnerships have been formed with the goal of infusing technology skills into the repertoire of classroom teachers. For example, Balajthy (1991) used a model of consultative consultation in which a team made up of a consultant from the college, a classroom teacher, and several student teachers worked together to create and implement lessons using technology. Byrne, Hittleman, and Marchisotto (1989) designed a voluntary staff development experience in which classroom teachers learned to use telecommunications as a vehicle for student writing. Roseman and Brearton (1989) trained teachers in basic computer use for science education, and then
trained a core subset of the original group as trainers and change agents at their own school sites.

Collaborative staff development has also been carried out with distance education technology as the medium of delivery, rather than as the content. Pitcher, Rule, and Stowitschek (1986) used two-way audio and video to consult with and train teachers at distant sites on several special education topics. Similarly, Knappczyk (1991) used audiographic system and fax machines to deliver special education training.

Several partnerships have been established to collaborate on research. These partnerships go beyond the more common arrangement of schools simply granting permission for university researchers to study their classrooms. Instead, an effort is made to jointly establish the goals of the research to the benefit of both sides. The Educational Technology Centre at Harvard University has published several thoughtful examinations of the dynamics of this kind of collaboration (Wiske, 1989; Lampert, 1988). Hillman (1987) describes the problems that occur in implementing research when school sites have not been sufficiently involved in the initial conceptualisation of the project. Typically, school sites provide input into the design process by articulating their needs, testing prototypes, and giving formative feedback.

Manatt (1991) describes the creation of a computer-based management system to implement the School Improvement Model. Burger and Stevenson-Burger (1989) built a computerised management tool for schools, while another project (Ritchie & Dodge, 1992) developed a tool for student-authored adventure games. The benefit to the school partner in these examples was the possibility of having software customised to their needs. To the university partner, having a field-based source of ideas and evaluation is what made the collaboration work.

3.9 Information technology support for education in Thailand

One of interesting issues concern economic crisis in Thailand today is "what are the affects of economic crisis on country development?". For example, the affects on IT development Plan and IT related development plan. As Koanantakool, T. (1997),
Deputy Director of National Electronics and Computer Technology Centre, NSTDA, Ministry of Science, Technology and Environment claims that:

In the middle of economic crisis in Thailand, one may wonder if Thailand has any future or competitiveness in IT after the year 2000. There are so many activities in the neighbouring countries that people begin to ask "How Thailand would progress along our national IT policy of Thailand (IT-2000)?"

Lacking the super hype activities, Thailand has in fact initiated many national-level projects which are aimed at the use of IT to raise the standard of living and quality of live of the people. There are many IT projects concerning national IT development which serve the objective of Thailand IT development, the IT-2000.

In May 1997, the government led by General Chavalit Yongchaiyuddh approved the budget commitment of about 4.2 billion baht for three major IT projects collectively titled IT Projects for national Development. These projects are Software Park, GfNet (Government Information network) and ThaiSarn-III (Thai Social/Scientific, Academic and Research Network Third Generation). The projects are initiated by the National Electronics and Computer Technology Centre, a quasi-government organisation under the National Science and Technology Development Agency, Ministry of Science, Technology and Environment, as part of the Thai government's IT policy. NECTEC is the secretariat office of the National IT Committee (NITC) which is formally chaired by the Prime Minister. Much of the groundwork to this cabinet's commitment was due to the efforts of the current NITC chairman, Mr. Sompong Amornvivat, M.P. and Minister to the Prime Minister's Office. (Koanantakool, 1997).

Koanantakool (1997) describes these new projects in detail as follows:
3.9.1 IT-2000 as the Foundation of IT development

A systematic approach to IT development in Thailand was formally started five years ago (1992), when the Prime Minister then (Mr. Anand Panyarachun) founded the National IT Committee (NITC) to look after the promotion of IT usage and IT development in Thailand.

NITC activated nine sub-committees to look into strategic areas for national IT development. Several initiatives have taken place in the past four years, while the master plan was being studied and synthesized by five sectoral expert groups. Finally, the plan has been approved by the government as well as by the NESDB (National Economic and Social Development Board) as part of the Eight National Economic and Social Development Plan.

IT-2000 plan consists of three main "pillars" which are identified as the supporting infrastructure for national development through the use of IT. They are (NESDB, 1994): (i) to build an equitable national information infrastructure, (ii) to invest in people, and (iii) to enhance government services and forge a strong information industry.

The summary of what is already happening in Thailand right now to make sure that we will be completing the groundwork for IT-2000, is classified by the three proposed pillars of the IT-2000 plan. It is expected that a more concerted effort for global publicity of these activities interest the current government. They are indeed the positive forces required to help economic recovery of the country.

Agenda 1. Build an Equitable National Information Infrastructure

The latest revision of Thailand's "Telecommunications Master Plan" and de-regulation process of Thai telecommunications service industry are being made by the Ministry of Communications and Transport.
There is a real proliferation of high-speed nationwide optical fiber networks in Thailand by several telecomm operators such as TOT (Telephone Organisation of Thailand), CAT (Communications Authority of Thailand), UCOM (United Communications Industry), TA (TelecomAsia), TT&T and the Provincial Electricity Authority.

Three ThaiCom satellites have been launched, with the latest one (ThaiCom III) having 39 transponders (compared to 24 each for the previous satellites), 7 of which have global beam. Thus Thailand's satellites are quite ready for the International competition.

The formal study by legal expert teams funded by NECTEC on "Electronic Commerce Laws" has been completed. This work will ensure that a new legislative committee is to be set up and will implement the modernisation process to laws to facilitate electronic commerce in this country.

The expansion of TOT's Rural-Area Telephone Project. The project targets all 60,000 villages in Thailand.

The government-funded "Information Superhighway Testbed" Project to explore and evaluate the feasibility of using high-speed networks in Thailand. This national testbed project is a cooperation between NECTEC, CAT, TOT, universities and many telecommunications vendors. The project looks into various applications of ATM (Asynchronous Transfer Mode) applications including distance learning, multimedia networking and virtual reality. This project is also listed in the world gigabit testbed directory. Details in http://ish.nectec.or.th.

*Agenda 2. Invest in People*

Several "school informatization" programs have been initiated by many organisations including the Ministry of Education. The most remarkable one is the IT-Project Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn. This project focuses on applying IT to schools in the rural-areas, disabled/under-privileged people,
and some pilot computer-assisted instruction development. Thousands of computers have been donated by the private sector to the project which then distributes these computers to many schools. The project permits several students in the rural areas to learn DOS, Windows, word processing and spreadsheets.

The Kanchanapisek Network Project began its service since December 5th 1996 to celebrate His Majesty the King's golden Jubilee. The project contained two major parts: WWW contents and nationwide access service.

The content part is a collection of web pages related to the royal activities and several royal-initiated projects. The major volume of this web site contains the Junior Encyclopaedia by the Royal Command of His Majesty. This web tree is being enlarged at the rate of one volume of encyclopaedia per month.

This unique network has nationwide access points in 20 provinces for all Thai residence to access free of charge. This access network was designed and implemented to make sure that the rural communities do have access to some form of "limited" Internet. In other words, it is the country's largest BBS in terms of number of access lines, its geographical coverage. The network access service is by far larger than any commercial ISP (Internet Service Provider) in Thailand. The WWW contents are also made accessible from the Internet at http://kanchanapisek.or.th.

Academic and Research network (ThaiSarn) gained wider access both into the international side (2 Mbps to USA, 2 Mbps to Japan) and greater bandwidth domestically. Notable examples are the high-speed 2 megabits per second links between NECTEC and Kasetsart University (KU), King Mongkut's Institute of Technology at Lad Krabang (KMITL) and Thammasat University (TU). Speed runners up are Khon Kaen University (512 kbps), Prince of Songkla University (256 kbps).

SchoolNet Thailand Project, the inter-networking project for Thai schools was initiated by the National IT Committee. It is operated jointly between NECTEC and Ministry of Education using the existing resources of ThaiSarn project.
So far, over 74 schools have joined the project with 99 more in the process. In 1996, Microsoft, Intel, Compaq and Powell Computer ran a special programme to donate 30 sets of hardware and 50 sets of software to the initial "founding" members of SchoolNet. This year (1997) seven more computer/telecommunications vendors have also started strategic partnership with NECTEC to speed up the network development.

The Ministry of University Affairs launched its distance learning "IT Campus" project in 1996, with the initial pilot phase operations with 15 campuses in 11 provinces. The full project will be implemented in the following years to cover 30 provinces by 1999. The estimated total spending is approximately 3 billion baht.

The National Multimedia Institute (NAMMI) project is being studied by NITC, with some expert advise from MIT professors and input from local content producers and authorities such as the Office of the National Education Commission. This institute is planned to speed up the local creation of multimedia contents, especially for education and self-learning. On the other hand, the project will enlarge the local multimedia markets and strengthen the content producers. The initial step of NAMMI will be focused on digital archiving of Thai contents and some infrastructure for Thai language processing.

Electronic Industry Institute project is being planned in order to enhance manpower in the industry to be more competitive, especially when the Information Technology Agreement (ITA) is becoming effective in the year 2000.

**Agenda 3. Enhance Government Services and Forge a Strong Information Industry**

EDI-TradeSiam Project, a government and private sector joint venture, was set up to operate the nation's Electronic Data Interchange (EDI) for international trade. The joint-venture deal was publicised by the Deputy Prime Minister for Economics, Dr. Annuay Viravan, on 29th May 1997. TradeSiam will be run by private-sector partners to ensure the timely development of EDI services for the Customs
Department by August 1997. TradeSiam will shorten and eliminate cumbersome the paperwork process between importers/exporters and the Customs (see 3.9.2).

Government Computerisation Programme - initiated in 1995 with a series of measures to make sure that Thai government agencies and their staff are well developed to serve the people better. The initial measure was to make sure that each government agency will be equipped with sufficient amount of office automation and IT. Other additional measures include the compulsory computer appreciation programme for all government officials above the C-5 level, and the target for government internetworking and EDI within 1998.

Government Information Network (GiNet) Project to empower Thai government agencies to automate inter-office communications and information processing within the agencies. This was planned as the second step in the government computerisation programme. The GiNet project, planned as a government private network, will be running on high-speed optical fiber backbone capable of data transmission at 620 megabits per seconds across the country (see 3.9.4).

Thailand Software Park Project to support the development of software industry in Thailand. There are several attractive measures already made available to any software developers to enjoy the benefits of producing software. Software Park provides all types of necessary facilities for software development and business (see 3.9.3).

Additionally, there are several computerisation projects currently on-going in many departments/ministries with the goal to enhance the efficiency of public services and administration. Examples are:

- tax computerisation projects (Revenue Department);
- geographical information systems by Ministry of Agriculture, Ministry of Science, Bangkok Metropolitant Administration;
- population database (Ministry of Interior);
- labour information system (Ministry of Labour and Welfare);
- import/export duties automation (Customs Department) etc.,
3.9.2 ThaiSarn-III

ThaiSarn Project, the Thai Social-Scientific, Academic and Research Network, was initiated in 1991 to support the needs of universities to contact and retrieve information from their international academic circles around the world. ThaiSarn-I, i.e. the first generation network, began with only 9,600 bits per second (about 1,000 characters per second) speed for information transfer between Thailand and the rest of the world. Later it was enlarged to multiple 64 kbps links and in 1995, 512 Kbps link, with the number of downstream sites around 40 organisations.

The Internet traffic among the academic users increased dramatically as in 1996 the total number of host computers connected to the Internet in Thailand went above 10,000 units, ThaiSarn's bandwidth was quickly became a bottleneck just like its own funding from the Thai Government regular budget. Thanks to the sibling organisations of NECTEC which are under NSTDA (National Science and Technology Development Agency) and NACSIS (National Centre for Scientific Information System) in Japan, new grants were made available to expand ThaiSarn to reach the outside world at 4 megabits per seconds in 1996. The provisions were named as ThaiSarn-II to denote its second-generation status.

ThaiSarn-II became a faster network with new service levels (Koanantakool, 1997):

- most of its downstream sites are now running at 64kbps or higher;
- several schools are not joining ThaiSarn as a sub-project called "SchoolNet Thailand";
- three major universities connect to ThaiSarn at the speed 2 Mbps each (with one more coming, and others running at 512k, 256k and 64 kbps;
- NECTEC demonstrated the "CLASSROOM 2000" concept to the public which embraces high-speed networking applications like lesson-on-demand and several Java-based virtual experiments for children.

The new ThaiSarn-III initiative starts in FY1998 (2541) budget, with a budget of 376 million baht from the government covering the next four years. The project objectives
are to make sure that the ThaiSarn network can cope with the heavy growth of demand of the users from all parts of the country: both in terms of increase in data volume and geographical coverage. This modest budget no longer covers the need of all universities anymore as it will be supplementing Ministry of University Affairs "IT Campus" Project with the budget of about 8 times larger.

Both projects, ThaiSarn-III and the IT-Campus were developed in close coordination by the respective project teams and are made to complement each other's goals in terms of geographical coverage; networking experts and learning resources for tele-education services such as the video-on-demand services pioneered by NECTEC.

ThaiSarn-III will be running its backbone on ATM (asynchronous transfer mode) technology at the speed of 155 to 620 megabits per second. The technology chosen is the most popular solutions for this kind of applications.

Specifically, in 1998, ThaiSarn-III was linked to at least one university at the speed of 155 Mbps. In addition, NECTEC's hub will also be linked to MUA's IT Campus gateway at the same speed to ensure that any university can reach both ThaiSarn and IT-Campus networks at all time. NECTEC's training room at the Bangkok Thai Tower is also equipped with tele-education equipment that is compatible with the world standard and is capable of teaching for any remote classroom in the IT-Campus project (and vice versa).

The number of high-speed links will be extended to 9 sites in the year 2001, when the IT-Campus reaches 30 provinces throughout Thailand. However, due the present reliant of universities to ThaiSarn, it is utmost important to make sure that ThaiSarn is well capacitated while the new "superhighway" is being constructed in the next 1-2 years.

Another most important contribution of ThaiSarn-III project to the nation is to make itself a reliable backbone for many other new academic networks being incubated in Ministry of Education, Ratchabhat Institute, and Ratchamongkol Institute. All of these new academic networks share the common ancestor: ThaiSarn-I.
3.9.3 Thailand Software Park

In 1995 NECTEC commissioned research on "Approach to Development of Software Industry in Thailand" (NECTEC, 1995) as part of the efforts to promote IT activities of the IT 2000 national IT policy of Thailand. This study found that software industry is one of the new industries in Thailand that is a strong force on the IT front since software is a major component of IT.

"It is crucial that a domestic software industry is developed to help this computerisation process in order to conserve foreign exchange as well as to create a locally sustainable computerisation process. It is undeniable that software industry has to become one of the strategic industries and partly replaces traditional cheap labour/local raw materials industry" said the study (NECTEC, 1995, p.31).

The study recommended that one way to help develop software industry in Thailand is to set up a software park to support and sharpen the potentials of domestic software industry to an international level in terms of quality and capability. Software Park will be the centre for all types of necessary facilities, amenities, resources and training. It will be the centre for high-speed telecommunications, training, consultancy, high-technology automation of offices as well as a business cluster for software businesses.

The facilities will attract both local and international businesses related to software including software and hardware vendors, training companies, system integrators, multimedia products and content producers, etc. In this regard, the Board of Investment (BOI) of Thailand is playing a crucial role in providing economic privileges to many of the software companies both inside and outside of the software park. Special privileges are also given to companies that want to set up another software park.

The software park will have both the physical facilities and facilities in cyberspace to help with training and technology transfer as well as being a marketplace for software producers and customers.
Software Park will provide six core service centres for tenants. These centres are: Business Information Centre; Training Centre; Information Technology Centre; Software Tool Application Centre; Validation and Verification Centre; and Telecommunications and OSI Compliance Testing Centre.

In the short term, Software Park will operate as an incubator facility with a permanent office that help support all the necessary functions of the park including public relations, information services, facility services, fund raising, etc. In the long term, Software Park will operate more as an industrial park much like the existing Software Park in operation in many other countries today.

Administration of Software Park is expected to be based on non-government management of the park. This may be in the form of granting management rights to companies to run the park or forming new companies to run the park. Revenue for the running of the park will be from renting of office space, and other commercial services to the users within the park. Companies that are allowed into the park will be selected by a review board setting up by the management of the park, primarily only software-related firms will be allowed.

Software companies will be attracted to software park on special promotion programme initiated by the Board of Investment. These privileges are: (i) permission to bring in foreign technicians and experts to work in promoted projects (ii) tax incentives for project located in Zone 1 and 2 (Bangkok and surrounding provinces in terms of exemption of import duties on machinery and equipment and exemption of corporate income tax and income tax on dividend for the first 8 years after the start of operation.

3.9.4 Government Information Network

GI.Net is a nation-wide high capacity network for government services that will provide channels for delivering government electronic information within geographically dispersed ministry and for inter-ministry communications. The
network to be set up will have 155-620 Mbps backbone to all provinces, with several 2 Mbps links to every district. The basic network serviced is part of the plan to computerise Thai government with IT applications on top of this network.

The implementation schedule of GiNet will start from October 1997, with technical specifications being developed during July and September. In the first six months, first ten major provinces will be connected. Full connectivity to all 76 provinces is targeted in 18 months. The complete delivery to all 680 districts would be completed in the third year.

A quasi-government unit named Government Information Technology Service (GITS) will be established to initiate and manage all of GiNet activities and applications of GiNet. GITS will act as a contract manager to provide network management and network backbone infrastructures for government organisations.

In addition to the basic network service, GITS will be responsible for (i) developing standards for government network which are necessary for both intra-ministry and inter-ministry information sharing for various applications; (ii) providing consultation services on the development of information systems to various government; (iii) support the development of standard generic government applications such as budgeting, accounting, procurement; (iv) supporting development of uniform standard for information systems development methodology. This is crucial to the success of systems analysis, design, and implementation of large-scale information systems.

The present government sees GiNet and GITS as the important keys towards government reengineering and empowering the agencies to reform themselves towards the slimmer but smarter government. The Prime Minister once said on public television that he would stop building roads for a day or two to funnel the money for making this important network.
3.9.5 The future vision about Information technology

Information Technology is seen as a very important topic for the current administration of Thailand. The recent approval of multi-billion baht for three IT projects are atypical, and can be seen as a clear commitment from the whole cabinet to focus on national competitiveness. With several initiatives taking place, sooner or later, Thailand will be in a position to promote its readiness as the economic centre with great IT supporting facilities.

All of the national projects are complementary to one another and are structured along the IT-2000 national IT policy and the Eight NESD plan. With strong fundamental support from the National Scientific and Technology Development Bill of 2534 (1991), NECTEC has been appointed to handle the project management tasks for a few of the projects due to its flexibility in employing highly competitive staff, which are the keys to the success in most, if not all, of the projects here. It is anticipated that, with IT initiatives, economic recovery of Thailand may be brought forward through Thailand's NII (NESDB, 1994).

3.10 Chapter summary

This chapter examined the advancement of information technology being used in universities, the virtual university, and the ideas about professional development models. These surveys suggested that the current technologies for teaching and learning in the virtual university are electronic mail, computer conferencing, real time chat, WWW, audio and video conferencing, and video clips on the web. In addition, the move towards virtualisation should be focused on the development of educational system that maximised opportunities for learning through the use of technologies.
CHAPTER 4

METHODOLOGY

4.1 Introduction

The purpose of this chapter is to present a study design adapted from theories and methodologies which have been developed in the field of teacher and education development. This design will be explored further in relation to the Thai school context, and to the specific needs of Thai teachers and educators as they seek to promote and improve professional development of teachers. This chapter discusses the study design in relation to theories and practices of professional development of teachers which provide a framework for understanding the processes and changes of professional development. These theories and practices include participatory research methodology which provide an insight into the influence of adult education, distance education, information technology, teachers’ needs and limitations about professional development, and school-university partnership on professional development models.

4.2 Theoretical framework

A researcher investigating the implementation of a professional development program or a process of change may draw upon three different research paradigms (Grundy and Kemmis, 1981; Grundy, 1982; Longstreet, 1982; Fay, 1987). The first paradigm is the empirical or classical science model known as the technical approach. This approach is based on the scientific method which traditionally has placed emphasis on quantitative data. When this approach is transferred to education, many difficulties are encountered. For example, it is difficult to control the variables being examined in a complex setting. In addition, education research is dealing with human beings and issues which involve important variables that cannot easily be measured or tested by quantitative methods.

The second approach is the interpretative or practical approach which emphasises a qualitative method of understanding, describing, and analysing the situation being
studied. This approach has developed from anthropological and ethnographic methods. Examples of this approach include historical research, phenomenology, case study and illuminative evaluation. When this approach is transferred to teacher education, it has limitations in improving the change process, as this is not its defined purpose.

The last approach is the emancipatory or critical approach which is informed by Habermas (1972). When this approach is transferred to education context, it is not only concerned with describing, analysing and understanding situations but also with direct improvement of education practice (Carr and Kemmis, 1986). This approach is informed by critical theory. Kincheloe points out that “educational reform of any stripe will not work unless teachers are empowered” (Kincheloe, 1993, p.178). This empowerment process is possible through the adoption of critical action research. For Kincheloe, “critical action research is ... an antidote to the perception of teachers as low-level, blue-collar workers” (Kincheloe, 1993, p.176). As he puts it: “when critical action researchers develop a system of meaning that helps them design research, select research methods, interpret their research, and act on the basis of their research, their way of seeing, their way of constructing their professional self-identify, is forever changed” (Kincheloe, 1993, p.177). Critical action research seemed an appropriate choice for helping Thai school teachers to break free from the hindrances to their professional development. The researcher was impressed by the claims made by advocates of action research (for example, Carr & Kemmis, 1986; Elliott, 1991; McKernan, 1991; Kincheloe, 1993) and was drawn to the assertion that in adopting action research “teacher-researchers constantly probe and question, listen and observe, notice and note - to them, professional development is driven by the vision, knowledge, and ambition generated by their research” (VanDeWeghe, 1992, p. 52). The researcher believes that teachers participating in the EDNET project are becoming empowered by action research to be driven by the vision and to take control of their own professional development.
4.2.1 Critical theory

Critical theory was developed during the 1920's and 1930's at the Institute for Social Research in Frankfurt (Germany) by members of the Frankfurt School. These members included Max Horkheimer, Erich Fromm, Herbert Marcuse, Theodor Adorno and Jurgen Habermas (Giroux, 1983). Their common ideas rejected positivism and scienticism which were based on the belief that scientific method can construct an objective reality; and that scientists can be detached observers of objective facts. They also rejected the claim by scientists that this kind of knowledge, which is one kind among the others, is the only valid and legitimate one. Critical theorists believe that knowledge in the social sciences should be practical. It means that theory must improve practice in order to be useful.

According to Giroux (1983) critical theory has two meanings. Firstly, it reflects a body of philosophical work developed at the Frankfurt School by Adorno, Horkheimer, and Marcuse. The Frankfurt School stressed the importance of critical thinking arguing that:

1) it is a constitutive feature of the struggle for both self-emancipation and social change;
2) it was in the contradictions of society that one could begin to develop forms of social inquiry that analysed the distinction between what is and what should be;
3) the basis of thought and action should be grounded in compassion in our sense of the sufferings of others (Giroux, 1983, p.9)

Secondly, critical theory refers to “the nature of self-conscious critique and to the need to develop a discourse of social transformation and emancipation that does not cling dogmatically to its own doctrinal assumptions” (Giroux, 1983, p.8)

Habermas has extended the work of the Frankfurt School with particular application in education. For Habermas (1973) the term critical means the potential people have for self-reflection and self-determination in a social structure. Traditional critical theory was seen as a product of a process of critique which was achieved from
interpretative social sciences; that is ways of viewing the world without necessarily changing practice in the world (Carr & Kemmis, 1986). On the contrary, Habermas argue that a simple understanding of phenomena is insufficient in the social sciences. Hence the idea of a critical social science is developed by Habermas as a way of overcoming this limitation. Furthermore, Habermas adds that a critical social science includes a process of critique and a critical praxis or informed action which aims at enlightenment and improvement of the social and material conditions under which the practice take place. Habermas brought up that the process of critical thinking required that of critique and by that he meant relentless criticism of all existing conditions (Habermas, 1978). This implies an integration of theory and practice as reflective and practical moments in a dialectical process of reflection, enlightenment and political struggle carried out by groups for the purpose of their own emancipation. For Habermas, critical social science therefore is:

a social process that combines collaboration in the process of critique with the political determination to act to overcome contradictions in the relationally and justice of social action and social institutions. (Carr and Kemmis, 1986, p.144).

This argument has been used in education and action research by various authors (Grundy and Kemmis, 1981; Grundy, 1982, 1986; Carr and Kemmis, 1986; Jennings, 1987; Winter, 1987; Kemmis and McTaggart, 1988). Habermas (1972) distinguishes three forms of social research in terms of their knowledge-constitutive interests as 1) technical interests of knowledge - an interest in controlling and regulating, 2) practical interests of knowledge - an interest in understanding and interpreting human action, and 3) emancipatory interests of knowledge - an interest in rational autonomy and freedom, emancipating people from false ideas, distorted forms of communication and coercive forms of social relationships which constrain human and social action. The aim of critical social science is to produce critiques of social life which show how our ideas and actions have been constrained through power-relationships (Kemmis, 1986). It aims to understand the social world around us and helps us to understand ourselves in terms of the language we use, and the values and beliefs we hold, in order to overcome frustration and to perform better in to those of our practice. Thus a critical
Theorist is committed to an inquiry about a social situation in order to reduce and/or eliminate frustrations experienced by its members.

The method of critical social science involves a different form of reasoning technical and practical interest. It includes dialectic reasoning and an emancipatory interest, which includes ideology-critique. Dialectical reasoning aims to overcome simple dualisms (e.g. gaps between theory & practice, individual & practice) and the problems of understanding which arise when these dualisms are adopted. Kemmis (1986, p.68) explains that "dialectical reasoning adopts as a central principle the notion of the unity of opposites, according to which the thinker attempts to rise above the two opposed positions and to understand how they are related to one another". In this sense, the notion of the unity of opposites provides dialectical reasoning through the study of contradictions. In expanding the social and educational process, Kemmis described the processes of dialectical reasoning employed by critical education theorists as:

first, by showing how simple dualisms limit our understanding; second, by showing how the oppositions posed in these dualisms lead us into contradiction; third, by showing how these dualistically-opposed ideas or positions interact; and fourth, by showing how the dynamic processes of interaction between the opposed ideas or positions actually constitute the patterns and consequences of action and interaction we observe in the social and educational settings we hope to understand and improve. (Kemmis, 1986, p.70)

Ideology critique involves the undertaking of enquiries both outwardly to illuminate the social world and inwardly to illuminate the formation of our ways of seeing and being in the world. This means ideology does not simply involve an understanding and interpreting of a situation. It involves a collaborative process of self-reflection by which we develop critiques of contemporary situations and engage in the historical, social and political struggle to change it (Kemmis, 1986). Ideology critique allows us to see the situation as a phenomenon subject to change, to reflect on what it is and to imagine what it could be. For example, it could be asked:
• What are the essentials in a given situation?
• How did situation change?
• What can be done to overcome frustration and contradiction in order to free the mind from empirical reality, to become enlightened and to be happy in this changing world?

When critical theory is applied to education, the processes required are those of dialectical reasoning and ideology critique. If education is the process whereby knowledge is created through the transformation of experience (Kolb, 1984), then the critical theory of education becomes the process whereby knowledge is created through the transformation of experience and all existing conditions are under relentless criticism (Habermas, 1978). Kemmis described a critical education in the following manner:

A critical education involves discovering the process by which our own identities are formed in relation to the processes by which our society, culture and ideology are formed. It involves analysing the process of contestation and institutionalisation at work in our language, activities and social relationships to discover how we are, as individuals, located in the specific perspectives and (self) interests of specific groups in our society at large. Once we have begun to recover (how) our location in society and history, we can begin to discover how our location offers us the power to change ourselves and, though not without constraints, to change our society and our world. We can change ourselves and our world through changing the ways we constitute and reconstitute it through changing the ways we participate in constituting social life in communication (language and discourse), work (activities and practices), and power (social relationships and forms of organisation). (Kemmis, 1988, p.5)

In this manner, Kemmis makes a link between critical education and development through changing the ways of participation in professional development program.
4.2.2 A critical theory of adult education

By clearly differentiating Habermas’ three domains of learning, he has provided the foundation for formulating a comprehensive theory of adult education. As each domain has its own learning goal (e.g. learning for task-related competence, learning for interpersonal understanding and learning for perspective transformation), learning needs, approaches for facilitating learning, methods of research and program evaluation are implied or explicit.

This extension of Habermas’ s theory of areas of cognitive interest is reinforced by the experience of adult educators. We have understood from conventional wisdom that educational design and methodology must be a function of the learning needs of adults and that formula or package programs which do not fully address the differences in the goal and nature of the learning task are of questionable value. Probably it is because we have been marginal to the mainstream of education for so long that we have been able to sustain our own rather distinctive perspective on learner centeredness in conceptualising our role. As educators, we need not concern ourselves with philosophical questions of whether Habermas has succeeded in establishing the epistemological status of the primary knowledge-constitutive interests with categorically distinct object domains, types of experience and corresponding forms of inquiry. There is sufficient force in his analysis to warrant serious examination of and design of appropriate approaches for facilitating learning relevant to these three domains of learning.

Mezirow (1981), as a professional perspective of adult educators, points out that andragogy must be defined as an organised and sustained effort to assist adults to learn in a way that enhances their capability to function as self-directed learners. To do this it must:

- progressively decrease the learner’s dependency on the educators;
- help the learner understand how to use learning resources- especially the experience of the others, including the educator, and how to engage others in reciprocal learning relationships;
• assist the learner to define his/her learning needs—both in terms of immediate awareness and of understanding the cultural and psychological assumptions influencing his/her perceptions of needs;

• assist learners to assume increasing responsibility for defining their learning objectives, planning their own learning program and evaluating their progress;

• organise what is to be learned in relationship to his/her current personal problems, concerns and levels of understanding;

• foster learner decision making—select learner-relevant learning experiences which require choosing, expand the learner’s range of options, facilitate taking the perspectives of others who have alternative ways of understanding;

• encourage the use of criteria for judging which are increasingly inclusive and differentiating in awareness, self-reflexive and integrative of experience;

• foster a self-corrective reflexive approach to learning—to typifying and labelling, to perspective talking and choosing, and to habits of learning and learning relationships;

• facilitate problem posing and problem solving, including problems associated with the implementation of individual and collective action; recognition of relationships between personal problems and public issues;

• reinforce the self-concept of the learner as a learner and doer by providing for progressive mastery; a supportive climate with feedback to encourage provisional efforts to change and to take risks; avoidance of competitive judgement of performance; appropriate use of mutual support groups;

• emphasise experiential, participative and projective instructional methods; appropriate use of modelling and learning contracts;

• make the moral distinction between helping the learner understand his/her full range of choices and how to improve the quality of choosing vs encouraging the learner to make a specific choice.

(Mezirow, 1981, p.7)
The researcher believes the recognition of the function of perspective transformation within the context of learning domains, as suggested by Habermas' theory, contributes to a clearer understanding of the learning needs of adults and hence a function of education. When combined with the concept of self-directed learning as the goal and the means of adult education, the essential elements of a comprehensive theory of adult learning and education have been identified. The formulation of such theory for guiding professional practice is perhaps a challenge of development of adult education programs and activities.

### 4.3 Appropriate methodology

Overall three cycles of an action research approach were taken from June 1996 to April 1997. Data were collected through document analysis, interviews, participant observation, reflective diaries, and email communications. Analysis of data was based on theme analysis to classify and group data and the explanation and description of data were used. In addition, cross checking were used to ensure the data validation.

In general, this study sought to investigate the process of information technology implementation in professional development program for secondary school teachers, in particular, the researcher sought to improve the professional development process by using the Internet within the specific context of Thai school system. The academic activities through the WWW homepage were developed and used as means by which teachers could participate in a professional development program. Kemmis argues that "improving education means improving the nature and conditions of the work of education, and the exercise of power in our education institutions" (Kemmis, 1998 p.4). In the context of secondary education in Thailand it was important to gain a deeper understanding of teacher work conditions and professional development of teachers within the Thai schooling system. Drawing upon traditional critical theory and introducing information technology to Thai teachers, the researcher and others involved in the study needed to understand the nature of teachers' work and the principles and rationale behind the professional development of secondary school teachers. Thus an understanding of the nature of professional development of Thai
teachers was a first task for a researcher before improving it. Kemmis and McTaggart presented this issue in the following manner:

In the process of improving our educational work we need to have a broad and dynamic understanding of our own work as a living part of wider processes which constitute the work of education and life of society as they have been formed and are formed through history. (Kemmis & McTaggart, 1988, p.30)

4.3.1 Contextual analysis

This necessary understanding of the learning process may best be achieved by employing a range of methodologies including survey, case study, ethnographic study, participatory workshops and action research. It was important in achieving the aims of this study, to develop an understanding of the professional development of teachers and the way in which it is practised today. One process initially used to achieve this understanding was a contextual analysis approach. A contextual analysis can be conducted by collecting information from documents, interviews, questionnaires, and case study. Information and knowledge gained from contextual analysis tend to be superficial since it is better suited to extensive analysis rather than intensive analysis (Lofland, J. and Lofland, L., 1984). This particular methodology is suited to preliminary studies which assisted the formulation of the research problem. The researcher studied the context and situation of professional development of Thai teachers through a literature survey and document analysis. Furthermore the researcher conducted a preliminary study into the practice of professional development of Thai teacher by means of conducting a case study and interviews (See Chapter 2).

4.3.2 Ethnographic study

Improving professional development of teacher process through the WWW homepage in this study involved human beings and issues in a complex setting. Professional development of teacher occurs in a social context and plays a crucial part in the
socialisation of school teachers because it is an adult education process. One of the most enjoyable features of adult education is meeting other people and sharing knowledge and experience (Daines, J. et al., 1994). As previously discussed there are three different research paradigms: the technical, practical and critical approaches. Practical and critical approaches are more appropriate to this study since the technical approach has a limited application when examining human issues in a complex setting, because such issues often cannot be measured and tested by quantitative data.

It was also suggested by researchers (Bruyn, 1966; Pelto, 1970; Spradley, 1980) that in order to understand a social situation or problem, the process used must be phenomenological and interpretative. To employ a phenomenological approach is to attempt to understand the situation from the perspective of people in that situation. This is done by entering into the individuals’ field of perception in order to see life as individuals see it (Bruyn, 1966). A research method which may be applicable in this situation of this process is ethnographic study and the researcher employed an ethnographic technique to understand the nature of professional development of Thai school teachers.

Ethnographic studies employ a research method developed and used by anthropologists to discover unknown facts, and life styles and to develop a theory of culture (Pelto, 1970; Spradley, 1979; Germain, 1986). Initiatory works in ethnographic research include the work of Franz Boas, B. Malinowski and Magaret Mead (Spradley, 1980; Leininger, 1985). The goal of ethnography is to discover culture knowledge. Its aim is to capture and understand a life phenomenon within specific environmental and abstract theories about people and general phenomena.

Ethnography can be a long-term and comprehensive study, macro or maxi ethnography, or a single social situation focused on a specific or a narrow area of enquiry, micro or mini ethnography. This study employed a micro ethnography focusing on the conduct of a professional development program for secondary school teachers in Khon Kaen via the Internet at the Faculty of Education, Khon Kaen University, Thailand (at http://ednet.kku.ac.th). The researcher spent his time with
school teachers for six weeks through school visits and communication via electronic mail (email).

The major methods employed by ethnographers include participant observation and interviews where data are obtained from human situations. Spradley described, step-by-step, the method of conducting participant observation and ethnographic interviews (Spradley, 1979, 1980). This framework provided the researcher with the following process for data collection:

- Describing the setting of the professional development of Thai school teachers;
- Doing participant observation;
- Making an ethnographic record of events;
- Making descriptive observations;
- Making focused observations and interviews.

Developing rapport fostered the development of trust that allowed the researcher and the participants to have positive feelings about the interviews. Rapport encourage the participants to talk about their culture (Spradley, 1979). Becker (1982) considered this was essential in doing an ethnographic study because rapport can ensure reliability and validity. More recent researchers (Lofland and Lofland, 1984; Guba and Lincoln, 1987) referred reliability and validity to credibility and trustworthiness. Developing rapport is not always easy. Being Thai and understanding Thai culture helped the researcher to build good relationships amongst participants. He has been involved in the professional development programs for school teachers in Khon Kaen prior to the commencement of the study. He had given lectures in educational evaluation, computer application in education, educational research, and instructional media at many professional development programs. He was also a supervisor for teacher students in the teaching practice course. So he has had an opportunity to work closely with school teachers. His good relationship with school teachers facilitated a good rapport. However, he recognised that some participants were his graduate students, this might inhibit eliciting information. He overcame this by building a good rapport through his people skills and through sincere expression of the objectives of the study.
4.3.3 Participatory workshop

In addition to the contextual analysis and ethnographic study, the researcher sought to achieve the aim of improvement of the social settings, described by Habermas (1973), through a collaborative analysis of the situation by a group of participants. As Kemmis (1988b) states:

> Education is a social and cultural activity which requires a very active form of participation by teachers and learners whose own interests and intentions must be taken into account in the act of education; they must interpret the language, activities and social relationships of education for themselves; together, by the way they interact, they must make their educational. (Kemmis, 1998b p.5)

This study aimed to improve professional development program through the Internet by a group of teachers who voluntarily participated in the program. As mentioned before, in improving our education work we need to have a broad understanding of that work. One way to achieve the aims of collaborative analysis of the situation and to enhance group understanding is through a participatory workshop. A workshop is particularly suited to these aims because it embodies a humanistic approach through discussion in which participants feel free to give their opinions which are considered valuable (Davis, 1977). The above comment of Kemmis supports the use of the workshop in this study because the workshop allowed participants to interpret perceptions, activities and relationships concerning their practice. During the process of formulating the proposal of this study, the researcher conducted a preliminary study which suggested the need for some kind of activity that would help the participants and the researcher to understand more about the process of professional development for Thai school teachers. The questions that needed to be answered were:

- What are we doing in our professional development?
- What are our needs and problems in our professional development?
- What might be done to improve our professional development process?
- How could information technology be used for improving our professional development?
Building on the conceptual framework of professional development of teachers, the preliminary study findings - teachers' needs and limitations about professional development, professional development materials (Day, 1993), critical friends (Egan, 1982), adult education, and action research (Kemmis and McTaggart, 1988), the researcher developed a draft of professional development model incorporating the information technology as shown in Figure 2.2 (see page 48).

It is a general model of professional development of teachers and has six components. They respond to teachers' needs and limitations about their professional development. The expanded model (Figure 4.1) was developed when the information technology and the collaboration are considered as factors involved in the professional development process. The links between teachers and professional development are teachers' needs, limitations of the professional development, and findings of adult learning theory. The links between information technology and professional development are distance education, teletraining, and the Internet. The relationship between information technology and the faculty of education, KKU are KKU network and information technology supports at Khon Kaen University. And the relationship between the faculty of education, KKU and school teachers are the partnership and collaborative projects in education development.
Figure 4.1 The EDNET Project: A Model of IT Application in Professional Development Project for Thai School Teachers (Framework for EDNET development)

This expanded model (Figure 4.1) was used as a framework for developing the EDNET project, the education network project for professional development of teachers. It was a tentative model that was later refined by teachers who participated in the project and the researcher. This was done through the process of participatory workshop and the communication through the Internet.

4.3.4 Action Research

The major reasons that the researcher employed action research as a method of approach were: Firstly, action research assists teachers to improve their information technology skills and professional skills through the development of critical reflection.
ability via the PD activities on the EDNET. This ability enables teachers to become more analytical about their practice, and thus they can see the right view of their practice in a different light and develop ways of improving it. In addition action research lessens the gap between research and practice since its process integrates with practice rather than is conducted separately and then is applied in the practice setting. It also lessens the gap between theory and practice. Finally, action research allowed the researcher to include the cultural context in the study.

4.3.4.1 Development and definition of action research

Action research was speculated by the American social psychologist, Kurt Lewin, in 1946 (Kemmis and McTaggart, 1988, p.6). Two main elements from Lewin’s work are group decision and commitment to improvement. Lewin’s view action research consisted of “analysis, fact-finding, conceptualisation, planning, executing, more fact-finding or evaluation, and then a repetition of this whole circle of activities” (Kemmis et al., 1988, p.29). Lewin’s view provided a basis for the work of Elliott and Kemmis and Ebbutt (McNiff, 1988).

Action research was transformed to a second generation as the work of John Elliot and Clem Adelman in England with the Ford Teaching Project in 1973-1975 (McTaggart and Garbutcheon-Singh, 1986). This work emphasised the self-evaluation process and was recognised as practical action research. The work in England led to the work of action research in Europe and Australia (Brock-Utne, 1980; Carr and Kemmis, 1986) which might be called participatory and collaborative action research. Kemmis and McTaggart (1988) developed the process of action research as a series of action research spirals of planning, acting, observing, reflecting and re-planning. They made the process of action research easy to understand. The concept of action research provided a useful tool for practising teachers and was widely used. It is a participatory and collaborative form of research (Grundy and Kemmis, 1981). Nonetheless, the model based on spirals of cycles tended to be simplistic. Thus critical theory was introduced to action research in what might be called as a third generation of action research (McTaggart and Garbutcheon-Singh, 1986). Grundy and Kemmis (1988) called it as critical or emancipatory action research.
Action research was applied to educational research the same time as it originated since Lewin himself worked in educational action research programs (Kemmis et. al., 1988). The work of Kemmis, Smyth, and McTaggart in Australia enhanced knowledge in educational action research (Corey, 1953; Elliott and Adelman, 1973; Stenhouse, 1975; Smyth, 1984; Ebbutt, 1986; Carr and Kemmis, 1986; Smyth et. al., 1986; Kemmis, 1986; Kemmis and McTaggart, 1988; Kemmis et. al., 1988). These researchers were concerned with such concepts as educational innovation, teachers as researchers, curriculum evaluation and development, teachers-student interaction, teaching evaluation and clinical supervision.

Action research has been defined by many researchers (Corey, 1953; Rapaport, 1970; Elliott, 1981; Ebbutt, 1986). However, the definition proposed by Kemmis and McTaggart is widely accepted in educational fields. They defined action research in the following manner:

Action research is a form of collective self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social or educational practices, as well as their understanding of these practices and the situations in which these practices are carried out. (Kemmis and McTaggart, 1988, p.5).

4.3.4.2 Methods and limitations of action research

The major aims of action research are improvement and involvement. The aim of improvement emphasised in three areas: 1) to improve practice; 2) to improve the understanding of the practice by its practitioners; and 3) to improve the situation in which the practice takes place. The aim of involvement includes all participants in the process of planing, acting, observing and reflecting in order to achieve the aim of improvement (Grundy and Kemmis, 1988).
Action research can be classified in three types: technical, practical and emancipatory action research (Grundy and Kemmis, 1981). These three types of action research are based on Habermas's three knowledge interests: technical, practical and emancipatory (Habermas, 1972). The first type, technical action research, is concerned with the product of the project: "How to better control the environment in order to produce the desired outcomes of the projects" (Grundy, 1986, p.29). The practitioners are co-opted and depend upon the researcher as a facilitator (Zuber-Skerritt, 1989). The second type, practical action research, is concerned with the understanding and development of the practice. The practitioners initiate the project and researcher's role is to encourage and assist practitioners to understand and improve practice. The third type, emancipatory action research, is concerned with a critical response to organisational constraints (Zuber-Skerritt, 1989). Emancipatory action research has the same objectives of understanding and development as the practical type but is also has political and social involvement as an essential ingredient.

Action research is an effective method for improving practice, however, it is not the only method to solve every problem in the practice setting. In some areas where human issues are not relevant other methods may be more appropriate. It has been argued that success in action research depends more on personal and interpersonal factors than methodological factors (Reason and Rowan, 1981). The researcher recognised this argument but argues that action research allows him to incorporate previous approaches in the professional development process of teachers through enquiries rather than focus on static methodology. In the case of this study it was recognised that the success of the action research approach would depend upon the receptiveness of the group to new ideas and new practices and that the role of the researcher as change agent in this process could be vital. In this respect the enthusiasm and prior knowledge of the researcher could create a positive atmosphere in the group.

4.3.4.3 Action research and professional development of teacher

The action research, by its definition, is grounded in two essential principles: improvement and involvement (Grundy and Kemmis, 1988). On the one hand action research is concerned with an improvement in existing conditions. However on the
other hand this improvement is only gained when participants take action. In this way improvement is linked with action and through this action gain a better approach of current practice. In this way the researcher employed action research with the professional development program in order to improve its process.

The most powerful action research is critical or emancipatory type in order to fulfill the requirements for improvement (Carr and Kemmis, 1986). Thus the successful way to gain improvement is through the intervening process of critical reflection. This process of critical reflection provides an important link between action research methodology and professional development of teachers since improving professional development process requires a process of reflection. Emancipatory action research enhances the process of reflection and adds a critical dimension to professional development process. In this way the researcher combined action research, adult education, distant education and information technology to enhance professional development program for teachers in this study.

4.4 Professional development in school: An action plan

The action plan of the EDNET project consists of two parts, the study design and techniques for monitoring the study. The details of each part were described below.

4.4.1 The study design

The broad structure of the study was based on the conceptual framework of professional development model (Figure 2.2), critical theory, and action research. A central approach of these three techniques of knowledge development is reflection. Thus critical reflection is aimed as a tool to meet the objective of improving professional development process through the conduct of the EDNET project.
<table>
<thead>
<tr>
<th>Step</th>
<th>Context</th>
<th>Research Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| Step 1: November 1995-February 1996 | **Contextual Analysis:**  
An Ethnographic study of Professional development in Thai school | 1. Interview with ten teachers from five secondary schools in Khon Kaen  
2. Participatory observation and doing a case study at one school | Investigate and understanding the nature of professional development of Thai teachers |
| Step 2: 16 February 1996 | **Participatory Workshop** | Facilitator to the workshop with ten teachers from five schools | Collaborative and participative understanding and planning to improve professional development process via information technology. |
| Step 3: March-May 1996 | **Managing change:**  
The EDNET development | Development of EDNET website:  
- Hardware  
- Server software  
- Webpage construction  
- Courseware development | 1. Construct the EDNET host for www server, FTP server and email server  
2. Design and plan for the activities of the professional development via EDNET homepage. |
| Step 4: May 1996-April 1997 | **The EDNET in action:**  
1. One-day workshop  
2. Action research: Three cycles of action research spirals: planning, acting, observing and reflecting. | Facilitator to the implementation of an alternative approach through two cycles of action research:  
- School visiting (individual counselling and coaching)  
- Participatory observation  
- Interview  
- Tape and Video tape recording  
- Email communication | Improving professional development process through the conduct of the EDNET project |

**Analysis and writing**
Three phases are evident in this study. First, the researcher formulated the research problem and study design within a period of ten months. Second, fieldwork in Khon Kaen, Thailand covered a period of nineteen months. Third, the twelve-months of analysis and writing was conducted in Thailand with closely consultation with supervisor at Khon Kaen University and Deakin University. The fieldwork was divided in four steps (Figure 4.2) as follows:

**Step 1:** Contextual Analysis: An ethnographic study of present professional development in Thai schools.

Ten teachers from five secondary schools in Khon Kaen who voluntary participated in the EDNET project were interviewed. The five schools are Khon Kaen Witayayon, Kullayanawat, Kaen Nakorn Wittayalai, Karmkaennakorn, and Mingmoung School. Including a case study which was conducted at Karmkaennakorn School. This step was the investigation and understanding the nature of professional development of Thai teachers (see Chapter Two).

**Step 2:** Participatory workshop

The researcher conducted a participatory workshop with the ten teachers from five secondary schools. The workshop involved understanding and analysing the professional development model. The collaborative and participative discussion was conducted during the workshop. Two proposed models, Thai teachers and professional development model (Figure 2.2) and The EDNET Project: a model of IT application in professional development project for Thai school teachers (Figure 5.1) were closely examined for planning to improve professional development process via information technology, and planning for the alternative approach. At the end of the workshop, the EDNET model was designed by the group (see Chapter Five). It also was an action planning phase of action research for the next step.
Step 3: Managing change: The EDNET Development

The EDNET host was created by the researcher as one node of the Khon Kaen University Network (KKU Net). Its components are email server, ftp server, and web server. The contents of the EDNET Website (http://ednet.kku.ac.th), and the courseware of a six-week tele-training curriculum were developed based on the EDNET model. The activities of the professional development of teachers via EDNET homepage were designed and planned.

Step 4: The EDNET in action

With this step the alternative approach was implemented with a group of ten school teachers at the EDNET Website through three cycles of action research spirals: planning, acting, observing, and reflecting (see Chapter 6).

4.4.2 Techniques for monitoring the study

In monitoring the study, the researcher employed the techniques of participant observation and interview through the school visiting and email communication. The researcher used unstructured and informal data collection techniques by drawing upon the judgements of other participants as data sources (Grundy and Kemmis, 1981). The researcher role involved development of a good rapport, the writing of field notes, the keeping of reflective diaries to describe, explain and draw conclusions from the events (Holly, 1984), and the use of audio recordings. In conducting the participatory workshop via email, the researcher played the role of facilitator. During the process of implementing the EDNET project through action research, the researcher was the facilitator, consultant and supervisor through email but not the teacher. Data were also collected through the examination of email using skill and the quality of academic papers, which were published on the electronic journal at EDNET Website. The names of participants do not appear in this report. Alternative names have been used to preserve participants' anonymity.
4.5 The EDNET project

During the preparation period of the EDNET project, the researchers had deeply studied networking technology and connecting to the Internet. The researcher found that the alternative technologies for computer mediated communication were Bulletin Broad System (BBS) and the Internet (Email, FTP, and WWW). After discussion with the other participants at the participatory workshop the Internet was selected in the project. The details of the EDNET development and timetable for its implementation are as follows.

4.5.1 The EDNET development

The EDNET development was based on the results of the ethnographic study. The findings led the researcher to come to the solution of using Internet for professional development process of school teachers. The Virtual University: Professional development for Teachers was established. The project was aimed to professionally develop resource personnel at school level to be capable of using a computer network for their professional development. The specific objectives of this project are:

(1) to set up the computer network for educational usage among teacher educators at school level for their professional development

(2) to develop a network for educational training programs for curriculum and instruction in the Northeast.

The hardware and software used in the project are detailed in Appendix A. At the physical layer of the network, the EDNET server was set up at the Faculty of Education and connected to the KKU-Net at Computer Centre, Khon Kaen University through the modems and the leash line (a copper wire). The Practical Peripherals modem (PC288LCD) was selected for connection because it supports leash line connection. The connection of EDNET server to the KKU-Net was shown in Figure 4.3.
In 1993, the KKU Net, a computer network within the Khon Kaen University, linked computer network at the Faculty of Science and the Faculty of Engineering to the Computer Centre through the leased line. The KKU Net was connected to the Internet via the satellite with 64 Kbytes. The optic fiber backbone construction for the KKU Net was in the IT development planed in the 1996 financial year. Thus at the time the connection of EDNET server had to use the leased line. Linux 2.0.30 was selected and installed on the EDNET server for running the operating system and tools (see Appendix A for details).

4.5.1.1 The Web page construction

In the light of the advancement of IT, its impact on distance education, and supports for IT in Thai schools and at Khon Kaen University, the Internet was selected for the new approach of teacher professional development. At the beginning of the EDNET development the researcher had no experience with HTML (Hypertext Markup Language). So he had to start studying HTML to construct the HTML files. The Notepad was used as a text editor for HTML files construction. Netscape V.2.0 was used for the HTML browser to check the HTML files. At the time he found that it took a lot of time to construct each Web page.

The structure of EDNET Homepage was designed based on the results of participatory workshop. It was developed in Thai at http://ednet.kku.ac.th (see Appendix D). Its main components are:
• EDNET introduction
• a six week training course
• educational consultation
• educational articles
• the Electronic Journal of Education
• CMI and CAI download site
• link to other Web site, and
• Internet search.

The electronic mail server was also constructed. All twelve participants were given their own email account at ednet.kku.ac.th.

4.5.1.2 The courseware development

The courseware on academic paper writing was constructed for a six week training course through the EDNET homepage. The courseware is a learning program text adapted from the printed program text which developed by the researcher in Thai. It was used in short course training programs at several secondary schools for three years. The courseware consisted of five units, they are: basic skills, structure of academic paper, information collection for writing, writing introduction, and writing academic paper. Each unit was designed with the same structure: objective, main idea, content, and activity for practising.

This courseware, academic paper writing, was selected based on the results of the participatory workshop to find out an appropriate process of training through the WWW.

4.5.2 A timetable and activities for change

One of the results from the participatory workshop (on February 16, 1996) is the tentative timetable for the EDNET project. The timetable was proposed by the
participants which was based on the convenience of all participants. As a result, a timetable was prepared prior to the project implementation as shown in Table 4.1.

<table>
<thead>
<tr>
<th>Date</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 3, 1996</td>
<td>• A one-day workshop on Internet skills.</td>
</tr>
<tr>
<td>June 4-7, 1996</td>
<td>• School visiting for setting up hardware and software consultation.</td>
</tr>
<tr>
<td>June 10- July 19, 1996</td>
<td>• Implementation of the first cycle of action research.</td>
</tr>
<tr>
<td>August 16 - December 12, 1996</td>
<td>• Email activities: consultations, discussions, and communication with participants via email. Re-plan and prepare for the second cycle of action research.</td>
</tr>
<tr>
<td>December 20, 1996 - April 11, 1997</td>
<td>• Implementation of the second cycle of action research.</td>
</tr>
</tbody>
</table>

Table 4.1 The timetable for the EDNET implementation.

During the action research the participants were assigned to follow the activities of the study. The three main categories of activities are the six-week training course participation, development of using email skills, and development of using WWW skills. The activities that participants have to follow in each category are:

4.5.2.1 The six-week training course participation

It was suggested to participants that they study all five units of the six-week training course, academic paper writing course, within six weeks. Participants were asked to submit the practice activities of each unit to the researcher via email.
4.5.2.2 Development of email skills

The purpose of this activity is to provide the opportunities to the participants in using Eudora software for communication. Participants were assigned to send email to the researcher at least two messages per week about their journal writing of using services that available at EDNET. They were also assigned to send email to other participants at least four messages to share their experiences about using Internet. The participants were suggested to use the advanced operation of sending email, for example CC, signature, and attachment.

4.5.2.3 Using the World Wide Web

The purposes of using WWW is to provide the experiences about using a web browser software and improve participants' skills in searching and retrieving information from the resources in the Internet. Participants were assigned to explore some educational, government, and business homepages and send their comment and reflection about search the information.

4.6 Strategies for analysis

In analysing the data collected by means of the techniques outlined in techniques for monitoring the study, the researcher, operating in a critical mode, was not bound by the same rules as technical researchers who are necessarily concerned with such concepts as internal validity, external validity, reliability and objectivity. However, the researcher was concerned with such terms as credibility, transferability, dependability and confirmability to ensure trustworthiness (Guba and Lincoln, 1987). These are achieved by triangulation techniques, grounded theory, illuminative evaluation and other techniques involved in analysing data suggested by Schatzman and Strauss (1973), Spradley (1980) and Lofland and Lofland (1984).

Triangulation as a technique involves combining multiple data sources and research methods in the study of the same phenomena so that the research problem can be explored from different perspectives (Denzin, 1971). Triangulation technique was
employed by combining multiple data sources and research methods. A triangulation of research method in this study included the ethnographic study, participatory workshop, action research and email communication among participants and the researcher. The researcher checked the contents of the teachers’ diaries (see Appendix B) sent to the researcher through email with the transcripts of the tape recording, the diary entries of the researcher.

Grounded theory was developed by Graser and Strauss in the 1960s (Graser and Strauss, 1967). The theory was used to develop theory from discovering data, from practice to theory. Data analysis in grounded theory concerns thematic induction in three simultaneous activities: describing and coding the action in the setting, developing categories or concepts and comparison of categories with other categories to establish hypotheses that relate to develop theory (Kozma, 1985).

In this study the analysis concepts of grounded theory were employed in describing and categorising data under the appropriate headings. These categories were then compared and discussed with participants through the collaborative analytical techniques employed through participants’ email communication and the later reflections made by the researcher.

Parlett and Dearden (1977) described that illuminative evaluation is involved with information gathering, description and interpretation rather than measurement and prediction. The process in illuminative evaluation are to observe, inquire further and seek to explain in order to "sharpen discussion, disentangle complexities, isolate the significant from the trivial, and to raise the level of sophistication of debate" (Parlett and Dearden, 1977, p.24). The process of illuminative evaluation was stimulated by the group reflection of participants and by personal reflection of the researcher. The group reflection process was particularly helpful in illuminating the data collected during the workshop phase and the implementation of action research.

In this study the data were analysed following collection, as categories were developed and alternative hypotheses were proposed and further explored while the researcher was at the schools and communicated with participants through email. The
final analysis was done during and at the end of each cycle of action research. The researcher used triangulation techniques to ensure dependability and confirmability. By the process of in depth description derived from illuminative evaluation and grounded theory, transferability can result. By checking back with participants through email, by developing a good rapport amongst the participants and by spending time with each participant at schools and communicating through email for a year, it was ensured that the researcher was correctly interpreting the data collected.

The analysis of data in the action research phase involved the cross-referencing of a number of participants of events in order to identify ideas, and to reflect on events which enhance the process of enlightenment (Henry, 1980). The researcher employed the action research philosophy that analysis should involve group discussion of issues of concern to identify criteria that would indicate the improvement of professional development.

Validity in action research refers to an improvement of practice through the development of practitioners (Lomax, 1986). Lomax made the point that:

> The validity of what we claim would seem to be the degree to which it was useful (relevant) in guiding practice for particular teachers and its power to inform and precipitate debate about improving practice in the wider professional community. (Lomax, 1986 cited in McNiff, 1988, p.131).

The researcher established the validity of a claim to knowledge and improvement of practice through self-validation. By this it is meant the researcher used his own knowledge of practice to interpret his observations, to share his interpretations with the participants and make decisions on how to improve it. By obtaining the agreement of participants on researcher's interpretations and decisions, peer validation was achieved.
4.7 Chapter summary

This chapter described the methodology of the research which is based on critical theory, professional development in Thai school context, adult education, and action research. The appropriate methodologies included ethnography, participatory workshop and action research. The study was carried out in four phases. The study design was developed based on an ethnographic study and participatory workshop. The fieldwork consisted of four steps: an ethnographic study, workshop, managing change (planning), and implementation the plan through action research.
CHAPTER 5

PARTICIPATORY WORKSHOP

5.1 Introduction

The purpose of this chapter is to describe the conduct of the participatory workshop held at the Faculty of Education, Khon Kaen University. The purpose of the workshop was to obtain the perceptions and critical reflections on the current professional development processes in Thai schools and to negotiate among participants to setup an alternative model for improving the professional development of Thai school teachers.

5.2 Participatory workshop

The participatory workshop was conducted in February 1996. A group of teachers who work with the researcher develop a collaborative approach to search for an alternative model for improving professional development process for teachers. The group sought to understand the nature of the professional development process in Thai schools and planned to improve it. The ethnographic study of professional development in Thai schools (as outlined in Chapter 2) provided the participants and the researcher with the base-line data for understanding the existing professional development of Thai teachers. The work of the participatory workshop group represented a planning phase for the action research cycle, which is outlined in section 4.5 and 4.6.

5.2.1 The participants

The participants who worked with the researcher were ten teachers from five secondary schools in Khon Kaen. There were eight males and two females, full time teachers, five of them held B.Ed. and the others held M.Ed. degree. There were five computer, two Mathematics, two science, and one English teachers. All participants told the researcher that they were interested in engaging in the EDNET project. The
group included Boonsong, Damrong, Ekachai, Chudapa, Anucha, Anupong, Chawalit, Danu, Boutong, Erawadee, and Dome, a computer network expert from a computer shop.

Participants were using computer in their work but nine of them had no experience with computer mediated communication (CMC). All five secondary schools were large schools located in the city. There were computer laboratories in all five schools. At this stage the researcher was aware that the CMC was new for the participants. It was challenge to find an appropriate model to induce participants to work with the new technology.

5.2.2 The workshop

The participatory workshop was selected as a method of inquiry since it allowed the participants and the researcher to enhance group understanding through the interpretation of perceptions and the closer examination of activities and relationships associated with the participants' professional development (Guilbert, 1981; Kemmis, 1988). These understandings were of particular importance for the improvement of professional development process, which was the aim of this study. A human approach such as the participatory workshop method allowed the researcher to build an atmosphere of openness and trustworthiness so that the participants can be critically constructive when operating with the group (Davis and Callon, 1977; Guba and Lincoln, 1982). As this participatory workshop was primarily devoted to planning, the group was recognised as being the first phase of an action research cycle. The participants were decision-makers in the process of planning an improvement in professional development process, through the implementation of the EDNET project.

The timing of the workshop was selected strategically to coincide with the participants' convenience. It was held on February 16, 1996 at the conference room in the computer laboratory of the Faculty of Education, Khon Kaen University. At the outset, the workshop was designed as a one-day flexible workshop. This meant the workshop could be extended. Since the participants had detailed discussions with the
researcher from the beginning of the operation of ethnographic study, the workshop was finished in one day.

5.3 Workshop in action

Throughout the conduct of the workshop the participants were engaged in planning a discussion of the current professional development of school teachers, analysing and reflecting critically on the existing professional development process. Participants were involved in the development process of an alternative professional development model, understanding the model, and planning for the implementation of the alternative model. They were involved in such activities as they worked through five stages as follows:

First session, in the morning

Stage 1 Setting the climate

The researcher planned to make a tape recording on the conduct of the workshop, so he could learn from the process and improve his skills as facilitator in the day operations of the workshop. On Friday, 16 February 1996, the researcher arrived 15 minutes before the session started. He re-checked the tape recorder, computer, and the video projector to make sure that they were ready for use. Table and chairs were arranged in a U shape, so that everyone could see each other.

After all participants arrived at the conference room, one teacher, Anucha, said: "what we are going to do today?" Since there were twelve participants at the conference, he felt that it differed from the workshop which there were usually more than a hundred of participants at the workshop. The workshop was very informal and the researcher took the opportunity to begin by explaining the purpose of the workshop and informal stating the principles and objectives of the EDNET project which enhance understanding and improve professional development of teachers. He explained the activities of the workshop as follows:
We will work together today on the professional development (PD) of Thai school teachers. I would like to collect our perceptions about our PD, so we need our distributions and suggestions about our experiences with our current PD and how we could improve our PD. It is an informal workshop. Please feel free and relaxed, we are free to work together today.

The researcher tried to develop a casual climate, by using a sense of humour, by including Dome in the conversation. He is a computer network expert from a computer shop in Udornthani province, who volunteered and was willing to help in establishing the EDNET project. By providing the participants with snacks during the workshop, with coffee-break and lunch together, and by calling each other by nicknames, they began to feel that they were close to one another, being friendly and relaxed.

After letting participants talk to each other about their work such as the problems of teaching with computers and implementing the computer network (LAN) in administrative work in schools, the researcher learned that most participants took responsibility for computer implementation in their schools. As the time went by, the researcher learned that most participants felt free and relaxed to discuss and share their experiences about their work. The researcher thought that being Thai and understanding Thai people helped him to set the climate for the participatory workshop which led to the discussion in the next step, because participants were happy and relaxed.

**Stage 2 Setting objectives**

After setting the climate, the group set the objective for the workshop together. The questions to be answer here:

- What is the workshop for?
- What will be the outcome of the workshop?
- How can we achieve the outcome? And
- What are we going to do with the outcome?
After using the brain-storming techniques we came up with the following objectives:

1) to enhance our understanding about what was happening in the current professional development of school teachers.
2) to reflect on what was happening, the strengths and weaknesses of the current professional development of school teachers.
3) to identify ways we might improve the effectiveness of professional development process.
4) to plan together to implement our alternative approach to professional development process.

At this stage the participants seemed to accept the objectives without question and changed some schedules of the workshop.

Stage 3 Focusing on the current professional development of school teachers

Following the setting of the objectives, the researcher provided an opportunity for participants to understand and reflect on what was happening in the current professional development of school teachers at the Faculty of Education, Khon Kaen University, by viewing the videotape of a computer training course about using Microsoft's software, PowerPoint. The aim of viewing the videotape was stimulate participants to reflect on the conduct of this training course, since video can be used to stimulate discussion and to provide real life examples.

While viewing the videotape, some participants took notes. Some of their expressions were:

For training in how to use a computer software, it is necessary to attend a computer training course. Practice skills are only developed when one has enough experiences in using the software. In training courses requiring practice, the attendance of participants is required.
The video showed a process of training in which lecture and practice go together. This training approach is appropriate with the training course which mainly aims to develop practising skills of the trainees. So face to face training is still necessary.

It looks like a lecture in many parts of the training. Listening to the trainer is time wasting for someone who already knows what the trainer is talking about. I saw several trainees at the back of the room who did not listen to the trainer. The lecture might be boring for them, so they practice using the software without listening to the trainer.

This situation is quite the same as in my computer class. My students always practise using the software without listening to my lecture. It is not different between the young and adults. I believe that when a trainee sitting in front of the computer, he or she would like to use it instead of listening to the trainer.

At this stage the participants picked up the points from the researcher’s presentation and from viewing the video. They were reacting to the process of computer training courses which is one of the professional development programs at the Faculty of Education, Khon Kaen University. They were thinking critically and judging the professional development process.

Following the discussion session, with its atmosphere of stimulating discussion, the researcher invited the participants to discuss the following questions in two groups of five:

a. What are the characteristics of current professional development processes of school teachers? Are we satisfied with the processes, and why?

b. What are the strengths of the current professional development of school teachers, and why? (After discussion about this question the meaning of
the term "strength" was clarified) What are the appropriate methods good for and how do they help us to be effective in our professional development?

c. What are the weakness of the current professional development of teachers, and why? This involved the discussion of the issues which inhibited the professional development process of teachers.

One teacher, Boonsong, started giving his suggestion on the discussion that:

We should start with sharing our experiences about attending the previous professional development programs. This helps us to explore the current professional development processes and we can judge what are the strengths and weaknesses of the programs.

All participants agreed with the suggestion. During the discussion several participants in each group distributed their experiences about attending some professional development programs hosted by various educational institutions. Some participants did not provide their experiences but joined the discussion by asking some useful questions, such as "Do your school principal encourage all teachers in school to participate in the professional development activities?" "Would you please tell us more about your school policy about professional development of teachers?" These questions led the group to rethink more deeply about the school principals' perceptions about staff development in their schools.

During the discussion, the researcher helped the participants to reflect their own experiences, to become self-reliant and to release themselves from the other experiences. Everyone participated in a friendly and relaxed manner (see Appendix C). Each group's opinions were then drawn out and written on transparency sheets and presented to the whole group. The following characteristics, strengths and weakness were identified.
The characteristics of current professional development

For more than three decades, research has indicated that school should be the focus of efforts to improve the educational practice of teachers (Gross & Herriott, 1965). Many teachers intuitively have come to the same conclusion that the school is the primary unit of change in education. Most participants agreed that the characteristics of current professional development are as follows:

a. Current professional development programs are mainly organised and offered by higher education institutes, such as universities, colleges, and Rajapath Institutes, and are not a response to teachers' needs.

b. Most inservice professional development programs are based on lecturing approaches. The lecturers play the major role at the workshops or conferences. The major activity of the participants is listening to the lecturers.

c. The content of the professional development programs mainly concern education theories. It is difficult to transfer those theories into teachers' practices. Some conference topics are ideal and far from the real classroom practices.

d. Most instructional strategies suggested by educators at conferences and seminars were not appropriate for large classrooms.

e. Most professional development programs are not responsive to teachers' problems and needs, since developers designed the professional development program without using information about the teachers' problems and needs for professional development.

f. Most schools have clear staff development policies that promote and support teachers to participate in professional development programs. But all teachers are facing with the lack of time and financial support to participate in the programs. This is the major problem of professional development for teachers in Thai schools.

g. Most teachers have positive perceptions of professional development and are committed to self-development through inservice training programs.
According to the workshop the following strengths and weaknesses were identified:

**Strengths**

a. Higher institutions- universities, colleges, and Rajaphat Institutes, organise and offer professional development programs for teachers.
b. Most schools have their clear staff development policy.
c. Most schools promote and support teachers to participate in the professional development programs.

**Weaknesses**

a. Most professional development programs are not responsive to teachers' problems and needs
b. Most professional development programs are based on lecturing approaches, the lecturers play the major role at the workshops or conferences.
c. Content of the professional development is concerned with education theories and is difficult to transfer to teachers' practices.
d. Some conference topics are ideal situations that are far from real classroom practices.
e. All teachers are faced with lack of time and financial support to participate in professional development programs.

On this first session of the workshop the atmosphere of friendliness and openness was developed. The participants developed critical thinking from reflection on the current professional development programs and they began identify the problems associated with these programs.

**Second session, in the afternoon**

**Stage 4 Developing the professional development model**

The researcher summarised the results from the first session which indicated what help or inhibited them in the professional development process. He then presented this question for discussion by two groups of five participants:
"How can we improve our professional development process?"

He gave a brief introduction, explaining that the aim was to share their understandings and ideas to improve it. His role in this stage was to help the participants to clarify formats and activities of professional development program which respond to their needs. The reasons for this were to induce the participants involved in clarifying their needs and gain consensus in order to assist collaborative and participative involvement and gain overall improvement (Kemmis & McTaggart, 1988).

After five minutes of discussion one participant suggested:

We should use the results from the previous study, the preliminary study by the researcher in 1996, as a frame of discussion. It will help us save our time and focus on our work more quickly.

All participants agreed with him so the researcher presented the results of the preliminary study about professional development for teachers that was done in 1996. The results were:

- Thai teachers’ needs for professional development (see Figure 2.1, p.27);
- Thai teachers and professional development model (see Figure 2.2, p.30)
- The available support for professional development in Thai schools (see Figure 2.3, p.31);
- The limitations of professional development for teachers (see section 2.8, p.31).

The researcher also asked Dome, one of the participants, to introduce the advantages of the Internet, the World Wide Web (WWW) and email, that could be used as knowledge resources and communication media. The researcher believed this would enhance participants' experience with Internet technology and lead them to reflect on how implement it in the professional development process.
Following the presentation, the researcher then facilitated a group discussion on how these concepts could improve the professional development process. His role in this stage was to challenge the participants with questions which promoted clarification, facilitated problem-solving and stimulated discussion. He used the following questions:

How can we improve our professional development programs that respond to teachers' needs?

How can we lessen the limitations of professional development for teachers?

How can we use the information technology to improve our professional development process?

What emerged from the discussion was realisation of the future and weakness of the present professional development process. As some participants pointed out:

Our present professional development process is not a clear system. There is no clear action plan about the format and content that responds to teachers' needs. Teachers have no opportunities to participate in the design of professional development programs offered by many institutes. In response to the question: how can we improve our professional development process, should we think about effective professional development systems first?

The professional development process is a change process. We put teachers into professional development programs because we want to change teachers. Why don't we clarify the components of this change process.

Internet technology is a powerful tool that should be used for decreasing the limitation of professional development for teachers. How can we integrate it into the professional development process?

These comments were the turning point which led the participants and the researcher to clarify their questions. They realised that they had no idea about the relations
among the change process, the system and professional development process. They felt that in the past they participated in the conferences, seminars and training courses because they just want to learn more or to know other new and different ideas. They do not think about the effects on other teachers, students and school improvement. They saw the need to develop a professional development system for the implementation of information technology and life-long learning principles in their professional development process.

At the end of this session participants agreed to draw the relationship of the four major factors that were concerned in professional development process. One participant suggested that:

We should start with examining the factors that were concerned in the relationship between school teachers and professional development, school teachers and the faculty of education, and information technology and professional development. Then we can integrate them together to see what is the appropriate system that we should deal with.

All participants agreed with him and the discussion started with this framework. At the end of the discussion the group proposed the four maps as follows:

Map 1: School teachers and professional development
Map 2: School teachers and Faculty of Education

Map 3: Information technology and Faculty of Education

Map 4: Information technology and professional development

At the end of this stage participants came to the conclusion of the alternative model of the EDNET project. It is the integration of the four maps and will be used as a framework for EDNET development as shown in Figure 5.1.
Figure 5.1 The EDNET Project: A Model of IT Application in Professional Development Project for Thai School Teachers

The group felt that the model in Figure 5.1 was too abstract to understand, so they identified the activities in the EDNET Project by combining the EDNET project model (Figure 5.1) and the model of professional development for Thai teachers (Figure 2.2) to make it more practical. The proposed structure of the EDNET Homepage as shown in Figure 5.2 used for the EDNET Web site development (Appendix D)

Figure 5.2 The structure of the EDNET Homepage
This structure was also based on the participants' needs which included participation in a training course (academic paper writing) and development of using Internet skills (Email, WWW, and FTP). All participants agreed to summarise each component as follows:

- Introduction of EDNET project: giving the details of the EDNET project;
- Academic paper writing: a training course which could provide information about the effectiveness of using Web page for training;
- Send Email to participants: an activity for participants to develop the skill of using email;
- Science-Math papers: a reading resource for participants to enhance their experiences in self study through a Web page;
- Electronic journal: a Web page for publishing participants' papers which were the product of academic paper writing activity;
- FTP: CMI & CAI software: a Web page for enhancing participants' experiences in FTP which is one of the Internet services;
- Links to other Web sites: a Web page for providing the information resources in the Internet that would enhance the participants' experiences in using the WWW;
- Internet search tools: a Web page for enhancing the participants' experiences in using some search tools.

**Stage 5 Planing for implementation**

The participants and the researcher started a discussion about whether the alternative model of EDNET project seemed an ideal model if it were not planned to put it into practice. The researcher's role at this stage was to help them to formulate their ideas and to suggest the ways in which the model should be put into practice. This was done by challenging them with the question "What is appropriate strategic plan, in order to put the model into practice?"
The participants agreed that this question was obvious. One participant suggested that we should start with identifying the activities that concern the implementation of the model. Then it can easily be seen who should take responsibility in each activity. At the end of discussion the participants identified the activities that should be done and the person who should respond to each activity for the implementation of the model. The plan of the activities is listed in Table 5.1.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Respondents</th>
<th>Date of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Development of the EDNET Project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• EDNET server</td>
<td>• Researcher and IT assistant</td>
<td>• March 1996</td>
</tr>
<tr>
<td>• EDNET Web site construction</td>
<td>• Researcher</td>
<td>• March-May 1996</td>
</tr>
<tr>
<td>• Training courseware development</td>
<td>• Researcher and participants</td>
<td>• March-May 1996</td>
</tr>
<tr>
<td>2. Preparation for action</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• One-day workshop</td>
<td>• All participants</td>
<td>• June 1996</td>
</tr>
<tr>
<td>3. EDNET in action: Action research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The first cycle</td>
<td>• All participants</td>
<td>• June-July 1996</td>
</tr>
<tr>
<td>• The second cycle</td>
<td>• All participants</td>
<td>• August-December 1996</td>
</tr>
<tr>
<td>• The third cycle</td>
<td>• All participants</td>
<td>• December 1996-April 1997</td>
</tr>
</tbody>
</table>

Table 5.1 Tentative activities and timetable for the EDNET implementation

Following the discussion about the activities and timetable of the EDNET implementation, the researcher then facilitated a group reflection on how they felt and what they learned from the workshop. All participants were surprised that such a big job was completed. Some participants told to the group that this was the first time that they participated in a workshop with such a relaxed and friendly atmosphere. And at the end of the day all participants promised to work together to reach the goals set.
5.4 The researcher’s reflection

The major result of the participatory workshop was the development of the framework of the EDNET project development and the structure of the EDNET Homepage. Simultaneously, the participants learned about current professional development processes, preparations for change, reflections from experience, creating a supportive atmosphere, and applying information technology in the professional development process.

The researcher was aware that he had imposed on the group a set of concepts and principles related to teachers' professional development process, but he thought that it was very helpful in enhancing understanding. He felt that he had gained understanding of the following ideas:

1. Having a firm and active mind helped the researcher to reflect upon action in the workshop. The tape recording helped him to improve himself by telling less but facilitating and stimulating more.

2. The opportunity to adopt an active and enthusiastic role encouraged the participants to engage in active participation. The participants said that the researcher’s enthusiastic feeling about this innovation challenged them to find out what the result would be. They saw him as a facilitator and this gave them confidence.

3. It was a one-day workshop. The participants and researcher spent time of the workshop effectively. This was confirmed by the result of the workshop that the group could achieve all the objectives of this workshop. The researcher learned that setting a good plan will help the group work effectively.

5.5 Chapter summary

This chapter was concerned with the planning of a strategy to improve teachers' professional development process by involving teachers in a participatory workshop. The researcher and participants used a critical approach to challenge the current professional development process. As a result of the collaborative process employed
in the workshop, an alternative model of information technology application in professional development for Thai teachers known as the EDNET Project and the structure of the EDNET Homepage were developed to improve teachers' professional development process.

After the completion of the workshop, the EDNET project and the structure of the EDNET Homepage were used as framework for managing for the change.
CHAPTER 6

THE EDNET IN ACTION

6.1 Introduction

This chapter deals with a story about the implementation of the EDNET project. By undertaking three cycles of the action research, the researcher together with ten teachers (the same group from the participatory workshop) implemented the alternative model developed from the workshop. The major research question guiding this implementation was: How can information technology, especially the Internet, be used to improve the professional development process for Thai teachers? This chapter deals with the search for the techniques of Internet implementation that would encourage teachers to develop skills in using Internet and search for an appropriate professional development model through the Internet. The main issue in this chapter was the process of implementation: the preparation for the implementation, the process of changes in the three cycles of action research, and the outcome of the alternative model.

6.2 The context of the implementation

Implementation was conducted during both in the regular workday and the weekend so participants could participate in the project at anytime both at school and at home. Ten teachers from five schools were participants in this study.

Using the action research process of planning, acting, observing, and reflecting, the first cycle was implemented from June 4, 1996 to July 19, 1996 with ten teachers. The second action research cycle consisting of re-planning, action, observation, and reflection was followed from August 16, 1996 to December 12, 1996 for developing the participants' skill in using the Internet. The third cycle started on December 20, 1996 and finished on April 11, 1997 for maintaining the participants' skills in using the Internet for professional development (See Figure 6.1).
The major period of the first cycle was six weeks in duration. The cycle started with a preparation phase of hardware and software installation followed by six weeks of the project activities and ended with a conclusion phase where the participants reflected their knowledge and skills developed from their six weeks experience (See Figure 6.2).

In week one, consisting of a cycle of six days, the participants were assigned to plan their activities during the week with the researcher via Email on Sunday. The major activities recommended were attending the online academic paper writing course, communication with other participants and the researcher by using Eudora, and searching and reading the educational resources on the Internet by using Netscape navigator. Then they followed the activities in their proposed plan during Monday to Friday. At the end of the week, on Friday, they were assigned to reflect on their activities through the week by sending to the researcher via Email (See Figure 6.2).

The reasons for the implementation were to introduce the participants into the starting point of using the Internet and to overcome a failure of necessary hardware and software installation for connecting to the Internet.

6.3 Preparation for the implementation: A one-day workshop

Prior to the implementation of the EDNET project, the researcher conducted a one-day workshop for participants on June 3, 1996 at the Faculty of Education, Khon Kaen University, Thailand. The purpose of the workshop was to prepare participants' basic knowledge and skills in hardware and software installations for connecting to Internet, using Email and Web browser software, and other Internet services.
Figure 6.1 Three Cycle of Action Research Spiral in the Implementation of the EDNET Project (Adapted from Kemmis and McTaggart, 1988, p.11)
Figure 6.2 The First Cycle of Action Research
6.3.1 Workshop plan

The research and participants plan to work in one day of achieve the aim of the workshop. Participants agreed to set the workshop schedule as follows:

June 3, 1996

08:30 - 09:00 Introduction
09:00 - 10:30 Hardware and Software Installations
10:30 - 10:45 Break
10:45 - 12:00 Trumpet Winsock: setting up and usage
12:00 - 13:00 Lunch
13:00 - 15:00 Using Netscape Navigator

    Internet services: gopher, telnet

15:00 - 15:15 Break
15:15 - 16:00 Using Email: Eudora
16:00 - 16:30 Discussion and suggestions

(The details of software used in the project are in Appendix A)

6.3.2 Workshop activities

In the morning the researcher started by explaining the aim of the workshop to participants. The demonstration by the researcher and practice by the participants were the main strategies used in the workshop. Each participant individually practised modem use and necessary software installations. Then they had the opportunity to practice using all software installed. The manual of installation and instructions for using the necessary software that participants could follow step by step was prepared by the researcher and was used in the workshop.

During the day the researcher observed the participants' responses to the activities and interviewed them to collect the data for the participants' knowledge and skills assessment. At the end of the day the discussion session was set up to encourage the participants to share their experiences and clarify all essential knowledge and skills in using the Internet.
6.3.3 What happened in the workshop?

According to the data collected through observations and interviews with the participants, it was found that the workshop facilities and activities were appropriate for enhancing the participants' knowledge and skills.

Workshop facilities

The researcher prepared the manual of modem and software installations and the step by step instructions for using all necessary software by participants. It was also used as a reference for participants when they worked individually at schools.

All participants found that the manual was easy to follow and very useful for working with later. The contents covered all necessary knowledge and skills for using the Internet. As they expressed:

This workshop is very interesting and easy to follow because the manual made it seem very simple. I never used the modem to connect to the Internet before but I can set up the computer for connecting to the Internet successfully. I feel that it is the same as connecting the video player to the television set.

The manual is very useful for me to work with the communication software. I have never heard about modems and Internet connection through the telephone line but today I can set it up and dial to connect to the kku host successfully. It's amazing!

Computer laboratory

The workshop was operated at the computer laboratory, Faculty of Education, Khon Kaen University. The computer network was well equipped with twenty workstations
and a server. All computers were ready to use, there was no problem with the hardware and software. The researcher realised that this is a very important factor in computer training courses so he spent two days checking all hardware and software before the workshop started. Two internal campus telephone lines were also prepared for connecting to the modems. Some participants told the researcher that the workshop was well prepared there was no problem with the hardware and software that usually occur in computer training. As one participant commented:

I think this is my first time that using the computer in the training course without hardware and software problems. I have learnt that the preparation for running the activities is very important. Participants can pay attention to the contents and practising. I think we use the time effectively because the computer worked with no problems.

Workshop activities

The researcher planned to develop the participants' knowledge and skills in using the Internet by providing demonstrations and practising installations and using the modems, Trumpet Winsock, Eudora, and Netscape navigator. He realised that these were necessary basic knowledge and skills for using the Internet. The participants could follow all activities and gained more experiences in using the Internet. They felt more confident to install and use these software by themselves. As some participants stated:

A modem and a telephone line enhance the efficiency of a computer. I have just understood the work "computer network" and how it works. After learning from the demonstration I feel it's not difficult to use because I can set it up and use it. I'm so excited when I can use the Trumpet Winsock for connecting to the KKU and using the Eudora to tell something to my friends. I never knew that there were so many knowledge resources on the Internet and I can use them in my work.
Yesterday I don't understand how people communicate with others through a computer network, but today I know that it is not difficult if I have a modem and a telephone line. It seems magic but it's a real thing. Arjarn Paisan sent a message to Khun Dome by using Eudora then Khun Dome sent the message back to Arjarn Paisan. I think this software could be used for our communication, it's faster and better than sending a letter by post.

After participating in the last workshop I ask myself "What is Internet?" I can't answer this question. Today, only one day, I feel confident to talk about the Internet with my friends. I have learnt and practised more with dialling through a modem, using Eudora and Netscape. I think I can use them at my school.

The above participants' expressions show that they were confident to use the Internet when they go back to school. The activities of the workshop encourage and enhance the participants' knowledge and skills in using Internet. The researcher found that if it was made simple and participants were supported to success in practising, they would gain more and have a positive attitude toward using the Internet.

6.4 Action research cycle No.1

The action taken in this cycle (Figure 6.3) was to implement the EDNET Project at http://ednet.kku.ac.th. It was a cycle of six weeks duration. Ten teachers participated in the project. The aim was to find out and overcome the problems that might occur in getting started using the Internet.

The researcher, as a counsellor in the school visiting week, kept diaries and interviewed participants. During the six weeks the researcher communicated with the participants via email. He used email for interviewing and counselling with the participants. The participants kept diaries and sent to the researcher via email. At the
end of the cycle, the sixth week, the researcher and participants reflected together on the implementation via email discussion.

![Diagram showing the first cycle of action research: Getting started cycle]

Figure 6.3 The First Cycle of Action Research: Getting started cycle

The researcher and participants recognised this cycle as a "getting start cycle" because it was the first time experiencing the Internet for them and they had difficulties in hardware installation and the hardware network. Most of the participants could not develop their skills in using the Internet because they had not enough time to practice. However, in the sixth week, three participants finished the activities of the online training course in academic paper writing.

The process of implementation in this first cycle was presented under heading of school visiting, the six week monitoring, and reflection on events as follows:

6.4.1 School visiting

The first week of the EDNET project implementation started with hardware and software installation for using the Internet. Participants were assigned to install the modems and all necessary software, they are Trumpet Winsock, Eudora, and Netscape
navigator. The researcher prepared two installation diskettes and distributed them to all the participants. The manual of hardware and software installation which was used in the one-day workshop was recommended as a reference. The researcher planned to visit each school as follows:

June 4, 1996 School A and School B
June 5, 1996 School C
June 6, 1996 School D
June 7, 1996 School E.

The aims of school visiting were to support the participants in hardware and software installation and to find out the difficulties that might occur. The researcher's roles were facilitator, counsellor and observer in the events. Interviews and diary keeping were used for data collecting during school visiting.

What happened in the events

Visiting school A

The researcher arrived at school at 9:00, Ekachai and Chudapa were waiting for in the computer laboratory. Ekachai showed the researcher his computer set which its modem and all necessary software already installed. He is a computer teacher and working as an expert in computer curriculum for the Institute of Promotion of Science and Technology Instruction (IPST), the Ministry of Education, Thailand, so he had no difficulties with modem and software installations. But Chudapa who is a Mathematics teacher has not much knowledge and skills in using computers. She only started using a computer for one year while she was doing her Master of Education. She was not confident to work alone with a computer so she was pleased to learn about the Internet with Ekachai.

Ekachai felt that the two installation diskettes were very convenient for installation process. He said:

I used the two installation diskettes received from the workshop to install all software easily. There was no
problem with modem and software installation. After finishing installation I try connecting to the EDNET server it works properly. I used Eudora for sending a message to you yesterday and I got your reply this morning. I also checked the Netscape navigator to access the EDNET homepage this morning, there was no problem. But I think it was very slow to transfer the data from the Web page.

(Journal extract, 4/6/1996)

Ekachai demonstrated dialling the modem to connect to the EDNET server and open the Netscape navigator to show how slow it was. It was found to be slow because he was using the computer with SX486 CPU at 120 MHz speed and Windows 3.11 Thai Edition. The modem speed was another factor of data transfer speed through the network. He used a 14.4 kbps modem to connect to the telephone line. It was agreed that the slow data transferring is not a major problem for their first time using the Internet because they can learn and practice with the hardware they have got. It wasn’t necessary to invest more money in their activities.

After spending about two hours with them, before leaving the school the researcher discussed with Ekachai and Chudapa about the plan for next week and asked them to send their weekly plan to him via email.

*Visiting school B*

At school B, Chawalit, a science teacher and Damrong, a computer teacher were participating in the EDNET project. On the afternoon of June 4, 1996 the researcher arrived at school at 13:00 as appointed. Damrong was waiting in his office next to the computer laboratory. He phoned to remind Chawalit to come to meet with the researcher and talked about the assignment while waiting for Chawalit for five minutes. Damrong told the researcher that he installed the modem and software already but the modem did not respond when he dialled through Trumpet Winsock. When Chawalit arrived a solution to the problem was sought. The researcher let them work together to see how they worked and what was problem. They followed the step
by step instructions as described in the manual but the researcher found that they had forgotten to install the modem driver which is one of the important steps of modem installation. Damrong said:

This is my first time using the modem. I just bought it last week. I try to read the manual but it was in English so it is very difficult to understand... My English is very poor (...laughing...).

(Journal extract, 4/6/1996)

With the researcher supervising they start working on setting up the modem driver from the diskette which came with the modem. After checking the configuration of Trumpet Winsock they tried dialling for the first time to connect to the EDNET server but the line was busy. They tried with the other five phone numbers but they were busy so they had experience with the sound of a busy line. Damrong tried dialling again with another phone number and the sound was different from the busy sound, which meant he could connect to the network. He continued using Eudora for sending an email message to Ekachai, then tried using Netscape navigator to search on the Internet by using Yahoo search tool. Although he worked slowly, he succeeded in using those two software.

Chawalit asked for the opportunity to use Eudora and Netscape so we let him try, as this was his first time using the Internet. He tried to follow the manual he received from the workshop. Damrong assisted him by explaining what to do when he was not sure. After spending thirty minutes practising with Eudora and Netscape the researcher asked them what they would like to know further about using the Internet. They learnt that this was just the start up period, and they would like to practice more to become familiar with it.

The researcher continued discussion with them by asking these questions:

What are the difficulties we are facing?
What we have learnt today?
How much confidence do you feel in using the Internet?
They learnt that using the technology, especially the Internet, is not difficult but basic knowledge and skills for dealing with an unexpected problem is very important. Setting up the hardware (modem) was their difficulty because they had no experience with it. With the researcher’s help they had learnt and practised together on dialling to connect to the Internet and using the basic software both Eudora and Netscape. They felt more confident using the Internet. As Damrong said:

"Today is a big day for me because I have learnt from you and can set up the modem successfully. I can connect to the EDNET for the first time. I can use Eudora and Netscape at my office. I feel I can go out to talk with the others and study what I would like to know through my computer. But I think I need more time to get familiar with this technology. I have to use it everyday."

(Damrong's journal extract, 4/6/1996)

Chawalit, as a science teacher, felt this was just the beginning for him in using the Internet. He had learnt a lot about the Internet by reading from Science and Computer magazines but never touched it in practice. He did not feel as confident as Damrong. He needed more time to practice with it. As he commented:

"For me, today is a starting point of the first phase of using the Internet. I have learnt how to set up the modem while was Damrong working with it. I would like to do it by myself, may be in the next time with my own computer. Although I can use Eudora and Netscape, I need more time to practice for enhancing my experience. However though I feel more confident when I work with Damrong. I think I need more help from you. Let me contact with you via email, I think I can learn from you via email."

(Journal extract, 4/6/1996)
Before leaving the researcher reminded them to start all the next week’s activities that they were assigned in the one-day workshop.

*Visiting school C*

On June 5, 1996, the researcher visited Anucha and Anucht at 9:50. Anucha who is an English teacher also acts as a vice school principal for academic affairs. Anucht is a science teacher. He teaches Physics and Computer subjects. They set up a new computer installed with 14.4 kbps modem in Anucha’s office on June 4, 1996. He connected the telephone line to the modem and dialled to connect to the EDNET. They demonstrated using the Eudora and Netscape to the researcher. They did not feel confident using Eudora and Netscape because they had only started using the software the previous day. So today they had opportunity to practice with consultation and coaching from the researcher to make sure that they could use the Internet properly. Anucha said:

This is my first time using the Internet so I am not confident to use it. I think it’s just starting point of my experience with Internet. However, practising with you today I feel more confident to use it.

(Anucha's journal extract, 5/6/1996)

Anucht felt more confident in using Netscape than Anucha because he finished his Master of Education in the field of Educational Technology last year. He quite familiar with computers, especially Computer Assisted Instruction. Today he demonstrated that he could search the educational resources in the Internet by using Yahoo and Alta Vista search tolls. But his English is not good so he was faced with difficulties in reading to understand the information from each search result. As he said:

Using the Internet is not difficult because I have experience with using many computer software programs while I was doing my Masters degree. But my major difficulty is English, as most search results on educational resources in the Internet are in English and this makes me spends a lot of
time getting information from those resources. I would like to see more educational resources in Thai.

(Journal extract, 5/6/1996)

The researcher encouraged him to think about how to deal with these difficulties. Anucha suggested that they should work together to learn and practice using the Internet because as an English teacher he can help Anuchit in dealing with this problem. This reflected that they start thinking about the benefit of collaboration. As in responding to Anuchit's difficulty, Anucha said:

I think we should work in collaboration to help each other. I have difficulty in using computer software but English is not my difficulty. Anuchit has difficulty in English but he quite good in using computer software. We might propose a project for collaborative work.

(Journal extract, 5/6/1996)

**Visiting school D**

The researcher went to see Erawadee and Danu on June 6, 1996. Erawadee, a female science teacher, had very little experience in using computers. Danu, a male teacher, has taught with computers for three years. His office is in the computer laboratory. Danu told the researcher that he had not got the modem yet, it was in the process of being purchased. So a new appointment was made for June 12, 1996.

When the researcher phoned Danu on June 10, 1996 to confirm the appointment Danu confirmed his meeting. Danu said that he had the modem and had successfully installed it. He tried sending email messages to Damrong and Anucha and he received the responses from them. This proved to the researcher that Damrong understood and could work by himself.

The researcher visited Danu and Erawadee on June 12, and they discussed the difficulties of hardware and software installations and using the Internet. Danu and
Erawadee could both install and setup the modem and software properly but they had no experience using Eudora and Netscape and wanted to practice with the researcher. Under the researcher's coaching, Erawadee started trying with Eudora to send a message to Danu for testing whether it works or not. Danu called Eudora from his directory and checked incoming mail. He got the message and replied to Erawadee. He also sent another message to Chawalit. Erawadee checked incoming mail in her directory. She got the replied message from Danu. These activities enhanced their understandings and skills in using Eudora. They were satisfied with the activities and felt more confident in using this software. As Danu said:

It's a good opportunity for me to practice using Eudora today. It makes me clear how it works through the network and how to use it. However, I need more time to get familiar with it because it's my first time in using email.

(Journal extract, 12/6/1996)

Erawadee added her reflection on this activity that:

I think using the Eudora is not difficult if I have more opportunity to practice. This is my first time to have experience with it. I feel more confident to use it by myself.

(Journal extract, 12/6/1996)

After discussing using Eudora, the researcher asked them about using Netscape. They preferred practising the next day because it may confuse their using Eudora. So the researcher encouraged them to use both communication software everyday if it was possible. At the end of the visiting the researcher reminded them to start the assignment for the EDNET project.

Visiting school E

On June 7, 1996, the researcher visited Buatong, a computer teacher, and Boonsong, a science teacher at Buatong's office. They started by discussing modem and software installation. Buatong told the researcher that he had not got the computer and modem
yet. They had to buy a new computer set because all computers installed in the computer laboratory are very slow and not suitable for installing the Windows 3.11. The school principal had agreed to purchase a new one for the EDNET project but they have to wait another week. The researcher was aware that if the project was explained to school principal properly, it would be supported.

On June 14, 1996, Boonsong phoned the researcher and asked for consultation on setting up the new computer which they had received and tried to install the modem and software but had not succeeded. The researcher worked with Buatong and Boonsong on June 17, 1996 as arranged agreed. The aim of visiting was to encourage and give suggestions for them to install the modem and the necessary software for connecting the computer to the Internet. The researcher was aware that the more they worked by themselves, the more experience and skills they would get. So the researcher’s role in the activity was a coach who observed and provided suggestions when they asked for them. The difficulties they faced were with the concepts about modem and software installation, because this was the first time they used Windows 3.11 as the operating system software. So they needed more time to get familiar with Windows 3.11. As Boonsong said:

I only use software on DOS platform, the Windows platform is new for me. I think it is difficult because these two concepts are different. However, I need more time to practice using Windows, dialling through Trumpet Winsock, Eudora and Netscape. I can say it is a turning point of my using computers.

(Journal extract, 17/6/1996)

After successfully installing the modem and all necessary software for using Internet, Buatong started working with Eudora and followed by Netscape. The researcher encouraged Buatong and Boonsong to use Eudora by asking them what they should do to check the message had been sent and the incoming mail in the inbox. The researcher was aware that letting them thinking about the activities that they should do would help them develop their thinking about planning to work. They found that by sending email to each other they can practise and suddenly get the results both sending and checking email and proceeded to send each other messages. Boonsong replied to
Buatong’s message, they learnt how to send the message by using the reply function. Then Buatong check his in coming message to learn how to get and read the new message. The researcher suggested that they should practice sending message to the other participants to develop their skills in using Eudora. They agreed to practice more in their activity plans in the next four weeks.

Buatong and Boomsong asked for practice with Netscape because they did not feel confident using it. The researcher stimulated their interest by letting them survey through the EDNET homepage to get familiar with Netscape. After spending about one and a half hour on Netscape, they felt more confident to use it. As Buatong said:

Having experience with Netscape, I think it is not difficult to search and get information on the Internet. I found that the Thai Web page is very convenient for me because my English is not good. However, I think I have to improve my English because there are plenty of resources that were published in English. English is necessary for using the Internet.

(Journal extract, 17/6/1996)

Before leaving school the researcher reminded them to start the assignments of the EDNET project. They understood that they had to inform the researcher of their weekly activity plan via email, use Eudora to communicate among participants to create a teacher network, attend the online six-week academic paper writing training course, and use Netscape for collecting the information to write a paper.

6.4.2 The six week monitoring

This monitoring phase followed the model of the first cycle of action research, a major cycle of six weeks (Figure 6.2 p.149). The participants were asked to follow activities of a major cycle of one week. It started with individual weekly planning then followed the individual activities they had planned and end with reflection on their experiences with the activities they had done during the week. All participants were asked to communicate with the researcher via email.
6.4.2.1 Planning for monitoring the activities

All participants were assigned to send individual planning for weekly activities to the researcher via email. The plan included what activities they would like to do during the week. In addition they had to set the aims of these activities for use as a frame of individual assessment at the end of the week.

In the first week six participants at school A, B, and C sent their weekly plans to the researcher via email. The plans showed they were eager to participate in the EDNET project. They clearly set the aims of each activity plan as very useful for making individual assessments and reflections. These are some interesting extracted email messages:

This is my first email to let you know about my activity plan in this week. I propose to send at least three email messages to other participants to practice more using Eudora. As your suggestion on attending the online six-week training course, I attempt to start studying the first unit to get familiar with the online training that I have never known before.
Would you please let me know when you get my message?

(Email extract, 10/6/1996)

It's so exciting to start the activities of the EDNET. This week I plan to email to Anucha and Damrong to get started communicating with them and I would like to see how it will be different from using the telephone. I also plan to attend the first unit of the academic writing training course to see how much I can learn via the online course.

(Email extract, 10/6/1996)

Arjarn Paisan (the researcher's name), it is so surprising for me to use the Internet. It's really my first time to plan for study by myself. Just let you know my plan for this week, I
will email to Anucha, Chawalit, and Ekachai to see how much they can learn through the EDNET homepage. I also plan to participate in the first unit of the online six-week training course to see how much I can learn from the unit. Don't expect that I will finish all my activities for this week because I'm so busy with my teaching but I will try my best.

(Email extract, 10/6/1996)

Arjarn Paisan, I think it's not too late to send my plan for this week. I was so busy with school board meeting yesterday but I always think about my activities and that I should participate for this week. I plan to finish the first unit of the six-week training course within this week. In addition I will email to several persons to practice more with Eudora. I will let you know what I have learnt in the week.

(Email extract, 11/6/1996)

The other four participants at school D and E were late participating in the project because they were faced with the hardware difficulties. Two participants at school D were three days late and the others at school E were one week late. However, they tried to catch up with the activities they were assigned. As they said in their email messages:

Paisan, thank you for your help in working with me to setup the modem and install the necessary software. I was 3 days late following the EDNET activities. I got an email from Anucha, who told me that he started studying the first unit of six-week training course and email activities two days ago. I replied to his email and he replied to my message very quickly. It means now I can use Eudora to communicate with the others. So I have to start my activities to catch up with the others. For the rest of this week, I plan to send at least two email message to Damrong and Chudapa to see how much they communicate through
the project's activities. I plan to start the first unit of the academic paper writing course, I hope I would learn more about paper writing. I'm waiting for your response.

(Email extract, 13/6/1996)

Arjarn Paisan, have you got the message from Boonsong that he sent to you yesterday? Chawalit sent a message to me and I have learnt that I was a week late to attend the EDNET activities. Chawalit encouraged me to participate in the project's activities. I think I can catch up with the others. Anyway, I plan to send email to Danu and Anuchit to see if I can get reach with them or not. I may attend the first two units of the six-week training course within this week. Thank you for your help on Monday for coaching us so our computer could connect to the Internet. I will try to keep connect with you via email.

(Email extract, 18/6/1996)

The above extracted email messages showed that most participants appreciated starting the project's activities. They were becoming more friendly and open with the researcher and the other participants. They had used the email to communicate with the others and this was probably the development of the teachers network.

6.4.2.2 Monitoring of events

The researcher and participants described the first cycle of action research as a "getting started cycle" because they were inducted into getting to know and practice using the Internet for the first time. The activities of the project, using email, using the WWW, and attending the online training course were new to them. They changed their perceptions and activities in the professional development program. They also had difficulties in both access to the network and using their Internet skills. The researcher shared these difficulties with the other participants and the difficulties of monitoring the project's activities were also found in this cycle. However there were some
potential developments that seemed to encourage the participants using their Internet skills.

According to the assignments of the EDNET project, the participants were asked to follow three major activities:

- Using email skills;
- Using World Wide Web (WWW) skills; and
- Attending the online training course.

**Using email skills**

All participants were assigned to use Eudora for communicating with the others in the first cycle of action research which lasted for six weeks. They were asked to send at least two messages in each cycle of one week. The researcher asked them to use the carbon copy (CC) function to send the messages to him for data collection which were later analysed to find out what communication among the participants was about. This was based on participants' considerations about which messages they think the researcher should know. If they would like to keep their privacy, they did not need to send the message to the researcher.

**Email and personal communication**

In the first cycle, it was found that participants used email for both private and academic communications. For private communication, the contents of the email messages were about personal contacts. Several messages dealt with social events and other personal communication such as:

> Hi Damrong, tomorrow night we will have a welcome party for our new teacher students who do teaching practice at my school. This semester we have five student teachers from KKU. I would like to invite you to joint the party at my home. The party will start at 18:00.

(Email extract, 25/6/1996)
Email and academic consultations

Some participants used email to track academic consultations among them and with other outside experts as they found that it was very useful for asking for suggestions and information. This was evident in messages such as:

Ekachai, I have heard from a science teacher at my school that there is an interesting online CAI at SchoolNet Web site. But I don't know what its URL is. Would you please give me its URL or where and how I can find it?

(Email extract, 19/6/1996)

Anucha, please try getting to the SchoolNet Web site from the NECTEC Web site at "http://www.nectec.or.th" Please let me know if you can find it or not!

(Email extract, 20/6/1996)

Some participants consulted with the outside experts via email about programming. Anucha who was developing a student registered program at his school consulted his problem in programming with the lecturer at a demonstration school at KKU. He found that email could be used as a new way of learning, especially to learn from the outside expert. As he commented in his email message to the researcher:

In the past I consulted my problems concerning the software development with Arjarn Pong (a research name) via telephone but I could not contact him for many times. Sometimes I have to go to see him at his school and bring the diskette with me to correct the debug of the program. After using email for a while I think it is convenient to communicate with the others. I can attach the source code files with the email message. So I try using the email to consult with Arjarn Pong. I feel I'm getting close to him through the email and more confident to work on programming.
To analyse how email could be used for consulting with an outside expert, the researcher asked for the permission from Arjam Pong and Anucha to use their email message for describing the events. Their communication through the email were as follows:

Arjam Pong,
Thank you for your last suggestion, I can solve the problem of input variable by using the GET command. But I am still faced with the problem of searching the case by using the name field. I use the "GO for variable name = tname field" syntax, but the syntax error message still popping up. Would you please give me your suggestion on this issue?

(Email extract, 23/6/1996)

Arjam Anucha,
According to your problem, I think the type of data field-character or numeric, is a sensitive of the syntax. You need to check your data file to see the "tname" field is character of numeric data type. It must be character type. Try again, good luck!

(Email extract, 26/6/1996)

Arjam Pong,
I changed the "tname" field to character type but the same syntax error still occurring. Do you have any suggestion about this?

(Email extract, 26/6/1996)

Arjam Anucha,
I think you are better to attach your data and command files with email message to me. I will work more easily. I need
the files to examine if there is another syntax error in your program that affected this command.

(Email extract, 26/6/1996)

Arjarn Pong,
I examined through the command file but I could not find the syntax error. So I attached the data and command files with this message. Would you please help me, find where the error is?

(Email extract, 27/6/1996)

Arjarn Anucha,
I send you back the data and command files with this message. Please look at line 15 and 97. Comparing to the old lines marked with *, you can see the differences of these two lines. Keep working on your programming and don't hesitate to tell me when I can help you. Cheers!

(Email extract, 27/6/1996)

Arjarn Pong,
Thank you very much for your helps. I have learnt that the type of variable in variable declaring line must be the same as the type of data field in the data file. This is another lesson I learnt from you. Thank you again.

(Email extract, 28/6/1996)

Another participant, Damrong used email to consult with Dome, an expert in networking who was one of the EDNET participants. Damrong decided to set up the Local Area Network (LAN) in his computer laboratory but he had no ideas and knowledge to work with. The researcher advised him to contact Dome and learn from him. The researcher encouraged Damrong to use email for this activity. After spent about two weeks of consultation via email communication, Damrong sent email to the researcher and reflected about the activity and what happened during their communication. As Damrong described in his email message:
I contact Dome with my first email message on June 27, 1996 to ask for help. I explained to him that I plan to set up a LAN system in my computer laboratory but I know very little about LAN. Dome responded to my request very quickly. He was willing to help me. So in the next four email messages of our communications I have learnt a lot about the LAN Server, the Clients, the network cabling, the server software, and the multi-user applications. Dome helped me to write the hardware specifications for setting up LAN. I prepared the proposal for presenting at the school budget committee meeting. Now, I feel more confident to present my proposal. I think this is my experience on using email to contact with the outside expert that we should recognise about getting the benefit from the technology.

(Email extract, 16/7/1996)

Some participants used email as a track of communication for science teaching consultations among them. They found that they could contact the others at anytime. They can learn from each other via email. In addition, they used a nickname for a group mailing address when they wanted to distribute the same message to all participants as the researcher did. They agreed that using email to communicate with each other was very convenient. It was two-way communication and asynchronised communication, which means that two persons did not need to communicate at the same time. It was better than using the telephone and experiencing that we could not reach the person we phoned because he/she had gone out.

Using WWW skills

All participants were assigned to use the Netscape browser for accessing the suggested Web site linking from the EDNET Web site. The aim of this activity was to induct participants into the new concept of accessing knowledge resources. In the cycle of one week it was suggested that they learn to use at least two Web pages of the EDNET and freely use the Internet search tools. During the week they were asked to send their
comments on what they have learnt from the WWW to other participants and the researcher via email. At the end of the first cycle of this action research most participants described that they spent most of time using email so they had not practised enough using the WWW.

Some participants said that browsing the Web site seemed like walking into the library of the world. They found that plenty of the information was difficult to choose for later use because they lacked information literacy. They did not know how to assess which information was suitable for them so they spent too much time with the unsuitable information. This made the researcher aware of a difficulty in using Web sites in Education. As Chawalit expressed in his email to the researcher:

Yesterday I surveyed the EDNET Web site, I found many pages that are available for my work. I think because it was in Thai. I also used Yahoo search tool with the key word "science teaching" and the search results came out with more than 45000 related Web sites. I spent about two hours examining two interesting Web sites but I could not find the information I was looking for. I think I need more time to practice with using Internet search tools.

(Email extract, 4/7/1996)

Another participant made a comment on using the WWW that with the link on the Web page it seemed like walking into an endless road of information. Each time he used the search tool, when the results came out with thousands of related Web sites he did not know to select an appropriate information. As he commented in his email message:

Every time I browse a Web site I always ask myself how big are the information resources on the WWW. Every time I click a mouse button I come to another new page which contains plenty of information. It seems like walking into the endless of the library of the world. What should I do with the thousand related Web sites of the search results? I
think I need more time to learn about using the Internet search tools because there are many things I do not know.

(Email extract, 11/7/1996)

At the beginning of the fourth week of the first cycle, there were three participants using the WWW, the others practised only using email skills. To encourage the participants to browse the Web sites, the researcher sent email to all participants to suggest the selected Web sites that they should examine. The message was:

Dear EDNET members,
We are reaching the first day of the fourth week of the EDNET project. I have got email messages from you and collected them for data analysing to get the information for our EDNET Development. However we are practising very little with Netscape navigator so I would like to suggest several valuable Web sites for school teachers. They are:

http://www.moe.go.th
http://www.moi.go.th
http://wphat.simplenet.com

Don't hesitate to browse these Web sites, you will find something interesting! Please let me know what you found from these Web sites. Good luck.

(Email extract, 30/6/1996)

Six participants responded to the suggestion. They found that the Thai Web pages were valuable for them because they could understand and use the information effectively. As they expressed in their email message:

Thank you Arjarn Paisan. The Web site of the Ministry of Education is very useful for school teachers. I found many pages at the site that extended my knowledge about our Education Revolution, Education Quality Assurance, and Teaching Standard of Teachers. I sent email messages to tell Boonsong, Erawadee, and Danu about the site. I have not
browsed the other two Web sites yet. I will try as soon as possible.

(Email extract, 2/7/1996)

Arjarn Paisan, I agree with you that the three Web sites were very valuable for teachers. I browsed all three Web sites and I found that all these Web sites could be used as online teacher resources. Especially, the Withayaphat Web site (http://wphat.simplenet.com) is one of the new ideas about Internet application in education. Thank you.

(Email extract, 5/7/1996)

Arjarn Anucha, thank you very much for the reminder message on browsing the Web sites. I accessed the Web site of Ministry of Interior, I found that this Web site is very useful for Social Study teachers. There is plenty of information about Thailand. This Web site could be used as teacher resource and a learning resource for students.

(Email extract, 9/7/1996)

These responses reflected that keeping close contact with participants and encouraging them regularly to participate in activities was very important for monitoring events. This information suggested that the researcher should plan to encourage all participants via email message twice a week.

Attending the online training course

Another major activity that participants were assigned to attend was the online training course on academic paper writing. The researcher developed this courseware in Thai and published it on the EDNET Web site at http://ednet.kku.ac.th/acadwrt.htm (12/6/1996). The online training course consisted of five units: the necessary basic
skills, academic paper structuring, information collection, writing introduction, and writing the main body. Participants were assigned to finish all five units within six weeks of the first cycle of action research.

Each unit consisted of objectives, main concepts, content presentation, and assignments. Participants were recommended to contact the researcher via email. The participants consulted about the lesson and sent the answer to the assignments to the researcher via email. The researcher gave suggestions and sent the scored assignments back to participants via email. Participating in this activity, the participants could not only follow the online training course but also have opportunity to get familiar with using email.

During the period of six weeks, Ekachai, Chawalit, and Anucha attended the online training course and contacted with the researcher via email regularly. Ekachai and Chawalit started studying the online training course in the first week, but Anucha started studying the course in the second week. At the end of the sixth week these three participants finished the course and sent their papers to the researcher for publishing in the EDNET Electronic Journal which is a component of the EDNET project.

Ekachai felt that this online training course was a new approach based on adult education and distant education. He could access and studied at school and sometimes at home. These were the elimination of time and place limitations for teachers who wanted to participate in the professional development program. He said:

After attending the academic paper writing course through the EDNET Web page, I think this was an appropriate application of Internet for professional development for teachers. Adult education and distant education could be included in the process that supports adult learning. When I would like to study, I can study whether I was at home or at school. The time and place limitations did not affect my learning. In addition, using the email communication in the process was very convenient for me to contact you.
Chawalit learnt in his first three weeks of attending the online training course, that in learning through the online course, self directed learning was very important. He planned his own learning time the followed the activities with his plan. He also found that this online course was an example of self study which based on a learner centred approach. He said:

After finishing the activities of the online training course in academic paper writing I have learnt that this was an example of a learner centred strategy. From my experience with the course, I had to plan my time table for studying to finish the course within six weeks. The activities during the weeks, I felt, were really self directed learning which is one of the major policies of the educational reform. I could finish the course in time because I seriously followed my studying plan. So I think "self directed learning" is very important in this online training course.

Although Anucha started the online training course one week late, he could finish the activities of the course at the end of the sixth week. He expressed that the thought online training was a new approach to training techniques that support professional development. He added that it was very flexible for the trainees to direct themselves through the course. This reminded the researcher about "flexible learning" which is one approach of information technology application in distant education and professional development program (Stacey, 1997). As Anucha said:

I spent the first week getting familiar with email so I started studying the academic paper writing course one week late. As I planned to start the course in my first week, I had to spend more time on the first two units of the course to finish them within the second week. The course itself is suitable for self study and very flexible to study. I can say it was
time and place flexible to follow the activities of each unit. I never attended a course like this but after finishing the fifth unit I found that this online training course is a new way of teacher professional development.

(Email extract, 16/7/1996)

At the end of the first cycle of action research five participants could finish three units and the other two did not start the activities of the online training course because they spent the time using email and browsing the Web sites. They commented that the three major activities: using email, using WWW, and attending the online training course, were new for them. They have no experience with the Internet so they could not finish all activities within six weeks. They agreed to have more time for developing these skills. Some participants reflected:

I could not finish the online training course because I spent most time on using email and browsing the Web site. I needed more time to practice this new technology. This is my first time to have experience with it.

(Email extract, 18/7/1996)

I can say it was my first time practising using these new technologies. As a science teacher, I think I must learn to extend my knowledge and practice more to develop my information technology skills. Six weeks were not enough for practising these new technologies. I need more time.

(Email extract, 19/7/1996)

I learnt from email communication with the others that somebody finished the online course, somebody came to the half of the course but I have not start the course yet. I understand that it takes time for change, especially changing with the new technology. I have no experience with the Internet so I need more time to get familiar with it.

(Email extract, 19/7/1996)
The information derived from email messages among participants showed that the most participants were getting familiar with using email for personal communication and some participants could use the Web browser for accessing the Web sites. Three participants finished the online training course and their papers were published in the EDNET Electronic Journal. The other seven participants could not finish the course because they spent most time on practice using email, which is new for them.

6.4.3 Reflection on events

This section includes the reflections of participants and the researcher on the first cycle of the EDNET project.

6.4.3.1 Participants' reflection

Prior to the reflection process the researcher interviewed the participants individually via email during the period of six weeks. In the last week he sent email to the participants asking them to reflect on their experiences about using email, Web browsers, and attending the online training course. The researcher presented the data collected in this cycle to the participants using the email at the end of this cycle. The aim of this email communication was to reflect together on their using Internet skills development through the EDNET project and to plan for the EDNET monitoring in the next cycle. They reached the following conclusions:

a. Several participants encountered difficulties participating in the email activities because this was the first time using the Internet. Some participants developed skills in using email to communicate with the others for both private and academic communication. They participated actively. They reflected on their own experience and pointed out the key ideas that they learnt and they helped each other learn. In addition they suggested that using email properly and regularly they could establish the teacher network.

b. Participants reflected that developing the technological skills needed time to learn and practice. The first cycle of EDNET project which lasted
for six weeks was not enough time to finish all activities. Participants agreed to extend the period of practical time for enhancing their experiences and developing their Internet using skills.

c. Participants reflected that using the Web browser to surf the Web sites was not difficult but it was time consuming. They found that many Web sites were very useful for teachers and suitable to be used as teachers' resources.

d. Participants concluded that using email to contact the researcher during the first cycle of action research was a new consultation tract. They learnt a lot from this activity. However some participants need more time to practice more in using email.

e. Some participants felt that the online training course, a six-week academic paper writing course, was an example of adult learning and distance learning applications in a training program. It was a practical strategy of professional development for teachers because it promoted self-directed learning and enhanced participants' information technology and academic paper writing knowledge and skills at the same time. However some participants could not finish the course because of their high school work load, so they could not follow their activity plans.

f. Participants reflected that face to face consultation was necessary in the first phase of change. As the EDNET project aim was to induce teachers to have experiences with the information technology, the face to face consultation in school visiting was a very useful activity for teachers to get started learning the new technology.

g. During the first cycle of action, some participants encountered difficulties dialling to connect onto the network. The telephone lines were busy so participants had to dial more than five times to get a successful connection. They found that the easy connecting time were from 8:00 to 9:30 and from 23:00 to 24:00 hours.

In addition, participants suggested that they needed more time to participate in the EDNET project for maintaining activities and developing their Internet using skills. This valuable suggestion was important for the researcher to revise the second cycle action plan of the EDNET project.
6.4.3.2 The researcher's reflection

The above evidence was collected in the first cycle: the researcher's school visiting observations, journal extracts, email interviews and reflections. On the basis of this evidence, the participants reached the conclusion described in 6.4.3.1. Here, it is possible for the researcher to draw additional conclusions about the process from the overall body of evidence collected.

Conformity of approach

A clear understanding of the objectives of the EDNET project, commitment, systematic planning, critical reflection and readiness by participants all played major roles in this implementation of the alternative professional development model. It seemed to the researcher that the participants and the researcher himself had to seek a conformable approach, seeking conformity of the implementation process, seeking conformity in activities, social relationships and forms of teacher network within a time-frame of activities. For example some participants went well in their development of Internet using skills and led to the formation of their network via email. After had tried to practice and improve Internet using skills three participants could finish the online training course.

Some participants had difficulties in connecting to the network, due to a failure in dialling to connect to the server and the lines were busy, so that they could not follow the time-frame of activities of the EDNET project. They need more time for practising in using email and Web browser.

Unsuccessful events

Unsuccessful events that the researcher discovered in this cycle were the difficulties of dialling to connect to the network and too short time for the first cycle. For example some participants told the researcher that they dialled to connect to the network, they had to dial more than five times to succeed because of the limitation of the telephone lines for modem dialling. Seven participants reflected that this was the "getting started phase" of the EDNET project, they needed more time for practising with the Internet
to get familiar with it. The six-week time-frame of the activities was too short to develop Internet using skills for new users.

**Successful events**

The participants’ success in using email, seemed to stimulate and enhance their using of the Internet. All participants expressed positive opinions on the activities of the project. For example Ekachai, Chawalit, and Anucha who finished the academic paper writing course reflected that it was suitable course for online training. They learnt how to write an academic paper and practised Internet using skills at the same time.

At this stage the researcher realised that in professional development program for teachers there is a need to adjust for flexibility that matches with individual experience, time, and skill. The researcher needed to extend the time for participants to get familiar with the Internet as the participants suggested in their reflections. The researcher planned together with the participants to continue the same activities of the EDNET project development

**6.5 Action research cycle No.2: Skills development**

It is shown if Figure 6.1 that three complete cycles were implemented in this study. This section the second cycle was reported under headings of problematic, planning for monitoring, and monitoring and reflecting on the events. Figure 6.4 summarised the process of planning, acting, observing, and reflecting in the second cycle. This second cycle was between August 16, 1996 and November 29, 1996.

The action taken in this second cycle was to implement the EDNET project by focusing more on enhancing the participants' skills in the Internet developed in the first cycle. The active involvement of participants and the researcher were through email communication.
6.5.1 The problematic

In the second cycle of action research (Figure 6.4) the participants continued their main problem from the first cycle and stated their problems in this cycle as follows: 1) How to improve the Internet using skills and to promote teacher network establishment? 2) How could we manage the time spent participating in the online training course?

6.5.2 Planning for monitoring

In this cycle the researcher had to spend his time for EdD. Program at Deakin University, in Melbourne, Australia from June 20 to December 12, 1996. In the planning for monitoring of the second cycle, the participants and the researcher decided that this was a good opportunity for them to practice more in email communication and continue activities of the online training course because they were in a real distance situation. The participants planned and followed their activities individually and communicated with the researcher via email as in the first cycle of action research. The researcher continued his role as a consultant via email.
6.5.3 Monitoring and reflecting on events

In this report the monitoring and reflection were integrated since this cycle was condensed for the purpose of this report writing. The following sections of the study integrate the monitoring and reflection stages for each activity in the cycle.

6.5.3.1 Participants' confidence using email

During the project the researcher relocated to Australia, to the Burwood campus of Deakin University. Though this caused some delays setting up computer and network access so that electronic communication could continue in Thai, the delay meant that only 2 weeks contact was missed. At this stage all participants were amazed and excited because they could contact with researcher, through email communication between Thailand and Australia. As some participants expressed in their email messages:

Arjarn Paisan, Thank you for your first message from Australia. How are you? It's amazing! I can talk with you via email. I'm waiting to hear from you. How about Melbourne? What does it look like? I'm still using email with the others.

(Email extract, 7/8/1996)

While working in Melbourne for four months the researcher used email to keep contact with the participants in Thailand. They learnt more about using the Internet by asking for advice from the researcher who played his role as a counsellor.

At the end of the second cycle of action research all participants reflected that they felt more confident in using email. Some participants used email everyday and felt that they had to check mail two times a day, in the morning and in the evening. One participant had use email to make links with a teacher at a secondary school in the United States of America to establish a cultural exchange project via email between Thai students and American students.
6.5.3.2 Six more participants finished online course training

In this second cycle of action research there were six participants who followed the online training course activities. At the end of this cycle they finished the course and reflected that learning through the online course was a highly self directed learning approach. The learners had to manage their time for working and learning properly. Some participants attended the course only from home because of their overload of school work. But some participants could attend both from school and from home, so they could finish the course in a short time. They suggested that this online training course could be used for teletraining in a professional development program for teachers because it supported distance and adult learning.

By participating in the online training course the participants also developed Web browser using skills. They searched and retrieved information from many Web sites to prepare for their paper writing. They felt more confident about using Netscape navigator for searching and retrieving information from the Internet.

6.5.3.3 Difficulties with hardware networking

During the second cycle of action researcher, the EDNET server was down for 29 days in four months period and the broken leased line of the network were major difficulties of the implementation. These difficulties obstructed the activities of the project, so the researcher collected the data about dealing with these problems (see Appendix A for details of problems). Need for a new server and a broken leased line caused lost contact among the participants and the researcher of nearly three months. However, this was a valuable experience for the participants and the researcher that in using new technology they may be faced with new problems that they need to learn to deal with it. This difficulty also suggested to the researcher to develop network cabling for the next cycle of action research.
6.6 Action research cycle No.3: Maintaining the EDNET project

At the end of the second cycle, the participants reflected on their experiences with the project and whether they should maintain the project for their professional development especially the teachers' network via email and the online training course. After the researcher went back to Thailand he set up the new EDNET server and connected it to the KKU-Net through the optic fibre system. This released the difficulties of server down time and the broken line that occurred in the second cycle. Figure 6.5 summarised the process of planning, acting, observing and reflection in the third cycle.

6.6.1 Taking aim

The participants and the researcher were committed to work together to maintain the EDNET project, so they focussed the aim of the third cycle of action research on what activities should be further attended to and how to extend the project activities to other teachers. They agreed to maintain these activities:

- Email communication
- Writing academic papers
- Using the Web browser
- Reading the electronic Journal of Education

6.6.2 Planning for monitoring

In this cycle the researcher and participants agreed to continue the EDNET project activities to maintain and extend the teachers network to other school teachers. They also planned to extend their experiences in using the Web browser for searching and retrieving information from the Web sites both in Thailand and the other countries. Participants were freely able to plan their own activities. They were asked to send an email diary to the researcher to reflect their experiences with the activities. This third cycle was between December 20, 1996 to February 20, 1997.
6.6.3 Monitoring and reflecting on the events

In this section the monitoring and reflection were integrated since this cycle was condensed for the purpose of this report. The following sections of the study integrate the monitoring and reflection stage for each activity in the cycle.

The EDNET server was more stable

Participants reflected on the capacity of the new EDNET server and found that it was more stable and data was transferring more quickly than the previous one. This was because the new server was linked to the KKU-Net through the optic fibre system. During the two months of this cycle it was never down.

Maintaining and extending the teacher network

Participants used email for maintaining their networking. For example, they consulted with the others on preparing lesson plans, instructional media production, and some teaching strategies in Science. Some participants sent email to teachers in the other
school who were not members of the EDNET project but had their own email account from the commercial Internet Service Providers and included them in the teacher network. They reflected that this was a practical way to extend the teacher network to other teachers. They planned to use email for monitoring academic activities among members in teacher network. They agreed to maintain email activities because they believed that if teachers could get benefit from email activities, the teacher network would never be lost.

Consultation with external expert

Some participants used email to consult with the external expert. For example, Anuchit who was developing a multimedia CAI for grade 11 students, asked for a lecturer at the Department of Physics to be a project consultant. They worked together successfully through email communication. Another participant, Damrong who was working on computer teaching and learning at secondary school level, consulted with a computer teacher at Khon Kaen University Demonstration School. They learnt from each other via email and later they established a collaborative project on computer teaching and learning.

More online training courses were needed

Some participants reflected that to maintain the EDNET project more online training courses should be developed and provided for individual interest. The more training courses, the more project activities there would be. This encouraged the researcher to study and work more on proving online training courses on the Web page.

6.7 Chapter summary

The main outcome of these three cycles of action research was the Internet application in professional development model. It was a framework for implementing the EDNET project in professional development for teachers. This included, getting started, skills development, and maintaining the EDNET project in the implementation of the model.
Through the action research process it was possible to employ email communication in the implementation of the online professional development program. This process led to establishing the teacher network that encouraged academic collaboration among teachers. Most participants felt more confident in using the Internet at the end of the project implementation.

In addition, as will be shown in chapter 7, it was considered that the study would possibly arrive at insights of wider interest to theorists involved in professional development for teachers and in action research.
CHAPTER 7

THEORETICAL CONTRIBUTIONS, IMPLEMENTATIONS AND PERSONAL REFLECTIONS

7.1 Introduction

This final chapter provides a re-conceptualisation of the findings of the study. It examines the likely derivative of these findings with reference to the theoretical contributions which can be made to the fields of professional development for teachers, a virtual university, and action research. This chapter examines some possible practical implications and includes the personal reflections of the researcher.

7.2 Re-conceptualisation of the study

This study aimed to improve professional development for teachers in Khon Kaen, Thailand by applying the Internet to the professional development program. The major question guiding this study was stated in the following terms:

How could Information Technology be used in developing an appropriate professional development model for Thai teachers?

This study has been based on the assumption that if there is a professional development program in which teachers can participate at anytime and on any topic they want, then teachers can release their time and financial limitations to participate in a professional development program. It was also believed that a computer network might be used as a means of delivering the program.

This assumption led to the study of the EDNET Project. It was an attempt to explore suitable methods of improving professional development program through the establishing of a computer network and teacher network.

A survey of the literature on the virtual university and professional development for teachers suggested that more than a thousand partnerships have been established
between schools and universities (Wilbur & Lambert, 1990). These collaborative projects concentrated on professional development for teachers via the university Web pages or virtual universities.

Research has indicated that schools should be the focus of efforts to improve educational practice (Gross & Herriott, 1965). Many teachers intuitively have come to the same conclusion that the school is a primary unit of change in education. Chapter three also outline strengths and weakness of current professional development of Thai teachers that should be focused on.

The application of information technology, especially the Internet, in professional development for teachers provides greater opportunities for helping teachers to participate in the professional development program (Rohfeld & Hiemstra, 1995). It appeared that no study had been conducted with Thai teachers to assess the effectiveness of this strengthened technology.

The researcher selected action research to achieve an improvement in implementation of the EDNET project because he believed that action research was an appropriate research methodology for the study. Data were collected through document analysis, interviews, participant observations, reflective diaries, and email communication. Analysis of a variety of data was based on theme analysis to classify and group data. Explanation and description of data and cross checking were also used. The principles in analysis were the triangulation technique, grounded theory and illuminative evaluation. Through the collaborative analytical techniques employed in the implementation of the model and through the reflections made by the researcher, it was resulted from a process of analysis and represented a grounded theory as it was possible to develop a monitoring model of the EDNET project (Figure 7.3) based on the participants' experiences with the alternative professional development model.

7.3 Theoretical contributions

Knowledge development from this study had the potential to contribute to knowledge development in three areas: development of Internet based professional development
for teachers, structure of the Internet based professional development, and monitoring model of the Internet based professional development program.

7.3.1 Development of Internet based professional development for teachers

The framework of the EDNET project development, an Internet based professional development (Figure 7.1), developed from this study has the potential lessen the weaknesses of the current professional development for Thai teachers identified in Chapter 5. The framework has two significant advantages: (1) response to teachers' needs, limitations of teachers' professional development, and teacher reform; (2) response to related aspects of theoretical framework involved in professional development for teachers.

7.3.2 Structure of the Internet based professional development program

Figure 7.2 outlines the structure of the Internet based professional development program which was the outcome of the study which included four steps: orientation, basic skills assessment, program activities, and post assessment.

Figure 7.1 The framework of the EDNET project development
Figure 7.2 describes the orientation that was necessary for the new learner. It provided the instructions for learner about how to follow the required activities. The basic skills assessment aimed to check whether the learner was ready to study or not. If the learner was not ready to study, attending the remedial study page was recommended to follow. The activities in the program included all necessary contents and skills for using the Internet. As in any training program, after finishing the last content unit the learners have to assess themselves to assure their successful completion.

7.3.3 Monitoring model of the Internet based professional development program

The monitoring model of the Internet based professional development program (Figure 7.3) developed from this study has potential to introduce information technology to teachers who have never had experience with it. The model suggests three phases of program monitoring: getting started, skills development, and maintaining the program.

7.4 Implications

This study produced evidence, within the context of professional development for Thai teachers, of how information technology, through use of the Internet, could enhance opportunities for teachers to participate in the professional development program by constructing the EDNET Web site. The study explored theoretical frameworks of distance education, adult education, and information technology which provided specific implications for Internet based professional development for teachers. It is possible for this study to widen its implications to professional development for teachers in general. Furthermore knowledge developed from this study might be applied in other educational institutions.

Practical implications

The results from this study indicated that the monitoring model of Internet based professional development program developed from this study provides an opportunity for teachers to participate in professional development programs. The model suggests that to assist teachers to have their first experiences with the Internet, to develop their
Figure 7.2 Structure of the Internet based professional development program
Figure 7.3 Monitoring model of professional development program
skills in using the Internet for participating the professional development activities and to maintain the Internet based professional development program, the major monitoring processes of the program are as follows:

1. School visiting is necessary for the first introduction of the program to teachers, as in the first cycle of this action research, because face to face coaching and consultation are needed for teachers who are not confident to start working with new technology. Furthermore, observations of participants' behaviour during the program activities could be done during the school visiting.

2. Email communications among participants and the professional development program coordinator is a major tool for online consultations and for data collection for program improvement. This study found that participants' daily diaries and reflections on the program could be collected via email. On the other hand, the program coordinators could use email for making comments on the participants' exercises and give other recommendations to support the participants while attending the professional development program.

3. Participants who are not familiar with the Internet need more time to develop their Internet using skills, as in the second cycle of this action research. The activities of the professional development program should be based on using the Internet services such as email, WWW, FTP, and on online training courses. Email communications could be used as tools for monitoring online training course activities and consultations during the program.

4. Teacher networks could be established through email communication among teachers. These networks will be more useful and powerful if teachers use them for their personal and educational development. Furthermore, this study suggested that networks could be extended to be educator networks that including teachers, educators, and faculties from all level of educational institutions and external experts.

5. The finding of this study suggested that to maintain Internet based professional development program, new online training courses should be provided for teachers. In addition, the activities of teachers networks
should be continued for both personal and educational development, especially focusing on teacher reform activities.

Other professional educators can benefit from the Internet based professional development program in this study since the model offers a process of implementation of the Internet in professional development. For example, the faculties in colleges and universities could use the above suggestions.

7.5 Personal reflections

At a personal level, the researcher reflected on the long journey of his study. It involved many people, many dimensions of epistemology as well as cultural involvement. He reflected on himself when he was an undergraduate and postgraduate student, a lecturer, a guest speaker, an educational administrator, and a researcher, he understood himself and his position better. He had been working, teaching, and speaking many things without really knowing the real meaning of his actions. This study taught him what is real learning.

Many colleagues told him that the idea of using Internet in professional development process seemed to be ideal. He was asked could it be used in real situations? The researcher believed that it would work under the assumptions of his study. His belief was confirmed when he actually saw the response to its implementation. In reflection and thinking back, it gave him "personal insight" through this innovative approach.

7.5.1 Reflection on researcher's role

The two main factors that could inhibit the participants working with the researcher were the researcher role perception and the nature of the study. Firstly, the researcher was viewed as a doctoral student and a university lecturer at the faculty of Education, Khon Kaen University. Participants might have felt discouraged by his observations, interviews, and working on the professional development program. Secondly, the nature of the study was to involve participants in ways of development of themselves through information technology skills which were seen as new innovations for them.
This study made participants feel comfortable cooperating with the researcher and they realised that many changes occurred during the implementation of the EDNET project. The researcher thinks that a key role in enhancing a good rapport in this study was his sincere intention to help participants improve their Internet knowledge and skills for their professional development, and his involvement in the real professional development situation as a facilitator, rather than being seen to work with them in order only to carry out a research project.

7.5.2 Reflection on the methodology

The triangulation of methodology, survey, ethnographic study, participatory workshop, and action research, provided a global perspective. The researcher’s long journey with these methods within a period of two years gave him the starting point to formulate his own framework of improving the teaching and professional development practice. He came to the point of understanding that no one single method can be applied to improve practice, it requires a multidimensional approach. This would depend on the persons, the culture in workplaces, the environment, and the interaction between person and environment. Culture plays a major role in both inhibiting and facilitating innovation.

The strength of this study was that participants continued the Internet based professional development program and extended their teacher network to other teachers in other schools. Participants keep on sending email to the researcher to report what they are doing. The EDNET project did not stop when the researcher stopped the action research cycles. In addition, by the end of this study the EDNET project was included in the Educational Development Plan (1997-2001) (Faculty of Education Khon Kaen University, 1996a) and the Information Technology Development Plan (1997-2001) (Faculty of Education Khon Kaen university, 1996b) of the Faculty of Education, Khon Kaen University. It has expanded its role for other educational developments and services.

Using email communication for data collection in this study was very convenient for the researcher and the participants. It could be used for data collecting through questionnaires, interviews, daily diaries, writing reflections, and group reflections. In
addition, it could be used for data validation, this meant that the researcher sent the conclusion of the findings to all participants for clarifying.

The weakness of this study was that action research was limited by the participants' diary writing. In this study, participants wrote reflective diaries under the headings of strengths, weaknesses, facilitating factors, inhibiting factors, feeling, and things needed to be improved in the implementation of the EDNET project (see Appendix B). This process helped the researcher and participants to clarify the issues.

The researcher did not prepare himself enough for the analysis and writing before starting to implement the project. He was not critical enough while he was monitoring the project. He developed more critical ideas during the process of final analysis from the process of analysis because his earlier experience with quantitative research provided a different model of theory generation.

7.5.3 Reflection on the analysis

Doing qualitative research, the researcher often felt that he was sinking in the sea of data and sought some means of making sense of these data. To some extent the drawing of diagrams provided a mean of clarifying categories of data. A grounded theory approach was employed in the study but it was never clear that the theories identified would have broad application outside the specific realms of this study. The researcher found that the qualitative researcher needed to be extremely patient in analysing and re-analysing data. His background as quantitative researcher in education often restricted his ability to understand the research methodology and statistical analysis used by social science researchers. His difficulties with English also often restricted his ability to express his ideas clearly.
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## APPENDICES

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- A: The hardware and software used in the project
- B: The Guidelines of reflective diary writing
- C: The participants and the researcher in the participatory workshop
- D: The samples of the EDNET Homepage
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Appendix A

The hardware and Software used in the project
**The server software**

*Server operating system*

The Linux 2.0.30 was selected and installed on the EDNET server for running the operating system and tools. The server software includes web server, mail server, and ftp server. The Linux is licensed software under the GNU General Public License (the GPL or copyleft). This means that it is intended to guarantee the freedom to share and change free software, and to make sure the software is free for all its users (Kamran, H., Timothy, P., et al., 1995). The Linux was selected because it is widely use for net server in Thailand. If the researcher face with the technical problem, he can easily consult with many Linux users and he can learn more from other Linux users’ experiences.

*Email software*

Eudora Light for Windows Version 3.0.5 (16 bit) was selected for communication software in the EDNET project. This is the freeware version of Eudora for Windows which own by QUALCOMM Incorporated. It was selected because it can be configured to use with Thai fonts easily.

*Web browser*

The Netscape navigator v. 3.0 was selected for web browser software in the EDNET project. Netscape navigator is registered trademark of Netscape Communications Corporation in the United States and other countries. It was selected because it can be configured to use with Thai fonts easily.

**The difficulties of the EDNET server**

The EDNET server firstly installed using the Linux operating system software on the Pentium 133 MHz with 32 MB RAM and 2.1 GB hard disk. The server was not only set up for Web and email server but was also used as a gateway for KKU Intranet.
Appendix A

The hardware and software used in the project

Hardware specifications:

A Pentium 133 MHz PC was used for the EDNET server. The server specifications are as follows:

Processor:
- Intel Pentium P54C series.
- Cyrix 6x86 and AMD-K5 64 bit microprocessor
- The mainboard run with 133 MHz speed.

Chipset:
- Intel 82437VX System Controller (TVX)
- Intel 82371SB PCI ISA IDE Xcelerator
- Intel 82438VX Datapath (TDX) EDS
- Winbond W83877F Super I/O Controller.

Cache Size:
- Build in 256 KB Synchronized Pipelined Burst Mode SRAM

Main Memory:
- 32 MB (32 bits non-parity 72-pin SIMM Module)
- Support Mixed memory Technologies:- EDO (Extended Data Output), Standard Page Mode (SPM), and Fast Page Mode (FPM).

Disk Drives:
- 2.1 GB Hard disk
- 3.5 Inch floppy disk drive
- 8X CD Drive.
This network was also used for KKU central library remote accessing which was the first development at that time.

The Faculty of Education library was the first library at KKU that used this system for testing the remote access to the central library via the network. The researcher checked the status of the EDNET server to collect the data on server down. The EDNET server was down on:

- August 27 (1 day)
- September 18, 24, 28, 29, 30 (5 days)
- October 5, 6, 7, 21, 22 (6 days)
- November from 11 to 27 (17 days)

The librarian at the Faculty of Education library sent email to the researcher every time that the server was down. So the researcher sent email to ask her to observe how many users accessed the system each time that the server was down. The researcher believed that the amount of data transferring on the network might be the cause of this problem. It was found that the EDNET server was down when more than five users accessed to the system at the same time. This finding suggested the researcher to plan for finding a new server which suitable for the system. On December 2, 1996 the researcher sent email to the secretary of the Faculty of Education to ask for purchasing the new EDNET server. The Dean of the Faculty of Education agreed to improve the hardware because it was in the Faculty Information Technology Development Plan. The researcher planned to set up the new server after he went back to KKU in the middle of December 1996 to implement the third cycle of action research.

**The broken leashed line of the network**

As described in section 4.5.1 and Figure 4.3, the leashed line was used for connecting the EDNET server to the KKU-Net. This technology not only effected on the low rate of data transferring, but also effected on the broken line problem too. The serious broken leashed line problem was from November 11 to 27, 1996. The researcher sent email to Dome, a network expert from a computer shop who was a voluntary participant in the EDNET project, to check the EDNET server. He could not find the
cause of broken line after working for two weeks. The researcher suggested he check the copper line from the Faculty of Education to the KKU Computer Centre. Finally, he found that the line was broken near the Faculty of Management Science due to the construction of a new building.
Appendix B

The Guidelines of Reflective Diary Writing
Instructions

Please use the following headings for your reflective diary writing. Your contribution is very important for the EDNET project improvement.

1. The strengths

2. The weaknesses

3. The facilitator factors

4. The inhibiting factors

5. Things needed to be improved

6. How do you feel about the EDNET project?

7. Other comments
Appendix C

The participants and the researcher in the participatory workshop
Participants distributed their ideas in the discussion.
Participants felt free in the discussion
Appendix D

The samples of the EDNET Homepage
Url: http://ednet.kku.ac.th/ednetman.htm
Printed date: 12/6/1998
เครือข่ายการศึกษา คณะศึกษาศาสตร์
มหาวิทยาลัยขอนแก่น

เพื่อเป็นการเฉลิมฉลองครองวาระสามสมบัติครบ 50 ปี ของพระบาทสมเด็จพระเจ้าอยู่หัว
รัชกาลปิยพิบูล และส่งเสริมการใช้เครือข่ายคอมพิวเตอร์ เพื่อพัฒนาการศึกษา
ในการครวญอนาคตเหนือ ซึ่งอยู่ในแผนพัฒนาการ ใช้เทคโนโลยีสารสนเทศ
เพื่อพัฒนาการศึกษาของทั้งวงมหาวิทยาลัย และกระทรวงศึกษาธิการ คณะศึกษาศาสตร์
มหาวิทยาลัยขอนแก่น ในฐานะสถาบันการศึกษาที่มีส่วนร่วมรับมือด้วย
ด้านการพัฒนาการศึกษา ได้ทุ่มเทจักร จึงเริ่มโครงการผลลองใช้เครือข่าย Internet
โดยเฉพาะการใช้ พพว เพื่อพัฒนาการศึกษาในภูมิภาคนี้
ระบบนี้เป็นระบบที่พัฒนาขึ้นในปัจจุบันไทย เพื่อให้ครู-อาจารย์ตามโรงเรียนต่าง ๆ
และผู้สนใจทางการศึกษา ได้มีโอกาสใช้เทคโนโลยีเครือข่ายคอมพิวเตอร์ เพื่อประโยชน์
ต่อการพัฒนาการศึกษาต่อไป

*** ATTENTION !!! ***

This homepage was created in Thai. Please click here for how to read in Thai

เมื่อเข้าสู่ระบบนี้แล้ว ท่านสามารถ ......
สิทธิ์ทุกชนิดเกี่ยวกับการศึกษา (EDNET:KKU)
คัดลอกสู่รายการเสียงและรายการวิทยาการ
ส่งข้อมูลถึงลูกค้าหนังสือ (Email)
สิทธิ์เข้าถึงเนื้อหาความรู้ทางการเรียนการสอนวิทยาศาสตร์และเทคโนโลยี
อ่านวารสารอิเล็กทรอนิกส์การศึกษาศาสตร์ (Electronic Journal of Education)
ให้โปรแกรมประยุกต์ทางการศึกษามาใช้งาน (CMI และ CAI)
รายชื่อ Homepage ทางการศึกษาอื่น ๆ ที่มีอยู่ใน WWW

การใช้ระบบนี้ ท่านจะเลือกคอมพิวเตอร์ที่ภายในห้อง ต่อไปนี้เพื่อเข้าถึงการใช้งานในห้องนี้

ขอขอบคุณ ............ ผู้ให้การสนับสนุนและดำเนินการต้นทุนในโปรแกรม EDNET

คุณพงษ์สิทธิ์ จันทะไชย
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คุณณพนพ์ ดวงสว่าง
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บริษัทลู่เอ็มเกิดคิดเดน

ปัจจุบันงานวิจัยเมื่อ 5 พฤศจิกายน 2539.......Last update: November 5th, 1996

โปรดติดต่อสอบถามและดำเนินการเพิ่มข้อมูลที่เป็นประโยชน์ที่ poisson@ednet.kku.ac.th
ระบบเครือข่ายการศึกษา (EDNET)

เป็นโครงการเพื่อพัฒนาการใช้เทคโนโลยีเครือข่าย Internet เพื่อการพัฒนาการศึกษา ระบบนี้เป็นระบบที่พัฒนาขึ้นเป็นภาษาไทย เพื่อให้ครู-อาจารย์ตามโรงเรียนต่าง ๆ และผู้สนใจทางการศึกษาได้มีโอกาสใช้เทคโนโลยีเครือข่ายคอมพิวเตอร์ เพื่อประโยชน์ต่อการพัฒนาการศึกษาต่อไป

ใครบ้างที่มีสิทธิ์ใช้ EDNET?

ระบบเครือข่าย EDNET เป็นระบบที่พัฒนาขึ้นสำหรับอาจารย์และบุคลากรทั้งในคณะศึกษาศาสตร์ โรงเรียนและหน่วยงานอื่น ๆ ที่เกี่ยวข้องกับการศึกษา รวมทั้งผู้สนใจทางการศึกษาทั่วไป

เครือข่าย EDNET มีอะไรให้บริการบ้าง?

เนื่องจากการติดต่อสัมพันธ์ระบบเครือข่าย EDNET ทำสามารถใช้บริการต่าง ๆ ได้ดังนี้

ศึกษารายละเอียดเกี่ยวกับเครือข่ายการศึกษา (EDNET:KKU)

รายการนี้ ใครจะเรียนอยู่ในระบบเครือข่ายการศึกษา ซึ่งจะมีการบริการที่สอดคล้อง ๆ ดังนี้

# ใครบ้างที่มีสิทธิ์ใช้ EDNET?
# เครือข่าย EDNET มีอะไรให้บริการบ้าง?
# การเข้าระบบเครือข่ายการศึกษา
เค้าจำแนกสูตรการเรียนเอกสำหรับวิชาการ

รายการนี้ เรานำหลักสูตรการเรียนรู้จากโลกออนไลน์  değiştir การเรียนเอกสำหรับวิชาการ เพื่อให้ท่านเลือกเรียนหรือไม่ในช่วงเวลาการพัฒนาแบบนี้ เมื่อท่านเข้าหลักสูตรโดยสอบผ่านตามหลักเกณฑ์ของหลักสูตรทางคณิตศาสตร์ มท. ท่านจะรับรู้และจะมีผลกับการศึกษาสามารถเข้าหลักสูตรได้ทันที

ส่งจดหมายอีเมล์ (Email)

รายการนี้ จะช่วยให้ท่านส่งข้อความหรือจดหมายไปยังสมาชิกเครือข่ายท่านอื่น ๆ เพื่อประโยชน์ในการสื่อสารระหว่างกัน ท่านสามารถใช้ระบบ Email นี้ เพื่อประโยชน์ในการสร้างหลักสูตรได้ในรูปแบบหลักสูตรให้ผลิตผลเพื่อเลือกแสวงหาผลิตภัณฑ์ ที่เกี่ยวข้องกับการศึกษา หรือจะใช้เป็นช่องทางในการจัดประชุมหรืออธิบายทางไกลรวมกันได้

วิทยาการพัฒนาเสริมแคลสิคที่กำหนดให้กับการเรียนการสอนวิทยาศาสตร์และคณิตศาสตร์
รายการนี้ จะมีแนวคิดที่กำหนดและเป็นประโยชน์ต่อการพัฒนาการเรียนการสอนวิทยาศาสตร์และคณิตศาสตร์ในระดับการศึกษาต่าง ๆ จากผู้ที่มีความสามารถและคุณภาพ ทั้งในคณะคณิตศาสตร์และโรงเรียนต่าง ๆ ที่เห็นว่าการเรียนการสอนที่ยอดเยี่ยม หรือคุณภาพ และผลผลิตที่เกิดขึ้นได้รับผลที่ดีขึ้น เพื่อช่วยกันพัฒนาการเรียนการสอนวิทยาศาสตร์และคณิตศาสตร์ต่อไป

บรรณานุกรม (EDNET.ELECTRONIC.JOURNAL)
รายการนี้ เป็นการนำเสนอสาระสีชีวสารศาสตร์ ซึ่งจะมีอนาคตเป็นรายการ โดยจะวิจัยและทำความเข้าใจวิชาการที่เกี่ยวข้องกับการศึกษาจากสังคมของระดับเครือข่ายการศึกษา บทความที่ตีพิมพ์ในสารานุกรมศาสตร์นี้สามารถนำไปใช้ข้อมูลเป็นแหล่งทางวิชาการที่ได้รับการเผยแพร่เช่นเดียวกับการตีพิมพ์
โปรแกรมประยุกต์ทางการศึกษา (CMI และ CAI)
รายการนี้จะมีโปรแกรมคอมพิวเตอร์ที่เกี่ยวข้องกับการศึกษาทั้งโปรแกรมที่ไว้ในการจัดการศึกษา (CMI: Computer Managed Instruction) และโปรแกรมคอมพิวเตอร์ช่วยสอน (CAI: Computer Assisted Instruction)
ท่านสามารถได้โปรแกรมไปใช้งานในเครื่องคอมพิวเตอร์ของท่านได้
และยังสามารถทำได้ต้องการเผยแพร่ผลงานทางการพัฒนาโปรแกรมคอมพิวเตอร์ที่ส่งผลลัพธ์ดังนี้
เพื่อประโยชน์ทางการพัฒนาการศึกษา ที่สามารถเผยแพร่ผ่านทางรายการนี้ได้

เข้าถึง http://www... Homepage ดื่น ๆ ใน Internet

การเข้าระบบเครือข่ายการศึกษา
อุปกรณ์ Hardware ที่จำเป็น
1. เครื่อง PC ที่มีแผนท์ผลตั้งแต่ 386 ขึ้นไป
2. สามารถแสดงผลแบบ VGA หรือ Super VGA ได้
3. ไม่ต้องความเร็วไม่ถึงกว่า 14400
4. สายโทรศัพท์ 1 คู่ชาย
โปรแกรมการสื่อสารบน Windows
1. Trumpet Winsock
2. Netscape 2.0
พื้นฐานโปรแกรมเนื้อสาร Download จากระบบ Internet หรือจาก Download จากเครือข่ายการศึกษานี้ก็ได้
คณะท่ามกลางพืชพันธุ์ระดับการศึกษา (EDNET:KKU)

ที่ปรึกษาโครงการ

1. ดร.ระวิณ สรีรัตน์  คณะพันธุศาสตร์
2. ดร.อริยะ ศิริยาภิรมย์  รองคณบดีฝ่ายวางแผนและพัฒนา
3. ดร. ดร.คงทิพ  ศิริสุขวงศ์  รองคณบดีฝ่ายวิทยาศาสตร์พันธุ์
4. ดร. ดร.สันติภักดิ์  นันทภัทรภูพงษ์  รองคณบดีฝ่ายวิจัย

คณะทำงานพืชพันธุ์ระดับ

1. ผศ.อนุชา สุวรรณขจร  ผู้ช่วยคณบดีฝ่ายวิทยาศาสตร์พันธุ์ หัวหน้าโครงการ
2. อ.ชัยภูมิ เพ็ญกมล  รองเรียนแผนกนคปรีภัณฑ์
3. อ.ชัยวัฒน์ ณัฐนิยม  รองเรียนแผนกนคปรีภัณฑ์
4. อ.ลิขิต วิจิตรเดชลิขิต  รองเรียนแผนกนคปรีภัณฑ์
5. อ.ยุทธภูมิ นิภัสสรีย์  รองเรียนแผนกนคปรีภัณฑ์
6. อ.สมพงษ์ ปัญญาภูมิ  รองเรียนแผนกนคปรีภัณฑ์
7. อ.สมชัย ตั้งทิพย์  รองเรียนแผนกนคปรีภัณฑ์
8. อ.อภิชาธิ์ สุวรรณคง  รองเรียนกิตติมศักดิ์
9. อ.เฉลียว ปรีดี  รองเรียนกิตติมศักดิ์
10. อ.อัศวิน หงษ์พานทอง  รองเรียนภูมิพล
11. อ.อัศวิน อาษา  รองเรียนภูมิพล
12. อุตม เจริญศิริ ผู้จัดการบริษัท อู้ตร visit คณบดีคณะศาสตร์พันธุ์ สายวิทยาศาสตร์พันธุ์
วัตถุประสงค์ของหลักสูตรการเขียนเอกสารทางวิชาการ

1. เพื่อให้ผู้เรียนมีความรู้และฝึกใช้หลักการเขียนเอกสารทางวิชาการ
2. เพื่อให้ผู้เรียนสามารถเขียนเอกสารทางวิชาการได้อย่างถูกต้องตามหลักการเขียนเอกสารทางวิชาการ
3. เพื่อให้ผู้เรียนเกิดความมั่นใจในการเขียนและเผยแพร่เอกสารทางวิชาการ

วิธีการศึกษา

1. ให้ท่านศึกษาจากบทเรียนและที่ก้าวกระโดดที่ก้าวเดินไปในแต่ละหน้า ท่านสามารถเลือกตีกษาได้ 2 วิธีดังนี้
   1.1 ศึกษาบทเรียนทางจอภาพ
   1.2 พิมพ์บทเรียนลงกระดาษเพื่อดีกษาในภายหลัง
2. การส่งงานที่ก้าวเดินไปในก้าวกระโดดแต่ละหน้า ให้ส่งทาง Email
3. เมื่อท่านมีปัญหาในการเรียน ให้ท่านส่ง Email เพื่อปรึกษาปัญหาการเรียนใหม่ที่

otch.ไพศาล สุวรรณน้อย (paisan@ednet.kku.ac.th) ท่านจะได้รับคำแนะนำโดยจะตอบให้ทันทีทาง Email

ท่านต้องการศึกษาบทเรียนหน่วยใด (ควรเริ่มเรียนจากหน่วยที่ 1 ตามลำดับ)

- หน่วยที่ 1 ทักษะพื้นฐานที่จำเป็น
- หน่วยที่ 2 การวางแผนสร้างเอกสาร
- หน่วยที่ 3 การสร้างข้อมูลสำหรับการเรียนเรียง
- หน่วยที่ 4 การเขียนเนื้อหา
- หน่วยที่ 5 การเขียนเนื้อหา
สังข์หาญส่งแผนพัฒนาระบบเครือข่ายการศึกษา

คณะศึกษาศาสตร์ มหาวิทยาลัยขอนแก่น

ในส่วนระยะหลักการพัฒนาระบบเครือข่ายการศึกษา ดังนี้เพื่อประโยชน์ในการส่งต่อสื่อสารระหว่างคณะกรรมการพัฒนาระบบ จึงได้จัดทำรายการถ่ายทอดสังจรตามยึดถือแนวทางการส่งข้อมูลข้อมูลในรูปแบบใดๆได้ ถ้าทำผ่านการส่งข้อมูลข้อมูลโดยตรง ให้ส่งผ่านมาส่งไปที่อื่นที่ทำนั้น แล้วส่งมาส่งไปส่งจุดปลายๆต่อไป

**** ด้วยมีปัญหาส่งไม่ได้**** ให้ส่งไปผ่านโปรแกรม Eudora ส่งจุดหมายตาม Email address ของแต่ละท่านต่างนี้ครับ
ยินดีต้อนรับสู่ แนวคิดใหม่ ๆ
ในการเรียนการสอนวิทยาศาสตร์และคณิตศาสตร์

การเรียนการสอนวิทยาศาสตร์-คณิต ฉบับที่ 1

ต้องการส่งข้อเสนอแนะ ด้านแนวค่า หรือ แนวคิดที่สนใจให้กับการเรียนการสอนวิทยาศาสตร์และคณิตศาสตร์ ให้ส่ง Email และAttach ข้อมูลเอกสารไปยัง ดร.ไพสัน สุวรรณน้อยEmail: paisan@ednet.kku.ac.th หรือ
คุณคณะ เจริญศักดิ์Email: dome@ednet.kku.ac.th

อ่านอีก EDNET KKV HOMEPAGE
ยินดีต้อนรับสู่ วารสารศึกษาศาสตร์

คณะศึกษาศาสตร์ มหาวิทยาลัยขอนแก่น

วัตถุประสงค์ของวารสารศึกษาศาสตร์
1. เพื่อเผยแพร่ความรู้ แนวความคิด แผนวิจัย และผลการวิจัยในระดับบทความ รายงานการวิจัย และความตั้งใจสร้างสรรค์ แก่คณาจารย์ นักศึกษา และบุคคลทั่วไป
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The participants in the one-day workshop
Listening and watching the demonstration
Practicing hardware and software installation
Practicing hardware and software installation
Telecommunication Technology in Thai Schools

Paisan Suwannoi

An Elective Research Paper submitted in fulfilment of
The requirements for the degree of Doctor of Education

Deakin University
1996
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Introduction

One has only to search obscure storage closets, libraries in schools, or talk with those who have been involved with education and its improvement over a period of time, to understand the frustration involved in changing the status quo. Innovations involved with instructional strategies, curriculums, and professional development for teachers have many failed. Remember the promises held by many for open classrooms, team teaching, educational television, new math, inquiry-oriented science, and educational satellite?

But did these innovations fail because the concepts and processes proposed were faulty? Or because they were not properly implemented or appropriated for teachers’ problems and needs? We will never know. Introductions and evaluations of innovations have usually focused on the assessment of their effectiveness. These types of innovation introductions and evaluations, without an examination of what and how the innovations were implemented, leads to distorted results.

There are several common and serious mistakes made by both the administrators and leaders of a change process. The first common mistake is to presume that the innovations they want the users to use, without doing the situation analysis, are always appropriate to their problems and needs. The second serious mistake is to presume that once an innovation has been introduced and initial training has been completed, the intended users will put the innovation into practice. The third serious mistake is to assume that all users of the implementation will react in similar ways.

This research report provides the information which is a basic factor necessary for change in Thai secondary schools. The data collected from many related documents, interviews, and a case study were analyzed to find out the answers of the four research questions:

- Do the teachers have realistic expectations?
- What would be helpful for teachers?
• What do teachers think about professional development?
• What is the relationship between technology and teachers professional development?

The information about traditional Thai culture and society, Thai schooling, and professional development in Thai schools is also examined.

This report provides new insights and understandings about change in Thai schooling. Its powerful message brings new understanding about the role and personal needs of people involved in a process of educational change. It hits at the heart of the problem by providing the strategies for the total management of innovation destined for success.
CHAPTER 1
TRADITIONAL THAI SOCIETY

Thai society
According to its geography and environment, Thailand, originally known as Siam, can be determined into two parts. These are rural and urban societies in which the environment and life style of the population are absolutely different. Thai rural society is surrounded with fields, forests, mountains, rivers, canals, and is encompassed by the natural environment. On the other hand, Thai urban society is surrounded by modern buildings, cars, and a world of high technology.

For ethnographic purposes, Thailand is divided into four areas, namely the Northern, the Northeastern, the Central and the Southern areas. The Northern area is a mountainous region with its predominant people being Thai, usually called Thai Nuea or Northern Thai. Thai live in the lowland area of the valleys, while a number of area primitive tribes live on the uplands. The Northeastern area is a vast plateau tilted towards the south-east and drained by the Mekhong river which forms the eastern boundary between Thailand and Indo-China countries, Laos, Vietnam, and Cambodia. The people in this area are also predominantly by Thai Lao. Living in isolated groups are the Phutai, another tribe of Thai origin who came from Indo-China, and a number of minority tribes. The Central area consists of one west lowland plain watered by the Chao Phya river and other smaller river systems. The people live in this area are mostly Thai, or previously called Siamese. In the Southern area, throughout the Malay Peninsula, are Thai, but in the southernmost parts the people are mostly of Malayan blood. Ethnologically, these four areas overlap one another and affect reciprocally also Thailand's neighbours, i.e. the Cambodians in the southeast, the Burmans in the northwest, and the Malayans in the south. Later came other races including Chinese, Indians, Indonesians, and other Asiatic races. Lastly came Europeans and Americans who radically affected the traditional society and culture of Thailand.

Debhanom (1995) states that Thailand has a total area of 514,000 sq.km. with a population fifty-nine million located in the Southeast Asian peninsula. According to data from the Institute for Population and Social Research, Mahidol University July 1,
1993, sixty-nine percent or forty-one million people live in rural areas of Thailand. The population growth rate was 1.2 percent with the life expectancy at birth at 66.4 years of age for males and 71.8 years of age for females. In 1992, about thirteen percent of the total population or 7.5 million people migrated within the country. About seventy percent are farmers and the average per capita income is about $US 3,759 annually. About twelve million people or twenty percent of the total population are still considered to be under the poverty line, especially in the Northeast Thailand (Debhnanom, 1995). In the past fifteen years, Thailand has experienced rapid industrialization and urbanization. Large number of young people, males and females, have left the farming sector of rural areas to seek jobs in urban areas leaving large numbers of old people and children in the villages.

The quality of life that the Thai government plans for them is called “Basic Minimum Needs” (BMN). There are nine groups of criteria, with thirty-seven variables, for evaluating the quality of life as follows (Debhnanom, 1995):

- Food
- Shelter
- Education and health services
- Safety to life and property
- Small family size (2 children/family)
- Community participation
- Moral values
- Income/Crop production
- Natural resource conservation/environment development

At the end of the sixth National Social and Economic Development Plan, the quality of life of the Thai people was assessed and it was found that on an average it was considered to be poor. Only Bangkok was graded as progressive and the provinces in the central region as average. But Debhanom (1995) said that the evidence derived from his interviewing with rural Thai people, considered their quality of life differently. All of them said they needed four important things as follows:
• Good income
• Safety to life and property
• Good health
• Good education (mostly for their children)

Technology in traditional Thai society
As other societies, Thai society is technologically modernized to the extent that it employs tools and inanimate power sources. Power resources include every things from gravity, wind, and water to electricity, stream, fuel machine, and nuclear energy. Tools run the gamut from primitive digging sticks to modern electronic computers. All societies make use of the some tools and some inanimate power sources; yet it is obvious that the differences between those used by primitive, archaic, historic, and modern societies - and the ways in which they are used - are great.

Most of the work in all sectors of traditional Thai society, depend on man and animal power with simple local technology. As an agricultural society, Thai farmers use both animated power -human and cattle power, and inanimated power -gravity, wind and water for the power resources in their fields. They use cattle to prepare the ground for plantation, human power and the simple scientific principle for seeding, plant irrigation, and harvesting. The traditional water irrigation, uses only fundamental knowledge about the land slope and the wind power. All home industries in traditional Thai society, such as earthware and textile productions, mostly use the family members power with the primitive mechanic tools. For transportation, they mostly use the cattle power resources such as pulling carts. In conclusion, the traditional life styles of Thai rural people are closely related with natural resources.

The relationship between technology and culture
Technology promises to have diverse and far-reaching impact and implications, both positive and negative for the way people live, work and interact with one another, and for society at large. We have learnt that technology can be a vital economic force, has educational potential, and is an important instrument to meet social needs. In addition, it can be a vehicle to improve the quality of life, enrich culture, or conversely, it can
be a threat to one's identity and culture. New sets of issues and questions are emerging, such as concern for personal privacy, personal freedom, disparity between the haves and the have-nots. The threat of increased international tension between technological advanced nations and the less-developed countries, and information ownership rights.

The effects of technology on culture has pervaded all countries. In the past, movies and television programs had a great impact on every life. However, their influences could easily be curtailed if the government chooses what the general public should hear or see. The progress in technology has changed all that. Among all means, satellite broadcasting seems to possess the highest potential impact on cultural transfer among countries or even within the same country. In Thailand, almost every house in rural communities has a television set. People in our rural societies began demanding merchandise that they saw during television programs. The western culture brought television programs such as music, movies, game shows, news, and even commercial programs which all affected Thai culture. Those outside cultures from far away countries or provinces could change the attitudes of our rural people towards living styles, standard of living, family and social activities, and the way to work. One may argue whether direct broadcast satellite (DBS) reception should be allowed. But one has to accept the fact that all the countries in the world are moving closer and closer together. The "cultural flow" seems to be inevitable and difficult to avoid.

It is very interesting to observe the change that is going to occur in Thailand, as the government has amended the Radio Communications Act in 1992, allowing one to install satellite dishes without having to ask for approval. Another change that is worth noting is that in 1992, the government has approved the setting up of new UHF television channels. Two of these channels will be allocated to private companies interested in operating the stations.

Thai society today
In order for Thailand to turn the economic expansion into an industrially driven economy, it must overcome constraints in several areas, namely infrastructure requirements, and saving-investment gaps, since the share of fixed investment in GDP
will rise sharply in the industrial take-off phase. Thailand’s comparative advantage in labour-intensive light manufacturing has been eroding at the same time as Indonesia and China are rapidly moving into those products. The ability of Thai manufacturers to increase their technological capacities to upgrade industrial structures is an important challenge. Lastly for the Thai economy to compete successfully in the 1990s, Thai industries need to gain competitiveness in the products that have higher skill content. Therefore, it is most urgent that the Thai government strengthen secondary school programs and encourage the private sector to provide vocational skill-specific training.

Over time, advances in technology and their utilization have revolutionized many services to the great benefit of consumers, such as teleworking, telebanking, telehealthcare, home entertainment, self-education, self-training and tele-education at home, irrespective of where one lives. Office-automations and factory-automation with the use of diverse computer applications and robotics are going to relieve humans from many of the repetitive and even dangerous types of work, so that workers can spend more time on the more interesting and more challenging tasks, or that there will be more free time for people to learn and advance their intelligence or more time for leisure, for social activities, and for cultural enrichment. All these possibilities and opportunities are real and varied. With the realization of future wireless communications networks the need for cities will diminish. A person may choose to live anywhere and still be able to work, learn and play with other people anywhere else.

But even without an advanced technology infrastructure as in many present day societies, the plain old telephone system improves the quality of life through its ability to overcome some of the disadvantages of distance. Telecommunications are primarily a means of reducing the cost of time and travel. Hudson (1981), among others, assert that the social benefits from improved quality of rural life are even more profound. To be able to keep in touch with friends and family, to order supplies from the city, and to get help in emergencies can assist in overcoming the disadvantages of rural isolation.
Overall, Thailand's educational system needs to be reviewed. It needs to be reshaped or reformed somewhat to prepare for the country's entry into the 21st century. A closer match is needed between the output of the educational system and the needs towards greater industrialization, calling for the promotion of science education at both secondary and higher education levels.

**Causes of change in Thai society**

External forces such as economics, politics and technology affect our society and education system. Teaching and the conditions under which teachers work may change in some very fundamental and positive ways. There is considerable evidence to suggest that teachers of the past may have let the future happen and have merely reacted to emerging conditions. No longer can they do that; instead, they must work toward the future they desire. As Hargreaves (1994) points out the post modern world as it is affecting teachers is that:

> The post modern world is fast, compressed, complex and uncertain. Already, it is presenting immense problems and challenges for our modernistic school systems and the teachers who work with them. The compression of time and space is creating accelerated change, innovation overload and intensification in teachers' work (p.9)

It would be unwise to speculate about Thai society without a close examination of the forces that are currently shaping our future way of life. At present, there are ten trends that would seem to be contributing most to how we will live in the twenty-first century.

**The changing nature of the family**

Traditionally, the family's function as the child's first learning environment especially in the previous Thai family which is called *extended family*. Children stay with their grandfather or grandmother while their parents work. So they can learn their early life experiences. But at present Thai families are changing to nuclear families. Children have to go to school while their parents work. They learn their early life experiences
from teachers at school, so now the school system has more effect on their life experiences.

The shifting of society
Thai society has changed from an agricultural to an industrial society. Today our society has shifted from an industrial society to an information-based society. As we have seen in our industrial and business organizations, most of their work is concerned with information transferring and processing. In 1970, only about 17 percent of us worked with information jobs. Now more than 60 percent of us work with information as programmers, teachers, clerks, secretaries, accountants, stockbrokers, managers, insurance people, bureaucrats, lawyers, bankers, and technicians. Information is steadily becoming the critical resource of our age and the ability to learn it and use it is the chief aim of education. This critical issue includes the transformation of agricultural production, the increasing role of industry in sustaining high growth rates, and the creation of enough additional employment for the growing labour force (NESDB, 1994). It would require the government to make the bureaucracy more responsive to the need of a skilled and educated workforce via the education process.

The rise of international terrorism
Recurring acts of terrorism around the world have taught Thai people that their futures are inextricably linked to political, economic, and religious events in other countries. It is therefore crucial that education will strive to help us understand our interconnectedness with other cultures and to become more sensitive to our own and others' motives and needs. The evidence is compelling that our survival on this planet requires us all to learn this important lesson.

The microelectronics revolution
One of the greatest impacts on education is the mushrooming revolution in microelectronics. Computer, video equipment, and communication devices that employ the awesome powers of tiny silicon microchips are having profound effects on our lifestyles, from determining what we eat and how we prepare it, to our television-
watching habits, to how we are cared for when ill. These technological advances are changing not only how we learn and what we learn, they are forcing us to realize that the future will require all of us to be continuous learners in order to keep pace with rapid changes.

Increasing crime
Unfortunately, in Thailand, there is evidence that crime will continue to rise in the future. Almost daily the media remind us that we live in violent world. Crime in our country takes many forms—from the sophisticated operations of organized crime in the areas of narcotics, gambling, the stock market, prostitution, and protection rackets, to the crudely planned strong-arm robberies of the street hoodlum. Much of the crime that occurs in and around schools is related to students’ use of drugs. Crime touches the lives of more and more Thais each year, and few of us go about our daily lives without taking at least some steps to protect ourselves from crime. Violence in some schools has already reached epidemic proportions. What was originally characterized as an urban problem has now spread to the suburbs and rural areas. Certainly, the reduction of crime is one of the critical challenges of the future.

The growing elderly population
With computer-age advances in health care, from artificial heart implantation to diagnoses using magnetic resonance imaging, the life span of people is steadily being extended. In addition, older people of the future will be better educated and more physically, intellectually, and politically active than their predecessors. Tomorrow’s elderly will recognize education as one of the keys for a satisfying and productive old age.

Rapid increase of women at all levels of the workforce
It appears that we are fast approaching the day when nearly all women will work outside of the home. As a result of gains made by the women’s movement, more and more women are not only moving out into the workforce, they are moving up. Women are obtaining an increasing number of executive-level positions in professions, business, and education so that now the feminization of the boardroom is a familiar phenomenon. Slowly, the workplace is changing to accommodate the career
pattern of women. Business and industry, for example, are receiving pressure from women’s groups to provide preschool and daycare programs as part of their fringe-benefit packages.

Continued depletion of our environment
Technological and scientific advances have given us considerable ability to change our environment to meet our need for food, shelter, and safety. We live, work, and travel with relatively little regard for the effects that our way of life has on our planet. However, experts suggest that we are ravaging the environment so that, at our present rate of population growth will one day run out of vital natural resources. Nevertheless, there are signs that we might be able to meet this challenge. Less developed regions of the world that traditionally have had the highest levels of population growth are expressing interest in methods of population control. Also, scientists are working daily on harnessing new, more pollution-free sources of energy, such as solar power and nuclear fusion.

A rapidly changing job market
The microelectronics revolution already mentioned, is radically changing the workplace. The jobs we are trained for today may not exist tomorrow. During the last half decade, very few kinds of work have been unaltered by the ongoing developments in computer technology. From the hairdresser who uses the latest video equipment, to the automobile mechanic who use computers to diagnose the efficiency of engines, today’s worker must be able to learn to operate an ever-increasing array of technological devices. The workers of today who excel are measured not by how much they can produce but by how quickly and well they can learn new skills.

The ways that Thai schools have changed
As we have learned, education is strongly influenced by currently prevailing economic, political, social, demographic, and technological forces. However, we must remember that education also plays an important role in shaping the world of
tomorrow. There are some likely changes that have occurred in Thai schools and in teaching during the past five years.

The use of computers and related microtechnology in education continue to accelerate, and students, from elementary through to graduate school, feel the impact of this trend. This technological revolution has moved education beyond the classroom walls, as students increasingly determine how, when, where, and what they learn. While the school curriculum still places great emphasis on the basics of reading, writing, mathematics, and oral communication, the curriculum has been reconceptualized to include the basic skills necessary for survival on an increasingly crowded planet: problem solving, human relations, creative thinking, and critical thinking.

Preparation for lifelong learning or self-education has increasingly been seen as the central purpose of schools. Career changes are the norm, and continuing education throughout one’s lifetime will be necessary. As Thai population becomes older, more and more people will look to education to help them make the transition from fulfilling careers to fulfilling retirement.

Teaching in Thailand has become increasingly professionalized through such changes as the following: more lengthy and rigorous preprofessional training programs; salary increases to put teaching on a par with other professions requiring similar education; greater teacher autonomy and an expanded role for teachers in education policy-making; greater recognition for high-performing teachers and individual schools through such mechanisms as merit pay plans, master teacher programs, and career ladders; and improvements in working conditions that contribute to teacher stress and burnout.

In an attempt to design schools so that are more responsive to students’ needs in the information age, bold innovations in how schools are structured and how teachers teach will be implemented. The need for well-educated, skilled workers will result in new alliances between businesses and schools. The teacher educator of the future will have extensive experience with such topics as brain development, chemistry, learning
environment alternatives, cognitive and psychomotor evaluation, and affective
development. The teacher’s role for the future schooling may be: learning
diagnostician, curriculum development agency, instruction designer, instructional
media producer, self-access center manager, or there is no role at all.

However, to acquire the knowledge and skills necessary to meet the complex
challenges of the future, one must become a thoroughly professional teacher. Such a
teacher has firm grasp of subject matter and is able to introduce students to the
intellectual skills demanded for rigorous study of that discipline. The professional
teacher also has a knowledge of child development theories and is continually alert
for new, more powerful ways to analyze, with sensitivity and accuracy, the needs of
students.
CHAPTER 2
CULTURAL TRANSITION

This chapter discusses the study of the issue concerning technology and culture. The transition from muscles to machines in Thai culture. The causes of cultural changes: Should it be controlled? The eighth National Development Plan is also examined. From reviewing some related books, the main findings could be described as follows:

- The transition from muscles to machines
- Causes of the transition
- Control of culture and transition
- The Eighth National Development Plan
- The benefits of The Eighth National Development Plan.

The transition from muscles to machines

Thailand's economic transformation, during the latter half of the nineteenth and the early twentieth century marks a watershed in its history, dividing the traditional from the modern era. This transformation took two main forms: (1) the development of a colonial-style modern sector with the diffusion of a money economy into the traditional sector, (2) the creation of a colonial-style, centralized, bureaucratic state. These two developments resulted from the fusion of the Western economic form of expansion with indigenous attitudes and institutions. Indeed the very magnitude of the changes, affected by Thailand's entry into the international capitalist system and by its rulers' emulation of a colonial-type administration, provided the Thai elite with the economic resources it needed to strengthen indigenous authority. Modern Thai history is therefore as much a product of the interplay of forces released by the impact of the West as it is of the constraints imposed by that Western impact.

The transition from muscles to machines in Thai society, on one hand, was the result of foreign demand for rice, along with the invention of new ways of transporting it, chiefly steamship and rail. On the other hand, rapidly expanding rice cultivation by Thai farmers was a response to economic opportunities. In the 1960s brought great
changes, there was a remarkable expansion in cultivation of crops other than rice, newly introduced crops such as corn, cassava, and kenaf, as well as previously cultivated rubber, cotton, coconuts, sugar cane, fruit, and vegetables. Along with large-scale new technology: expansion of irrigation, rapid spread of mechanization, use of fertilizers, pesticides, and improved seed, combined with better marketing facilities and more government extension services to farmers. But the distribution of these crops is very uneven. For example, three-quarters of all corn, a major export crop, is grown in only four provinces out of the nation's seventy-two, cassava in another four, and sugar cane in five provinces. As for mechanization, there were practically no tractors in use in Thailand in 1950, compared with 25,000 operating in 1969; by 1970 more than half the area under crops was tilled by tractors (Ingram, 1971) and in 1994 more than three-quarters of Thai farmers use machine for their cultivations and the potential demand has been estimated more than 120,000 tractors. Fertilizer, too, was barely used in the 1950s, while in 1968 more than 250,000 tons were imported (Ingram, 1971). In 1995 fifty million tons of chemical fertilizer were imported (Office of Agriculture Economics, 1995).

Causes of transition
Thailand is now industrializing its society, but Thailand is still far from being a newly industrialized country. Thailand started developing its industry since the reign of King Rama IV which was an important byproduct of open policy. It was the first time that steam engines replaced manual labor in rice and saw mills, which grew in size. The Bowring Agreement of 1855 also caused a major economic change by helping Thailand to greatly expand its trade with other countries.

International observers have all along speculated that Thailand may be the next country to join the rank of Asian New Industrial Countries (NICs). The tremendous dynamism that the Thai economy has shown in the last 3 decades and general development maturity it has achieved form the basis for such speculation. However, recent shifts in comparative advantage in East Asia and the emergence of the new economic force of Chinese economic area (CEA), comprising China, Hong Kong, and Taiwan, have presented Thailand with a new set of challenges and prospects for the rest of 1990s (World Bank, 1991).
The most important question at present is how Thailand’s current economic growth can be sustained and competitiveness be sustained. To respond to this question, Thailand must overcome constraints in several areas and open new avenues of development, taking advantage of new opportunities. These are causes of the transition which also affect Thailand’s educational system and culture, they are:

Firstly, East Asian economies are expected to grow significantly, higher than other regions of the world during the rest of the 1990s. China and CEA are the principle cause of the region’s high growth prospects with the characteristics of growing economic mass. Exports are still a central driving force behind this high growth in the East Asian region, although domestic demand is expected to become more important in the high-income countries such as Korea and Thailand. Thus, trade within East Asia is expected to grow in the 7-8 percent range according to recent World Bank’s projections. Thus there are bright prospects for Thailand for further export expansion in these new markets. Thailand’s export promotion and trade regime have also become significantly more outward looking in recent years.

Secondly, opportunities to promote subregional economic cooperation among the six Mekong Basin countries as well as the Growth Triangle among southern Thailand, northern Sumatra, and northern Malaysia are now well under way. This would enhance cross-border trade and investment flows with a high possibility that these subregions would be centers of economic growth towards the year 2000. Thailand could play a very important role with this subregional economic cooperation.

Thirdly, opportunities to further expand and diversify the Thai industrial base are still very good, through general deepening and upgrading industrial structure both in terms of export-oriented and import-substituting industries, especially the six target industries envisaged in the current Seventh National Economic-Socio Plan, namely the agro-industry, textiles and garments, automotive and engineering industry, electronics industry, petrochemical industry, and iron and steel industry. There will be greater emphasis on building backward linkages by encouraging the manufacture of machinery, parts and equipment rather than concentrating on the assembly of those
components. There must be a shift from simple to higher-technology industries. It is recognized that the Thai economy cannot depend on cheap labour as the source of industrial growth for much longer. In addition, the promotion of rural industries reflects the latest shift in the Government's priority. These key elements of industrial policy would strengthen backward linkages from the urban to rural manufacturing sectors. However, the economy needs to accumulate more physical and human capital if Thailand wants to widen and deepen its industrial structure. It needs to be more capital intensive and more skill intensive as well. Thailand now faces increased competition from two sides. On one side, modern automated production methods are helping developing economies regain comparative advantage in some of the more labour intensive products that Thailand is exporting. On the other side, less developed economies in this region with cheaper labour are competing more labour-intensive light manufactured products, that Thailand currently exports.

Fourthly, the policies to liberalize further the financial capital sector and the foreign exchange market, and to develop capital markets, will improve financial and capital market structures and efficiency. This will enhance Thailand's international competitiveness by reducing financial cost and increasing flexibility, and thus promote Thailand as the region's economic and financial center. These financial policies will also help to speed up industrialization as well as contribute to the mobilization of higher savings.

Lastly, opportunities for an increase in productivity through the application of appropriate technology to production processes, and the application of high technology in several sectors, including modern agriculture, the electronics industry, food processing, telecommunications, and banking and finance. This would increase productivity and improve the quality of products to enhance the competitiveness of Thai exports (NESDB, 1994).

Unfortunately, the major economic changes at the end of 1997 effected Thailand's economic and educational development plan. All development programs of the Seventh National Economic and Social Development Plan were delayed because the
government had to allocate most of the budget for dealing with economic and social problems.

**Facing the Impacts of the Economic Crisis**

It is recognized that Thailand's relatively weak human resource base has been one of the major contributors to the financial and economic crisis which has affected the Thai society adversely since 1997. As a result, the whole education system was facing greater challenges. Much more attention needed to be devoted to the immediate problems brought about by the crisis as well as long-term structural problems. Major on-going efforts to address critical issues in current educational development, both quantitative and qualitative aspects, are presented below.

Recognizing the severity of the economic crisis, the government has established urgent plans of action to deal with the problems on all fronts. The implemented policies could be classified into two phases, i.e., the immediate term, with measures to be taken within the shortest period of time, and the medium term, with measures to be taken within 6 months to one year. The stated policies relating to education are as follows:

**Immediate-term policy:**
- Alleviating social problems
- Ensure educational opportunities for Thai youth whose families were affected by the economic recession by providing assistance in the form of student loans.

**Medium-term policy:**

(1) Formulate a plan to expand basic education opportunities to at least 12 years, to be provided by the state throughout the country, with good quality and at no expense.

(2) Provide a national education law, as well as adjust the educational system at all levels to conform with economic and social change, by using education as a medium to promote knowledge and instill political consciousness of democracy with the King as Head of State. Support research on the arts and sciences. Expedite the development
of science and technology for national development, and promote local wisdom, arts and national culture. The government considers the laws under this heading to be laws necessary for the administration of state affairs pursuant to Section 173 of the Constitution.

(3) Support the private sector, professional organizations and local administrative bodies to participate in education management by emphasizing knowledge coupled with ethics, especially in the provision of professional training and education, and education for the underprivileged, as well as look after student welfare in terms of medical care, nutritional supplements, milk and lunch.

(4) Educate parents and families on providing the basic foundations of life and preparing children at the pre-primary school level while promoting pre-school education.

(5) Promote independent high-quality management in private educational institutions, with the state playing a supportive and promotive role, and introduce the coupon system to subsidize private education.

(6) Expedite the development of educational quality so that students enjoy learning and well-rounded development, especially in ethics and the capacity for lifelong self-learning. Set national education standards and evaluation system while guaranteeing educational quality to meet standards of excellence.

(7) Expedite the development of the teaching profession into a highly regarded profession so that teachers can work with honour, by reforming the process of training and developing teachers, emphasizing the production of teachers in the fields where most needed. Set standards and criteria to honour and reward good and capable teachers with career advancement by promoting the welfare of teachers.

(8) Encourage budgetary and administrative independence at state institutions of higher education that were ready, by beginning with the areas that were ready.

(9) Expand opportunities for higher education through the formulation of 3 interlinked systems, i.e., the community college system, which trains mainly medium-level personnel at short periods or in response to community needs; the college system, which focuses on producing bachelor's degree graduates and the provision of academic services to society; and the university system, which focuses on graduate studies and advanced research.
(10) Expand opportunities for higher education to the provinces through the use of information technology (ONEC, 1998, p.87).

Alleviation of Economic Impacts on Education

The current financial and economic crisis has affected the Thai society in various ways e.g., displacement of workers and growing unemployment and poverty. It is anticipated that it will affect the education sector through an increase in dropouts from school systems at all levels of education particularly at the upper secondary and higher education levels, through reduced budget for the sector, and through weakening of the financial viability of private schools. The impacts of the crisis have been realized since the beginning of the 1998 academic year when a large number of students nationwide were reported to have dropped out of schools (ONEC, 1998). The Government has expanded scholarship and loan programs to minimize student dropouts from the education system. At the same time, budget utilization and allocative efficiency need to be improved to support the continued quantitative expansion and qualitative improvement of the education system even with reduced budgets. The Government specifically protected current operational budgets for teacher training and instructional materials in science, mathematics and foreign language education and has established a mechanism to monitor relevant expenses.

At the upper-secondary level, the budget was shifted from vocational education to the general academic stream. With the aim of improving the quality of education, an independent school inspection body was established outside the education administration system to avoid conflict of interest between performance auditors and education administrators. The administration of the education system was transformed from a system based on central control of inputs through budget to an output or performance based management system.

In order to alleviate the impacts of the economic crisis on education, the Government aims at increasing the efficiency of educational management through the reduction in number of teachers and decentralization of the education system. The Government recognizes that the total number of teachers in comparison to students is too high at
the macro or aggregate level in light of international standards, although at the institutional level, there are significant imbalances in the deployment of teachers, with shortages in specific academic subjects such as science, mathematics and foreign languages. As a first step to rectify this situation, the government has strictly controlled hiring of new primary teachers began in fiscal year 1998 to increase the student/teacher ratio at the primary level to 25:1 by fiscal year 2002. This increase will be achieved through teacher attrition and redeployment of primary teachers to the secondary level after additional training as necessary. The decentralization of the personnel administration of teachers will be achieved by transferring the personnel administration and salary system for primary and secondary teachers from the central civil service framework to local governments by fiscal year 2001. Concurrently, a scheme was put in place to reduce the number of administrative staff in the Ministry of Education in Bangkok by at least 25 percent through rationalization of positions and redeployment to local governments (ONEC, 1998, p. 90).

In addition to personnel and salary administration, decentralization of the education system is also envisaged in finance and management to make all levels of education more responsive to societal and community needs. At the primary and secondary levels, selected academic, financial and personnel management functions will be delegated in a phased manner to provinces, municipalities and local communities (sub-districts), to be completed by 2005. Vocational schools and skills development institutes will be delegated authority and responsibility for program and curriculum development, cost recovery mechanisms and personnel and financial management, supplemented by the introduction of a performance-based monitoring system. By fiscal year 2000, the government will delegate to all higher education institutions the authority and responsibility to manage the entire non-salary current operational budget. A performance-based monitoring system to ensure accountability and transparency of the institutions’ operations was established in March 1999. The government confirms its commitment to make all public universities autonomous by 2002.

To promote the qualitative improvement and quantitative expansion of the education system with a minimum burden on the national budget, the government intends to
develop a productive partnership with the private sector. This will be achieved through resource mobilization and the protection and promotion of private institutions. The current economic downturn is adversely affecting the financial viability of a number of existing private education institutions. They were protected by facilitating their access to the Human Resources Development Fund which was established in 1995 to provide loans for the establishment of new private education institutions outside the Bangkok Metropolitan Region. An official policy on the role of the government at all levels of education will be established, specifically aimed to avoid crowding out of private schools/institutions. In addition, inequities in the regulatory framework for private education as compared to that for public education will be eliminated, and private schools/institutions will be allowed to establish their own fee structures without the government's control.

Accordingly, in addition to the Financial Markets Reform Program Loan, the Asian Development Bank has provided the Thai government with the Social Sector Program Loan. The Program includes specific reform measures and various activities to address key policy priorities and problems in the labour market and social welfare, education and health sectors. Policy priorities in the education sector include: (1) reduction of the incidence of student dropouts from the school system due to financial difficulties; (2) improvement in the quality of priority education programs through better allocation of resources; (3) rationalization of the staff size and deployment and the establishment of a new personnel management framework in line with the government's general decentralization policy to delegate greater authority and responsibility to local governments and other entities; (4) financial and management decentralization to make all levels of education more responsive to societal and community needs; and (5) promotion of private sector in the provision of education and training (ONEC, 1998, p. 92).

**Control of culture and transition**

According to the causes of transition mentioned above, the key areas and constraints to be overcome and the action to be taken both by the Government and the private sector are: Firstly, human resources: erosion of the competitive advantages and action
to be taken in reshaping the education system. Recent changes in the economic and social environment and in the population structure have led to gradual decline in the competitiveness of Thailand's labour force (World Bank, 1991). Increasingly, there are shortages of labour in both quantity and quality at all levels, particularly in science and technology related fields, resulting in increasing wage rate and threatening the competitiveness of the Thai economy. The education and training system has not been able to respond to this worsening situation by providing appropriately skilled manpower in the numbers required. If the current economic growth continues, the present trends mean that there will be a labour shortage towards the end of the 1990s. At the same time, Thai industry needs to produce products with greater skill content if it is to keep its market and also meet new challenges, with the workforce needing to be more competent. There is a rising demand for workers educated to secondary standard and an increasing need for qualified professional personnel, particularly in advanced technology areas.

It is now of vital importance for the Government of Thailand to reshape its education system for the 21st century, exploring and innovating in new directions appropriate to the needs of its increasingly high technology economy. The number of students going on to secondary education lags substantially behind levels in other Asian countries of the same development level. It is therefore of crucial importance for the country, that the secondary education program be expanded. Government's recent decision to provide compulsory lower secondary education is most welcome. Consideration should now be given, to the extensive provision of scholarships, for secondary education, targeted at those from poor families. In addition, there is an immediate need for substantial changes in higher education, in order to improve the response to education within the economy's demand for diverse levels of skills. At the same time, the Government could consider relaxing the stringent regulations that govern private universities, while providing for their accreditation on a differentiated scale of academic excellence. In summary, Thailand's overall macroeconomics transition towards the year 2000, does need new direction for human resource and education development programs.
Secondly, upgrading and providing a new generation of infrastructure provision to prepare for Thailand's entry into the 21st century. Virtually all basic infrastructure services are inadequate to meet the strong demand resulting from the growing economy. It is recommended that the government reviews the public sector's investment programs, to ensure longer term adequacy of infrastructure, particularly for the major urban areas and the new economic zones. It must be recognized that major urban areas, particularly the Bangkok Metropolitan Area will continue to grow and remain the leading growth center of the Thai economy. It is critically important to manage its growth. At the same time, with the improvement in basic infrastructure in other regions, a clear trend of decentralization has emerged. It is important for the Government to concurrently pursue a decentralization strategy. In order to maximize the impact of the limited public financial resources available for infrastructure development, particularly in the Bangkok Metropolitan Area and other new economic areas as well as new industrial sites. At present, the policy to promote private sector provision of infrastructure services has not been implemented in a correct and timely manner, which has impeded on both current and future development efforts. Greater participation of the private sector in infrastructure will definitely enhance the impact of Government spending on infrastructure. However, this approach cannot eliminate the need for greater public sector investment on infrastructure in the near term, especially since the Government had underinvested in basic infrastructure during the 1980s.

Thirdly, upgrading industrial structure through a coherent technology strategy. Thailand's comparative advantage in labour-intensive light manufactures erode as China, Indonesia, and Vietnam, with large reservoirs of cheap labour move rapidly into those products (World Bank, 1991). Thai manufacturers must enhance their competitiveness through general deepening and upgrading of the industrial structure as well as increasing their technological capabilities. In order to increase its industrial competitiveness and to sustain its export-led growth, a coherent and well articulated needs strategy should be developed to improve the technological level and capabilities of Thai industry. Such a technology strategy must be part of a broader industrial competitiveness. The crucial elements include acquiring foreign technology, using and diffusing technology, improving and developing technology to keep up with the latest
developments, and developing an adequate technical human capital base in order to undertake these technology tasks effectively. However, Thailand will get larger economic returns by concentrating on becoming efficient by acquiring international available foreign technology that is relevant for its conditions, and using and diffusing it efficiently rather than by trying to develop its own technology at this stage. However, Thailand must develop a strong local capability to assess, select, adapt, and improve technology. The local development of technology should only be attempted in very selected areas where what is available internationally is not appropriate, too expensive, or where Thailand has particularly strong research and development capability (World Bank, 1991).

Fourthly, income and prosperity distribution to the region and rural areas. Despite Thailand's high rates of economic growth in the past three decades, income disparities have widened among different groups of people in the urban areas, between urban and rural areas, and between Bangkok Metropolitan areas and other regions. Income disparities among households of different socio-economic status and between rural and urban areas have increased to an alarming level. For instance, income share of the top 20% or the wealthiest group of households, had increased from 49.3% during 1975 to 55% by 1988, while income share of the lowest 20%, or the poorest group of households, had actually declined from 6.1% to 4.5% during the same period. Furthermore, regional disparities have also been on the rise. In 1981, Bangkok contributed about 42% to GDP. By 1989, this share increased to 48%, while in most other regions, these shares had actually declined. It is projected that unless income distribution and decentralization policies are rigorously implemented, the income disparities may become more severe.

In order for Thailand to turn the current economic and development transformations into a more sustainable and competitive growth path towards the year 2000, Thailand must explore the new opportunities available and overcome the major constraints already mentioned. Predominant among these at the moment, is the human resource development issue. The state of infrastructure in Thailand today also requires major investment programs. In the light of the long lead time required for both human
resource development and infrastructure projects, there will be pressure to move ahead quickly and systematically.

The Eighth National Development Plan

Thailand has implemented seven National Economic and Social Development Plans since 1962. The course of each plan is different which can be determined from its objective proposed by The National Economic and Social Development Board (NESDB) of Thailand. Each plan is as follows:


According to the Eighth National Economic and Social Development Plan seminar hosted by the NESDB in Pattaya on March 3-4 (Pouaree, 1995), the past seven development plans have failed. Participants from the agriculture, business, industry, and government sectors all agree that the past seven national plans were good, but there are several points indicated that they were poorly implemented by the bureaucrats. First, government officials see villagers as beneficiaries waiting to receive state services, but, in fact, they are clients with which the government officials
have to serve. Second, real income distribution and sustainable development are for
the government and the NESDB to study and capture their meaning. Third, farmers
are in debt because they are encouraged to produce cash crops for export which need
more chemical fertilizers and pesticide, and with no market resources to help them.
Therefore many of our countrymen are in debt and it accumulates every year, making
it hard for them to escape from this cycle. Last, both farmers and the non government
organizations (NGOs) have similar ideas that the government did not play a subsidiary
role of assisting and supporting the people at local level, but instead dominate those
people to do as the government want them to do. The bureaucrats always support
people’s activities, in the initial stages, in order to project a good image for
themselves, but they eventually ignore the real problems of rural people. To achieve
the human resource development, the government needs to be less in centralized, and
in the local administrative body, all government agencies should work cooperatively.
This is to strengthen the local resources which serve the real needs of people.

The Eighth National Development Plan (1997-2001) should be geared towards human
resources, with economic growth playing a supporting role. This view was shared by
most participants in the seminar. They agreed that in order to achieve the aims of
human development, the bureaucratic system must first be reformed. The Ministry of
Education, the Ministry of University Affairs and the Office of the Civil Service
Commission (OCSC) are particularly mentioned. Most of the participants claim that
the education system is not good enough for human development and major reform is
necessary. Human resources, process improvements, and technological development
are the three most significant points mentioned by participants. They point out that if
human resources are not properly developed, the two other factors will be affected
too.

School teachers and university lecturers have an important role to play in improving
the quality of their students. Certainly; we need to improve the quality of teachers, and
deputy Prime Minister Supachai Panitchapakdi shares this concern. He told the
seminar not enough ethics were taught in school (Pouaree, 1995). The government is
planning to expand compulsory education from six to nine years, but Dr. Supachai
cautions that good education must come with good moral standards, if human
development is to achieve its desired goal. He stated people who have high education but are dishonest can cause more harm to society than do people with low education. Most participants agreed that human development in terms of education quality, ability to work, and ethics should be the main target of the Eighth Plan, with economic development to be considered. As Dr. Supachai pointed out, economic and human development cannot be separated. “They are interdependent”.

The benefits of The Eighth National Development Plan

According to the target of the Eighth National Economic and Social Development Plan which aims at ethically targeting key human development reform, the plan will benefit to both urban and rural people. Education reform will improve the quality of life because people have the opportunity for training and equality in the workplace. However the proper implementation of the Eighth Plan is as important as the planning for the objectives to achieve the goal of Thailand’s economic and social development.
CHAPTER 3
IDEALS AND REALITY

The feasibility of telecommunication technology: lessons from other countries

There are various ways in the implementation of telecommunication technology in many countries which indicate that it is possible to introduce this technology in education. For example, there are many computer-related educational practices for USA, Japan, China, and Thailand which focus on the existing role of computers in education.

USA
Many schools in USA began using computers in 1982 (Pelgrum & Plomp, 1991). During the decade of the 1980s many individual states adopted elementary and secondary curricular requirements for computer use and established teacher training programs. In 1990 the Accreditation Committee of the International Society for Teacher Education (ISTE) began formulating universal guidelines in the area of information technology for submission to the US National Council for Accreditation of Teacher Education (ISTE Accreditation Committee, 1991). Proposed ISTE recommendations included competency for teachers in four areas: a) foundations for all teachers; b) computer/technology literacy for teachers of computer literacy; c) educational computing and technology specialty for computer coordinators and other technology leaders; d) computer science education for teachers of computer science in secondary schools. These standards will apply to all programs which lead to a degree or an endorsement (training certificate). Because a large number of existing teachers in the USA are pursuing higher degrees or endorsements in information technology while they are teaching in another field, the standards will commonly apply to in-service as well as preservice training. Traditional short-course in-service training is coordinated by each state's education agency.

Japan
Many schools in Japan first began using computers in 1985 (Pelgrum & Plomp, 1991). A new Course of Study which extensively revised elementary, lower secondary, and
upper secondary curricula with respect to internationalization, the information revolution, and individualization was announced in 1989. A major revision in the Teacher Certification Law also took place, which introduced a new required course in Educational Methodology and Technology for all teacher trainees entering university beginning April, 1990. This course includes skills in three areas: practical instruction competencies, instructional media utilization, and information utilization (Arizono & et al., 1994). As only a small percentage of new teachers enter the workforce in Japan each year, most computer-using teachers receive their training through in-service programs (Sakamoto & Stern, 1988). Sakamoto & Knezek (1991) described in the detail of this program that Part 1 of the Basic Course for in-service training, adopted in June 1990, includes the general overview for enhancing fundamental knowledge and skills in each medium and the knowledge required for the classroom application of six different types of media: slide, overhead projector, broadcast, video, film, and the computer. Part 2 of this Basic Course is related to the knowledge and skills necessary for teacher training. Since 1990, Part 1 of the new Basic Course has been required for all teachers and leaders in educational institutions, while Part 2 is designed for the leaders in prefectures and big cities.

China

Pelgrum & Plomp (1991) stated that the Chinese Government began offering computer lessons at five secondary schools in Beijing in 1982, and that many schools in China began using computers by the end of 1986. Early in 1983, the Ministry of Education called for a National Computer Education Conference to create an outline of a teaching program for computer education in secondary schools. It focused on computer principles and programming in BASIC. Later, in 1986, use of computer application software was added to the main outline. In 1987 the National Research Center of Computer Education for primary and secondary schools was set up under the BASIC Education Department. In 1991 the center adopted and published the Instruction of the Computer Course for primary and secondary schools, making it an independent course for students. In 1992, the State Education Commission set up the Leading Group for Computer Education in primary and secondary schools to administer and supervise primary and secondary computer lessons. The evaluation Committee for Computer Education Software was also formed in 1992 under the
leadership of the State Education Commission. With respect to the training of teachers and administrators, the State Education Commission has made a special effort which has led to gradual opening up in normal colleges and universities, departments and special areas to offer courses on computer science, and to enroll graduate students into special lines of study so that later they can take CAI and CMI-related work as life careers. Nevertheless, the two main impediments to more rapid introduction and utilization of computers in Chinese education continue to be the lack of technology-literate teachers and the shortage of other qualified personnel.

**Thailand**

Although computer instruction has been used in Thailand for the past twenty years (UNESCO, 1985), greater use of computers in education came after the advent of microcomputers. In 1983 some secondary schools in Thailand acquired microcomputers and began offering elective courses. In 1985, the Ministry of Education implemented a computer curriculum for the upper secondary school level throughout the country. The Institute for the Promotion of Teaching of Science and Technology in Thailand, initiated a pilot project scheme in 1987, to encourage the integration of computers in teaching mathematics and physics at upper secondary level. By 1990, 15 universities and 36 teacher colleges in Thailand, provided computer courses for both graduate and undergraduate students. Thailand as a whole however, is not far advanced in its use of computers in the school system.

Huang (1994) explored the relationship between prospective teachers' use and perception of the value of educational technology. His study addressed three research questions:

- What are student teachers’ uses and the perception of valued educational technology?
- Is there consistency or discrepancy in prospective teachers’ perception of the value and actual use of educational technology?
- How do teacher characteristics relate to the utilization and value perception of technology?
The results indicate that preservice teachers have positive perceptions of the value for technology and that this perception played an important role in student teachers’ actual use of technology. The greater value student teachers placed on educational technology, the more frequently they use educational technology. Nonetheless, the results also revealed that the potential of technology is relatively underutilized when compared to the value perceived by student teachers. In addition, there is a gap between value perception and utilization as shown in the rank orders of these technology activities.

The available systems for education development

Rapid developments in communications and network technologies and regulatory frameworks, including digitization, wireless communication, optoelectronics and optical fiber, as well as the corporatization and liberalization of telecommunications operations are particularly significant in setting the stage for radical changes in information technologies today. Indeed, in 1992 Michael Spindler, then Apple’s President, stated in his address on “The Evolution and Revolution of the Personal Computer Industry” that “The computer industry is much more driven by communications than the other way round. Small computers today are communication-intense like never before” (Spindler, 1992). Many products, services, and technologies related to information technology are more and more being merged. The impetus to this merger of computers, media, consumer electronics and communications was the move to digital technology, the language used by computers, which is now becoming the common language for all. A selected number of technologies, products and services resulting from the merger is described below.

Multimedia: interactive electronics media of the future

Multimedia represents the convergence of computer, communications, consumer electronics, entertainment, media and publishing. A multimedia system consists of a Personal Computer (PC), HDTV, compact-disc devices, and is equipped with two-way communication capability in which a PC will mix text, graphic, high-fidelity stereo sound and video images.
At present, multimedia is extensive in the world market. When fully developed, the technologies promise to revolutionize the information technology industry, including computer communications, consumer electronics, and mass-media. One of the largest potential markets for multimedia is in education and training. Furthermore, the system is now available for computerized libraries of books, magazines, newspapers, and movies.

Many other opportunities and innovations exist for made-to-order products and services. An example is a personalized electronic newspaper tailored to each individual, with computers running media networks for information of particular relevance to individuals based on a sophisticated electronic model of a person to determine which news items should or should not be selected (Negroponte, 1991).

Whether or not multimedia takes off rapidly will depend on the development of many associated technologies and services. These include ISDN, HDTV, AI, and key human-machine interfacing technologies like voice-recognition.

The Thai HDTV system is yet another example of the merger of computers and consumer electronics. It is used for running courses of non-formal education via THAICOM 1 satellite. Furthermore, as Spindler predicted, the shape of a TV-set being a flat screen on the wall driven by software under computer control is now widely used in many sectors (Spindler, 1992).

The personal communicators: the merger of personal computing and networking

In the advancement of telecommunication, the two most important factors that promise to make this possible are computer hardware and communication software. The hardware technology is still developing, especially the central processing unit (CPU) and the telecommunication interfacing technology. The CPU capacity is rapidly developed from 80386 to pentium technology. This new technology speeds up the data transferring and processing time. Portable computer, notebook or subnotebook, merge with pocket modem as another personal communicator that can be used for personal communication. Among most modern hardware of the personal communicator is a small portable electronic device about the size of a videotape that
combines the functions of cellular phone, computer, fax, and electronic organizer. In May 1992, Apple was the first to unveil a prototype called “Newton” which sold during early 1993 at a cost of less than US$ 1,000 (The Bangkok Post, 1992).

**Video-conferencing**

In the 1980s a number of merging trends converged leading to investment in videoconferencing and telecommuting technology. Telecommuting is a new pattern of work based on information technology development which can permit a certain type of employment from the home. Telecommuters or teleworkers effectively maintain electronic connection to their organizations exchanging their daily commute to work. Video-conferencing, a form of teleconferencing, is the simultaneous video transmission linkage that interconnects two or more parties at different locations allowing them to see and talk to one another in a long distance conference arrangement.

The essence of videoconferencing is communication. Videoconferencing hardware and software are tools for communication and nothing more. If used skillfully, they can aid both the sender and receiver of a message in understanding that message. If used improperly, either due to unfamiliarity with the technology, or more importantly, unfamiliarity with the impact of the medium on the communications process itself, then the message will be lost.

In its simplest form, videoconferencing is the live connection of two or more people using some combination of video, audio and data for the purpose of communication, with video being the only prerequisite to fulfill the definition. The latter is an important distinction. Sign language is a purely visual method of communication and videoconferencing supports that quite well. Naturally, a system which only transmitted images wouldn’t be commercially viable so we have come to expect true videoconferencing to include audio or, as a minimum, text communication in addition to the video feed.

Nevertheless, it is helpful to think solely of the visual impact of the medium from the outset because the roots of how we communicate with one another predate the
development of language. Non-verbal communication is a behavior we do inherently and unconsciously even when we are talking on a conventional telephone and the person on the other end of the line cannot see us. If we get angry on the phone, we stiffen up, for example, but these non-verbal queues, which are also called body language, are lost in the absence of visual communication.

Because visual communication is part of the human existence, there is no doubt videoconferencing will become mainstream, both professionally and personally. With the integration of NetMeeting (free, low-quality synchronous conferencing software) into their next operating system, Microsoft is already doing its part to seed the market. And certainly Intel joins them with the creation of their newer, faster MMX chip.

However, the fundamental issues of usability and functionality still remain. Until bandwidth issues are resolved, software-based visual communications over the Internet will remain sub-par, and use over corporate LANs and WANs will create greater demands and risks for the overall infrastructure, possibly jeopardizing mission critical applications like databases, email and legacy data access. Likewise, until availability and pricing for dedicated communications like ISDN achieve greater acceptance (and this is happening internationally), hardware-based solutions will grow, but at slow rates.

In emphasizing educational context, if teachers are in search of a business videoconferencing solution, they must still define how they want to use the technology. Indirectly they are implementing this technology to a) increase teaching classes between multiple campuses, b) lower travel expenses for giving a lecture or broad meeting, and/or c) make money. They can make money with videoconferencing by using it as part of a customer service or technical support function for their clients, or as a service they sell to clients such as distance training.

There are many reasons for using videoconference systems, some can be measured quantitatively, others have to be considered qualitatively. Myhrman and Eriksson (1997) suggest some of the major strategies to find out why, when and how one should use the videoconference system:
1) Introduce the meeting rule. The meeting rule states that every physical meeting that requires more than one hour of travel, has to be preceded by a videoconference meeting. This way, the user will learn one of three things: (a) that the physical meeting could be cancelled since they covered all aspects in the videoconference meeting, (b) that the physical meeting still had to take place but it gave a better output since the participants were better prepared, or (c) that there was no difference in the outcome of the physical meeting. In any case, the user will be more aware of when and how the videoconference system should be used. He/she will find new ways of communicating and new ways of working.

2) Inform the employees. The users have to be informed properly, a simple show-you-how-it-works is not enough. The "information campaign" should cover instruction videos, articles in the corporate newsletter, and even case studies that must be carried out using the videoconference system. But most importantly, examples of successful uses must be brought forward.

3) Evaluate constantly. The evaluation process does not just include asking people during the coffee break what they think of this fascinating piece of technology. It has to be easy for users to fill out evaluation forms after having used the system, and follow-up of the evaluations are crucial. As with all new technology, bad word-of-mouth can be devastating and corporations should not stick their heads in the sand when people said they hate videoconferencing.

4) Study physical meetings. By studying physical meetings it will become more obvious that using the videoconference system is not like talking to the camera at the five o'clock news update. It's about communication between people, an interactive process. Attend a drama class to see how people act, analyse the next board-meeting. Who says what, when and how are crucial questions.

5) Outline a corporate strategy. Motivate the company why you use the videoconference system at all. Define goals, not just "cut travel by 30%". Try to define goals with quality, such as "we want people to meet more often", or "we want to cut
the budget period by three weeks". And don't forget to change strategy as you evaluate the use; using the videoconference system is no static process, goals and measures have to be reviewed and changed constantly (Myhrman and Eriksson, 1997 p. 2-3).

The above suggestions give me some basic thoughts about how I can plan and implement the videoconference system in educational development. Although the above suggestions were from the business context, they may be applied for educational context.

Telecommunication technology for education development

According to interview data of ten teachers from five secondary schools in Khon Kaen, there is telecommunication technology available for education development in all five schools. They already have microcomputers, telephone lines and fax machines. In five schools, telecommunication technology is used in a similar way. As quoted by one interviewee:

   We use microcomputer for both computer courses and administrative work in our school. We have three telephone lines, but we only use the telephone and fax machine for communication with outside organizations related to school administration. The fax machine in my school is installed in the office of school principal.

There are many academic resources accessing through the telecommunication technology by using fax machines in the running of the business. For example, The Sunday Magazine advertises that:

   "Instant help in reading today’s The Sunday Magazine
     Do you want to improve your English?
     Do you want help reading today’s The Sunday Magazine?
     Do you have access to fax machine?

You can instantly get the Sunday edition of *Learn English By Fax* free through Postfax. This is a full page of English instruction,
helpful reading tips, and exercises based on today’s The Sunday Magazine. Just follow these instructions:

Dial 671-3130 on your fax machine, followed by 0302 and end with the pound key (#). When you hear the “beep”, press start. Then wait for your fax. (It’s easy. A voice message will help you follow the correct procedure.)” (The Sunday Magazine, 1996).

Interviews with school teachers, although this service is known to them, revealed they could not use it as the school would not pay for the expense of the services - the long distance dial charge of the fax machine.

Another telecommunication technology business information service in Thailand is POSTLINE, which consists of two services: the postfax and postvoice variety guide (The Sunday Post, January 14, 1996, p.15). The postfax variety guide provides the information on the Bangkok Posts latest news report via POSTFAX, hotels, services apartments, condominiums, airlines, used car auction centers, private hospitals, travel agents, golf courses, and the postline shopping guide by DMG. The directions to use this service being easy to follow:

“POSTFAX variety guide
To get information on the list below, simply pick up handset of your fax machine, dial 671-3130-64, and listen to the voice instruction. Then press appropriate code, followed by # key. After the “BEEP” tone press “START” or “RECEIVE”. And wait for your fax.”

The postvoice variety guide provides information on songs, travel, lottery results, football, car accessories, horoscopes, and postline shopping guide by DMG. It gives simple directions to get information:

“POSTVOICE variety guide
Call POSTVOICE 📞 671-3130-64, listen to voice instruction, enter the code, followed by the pound “#” key. After voice instruction,
press “1” for English voice information, press “2” for Thai voice information.

Remark :Telephone line with “pulse” system and some models of mobile phone cannot use POSTFAAX and POSTVOICE. International call dial (662) 6713130-64
:Horoscopes, Songs and information index call POSTFAAX code 0003
:POSTFAAX & POSTVOICE computerized service available 24 hours.”

Furthermore, there is the latest business on-line service system, called CYBERNET, established by American Datacom Co., Ltd. in Bangkok (Mekpraditsin, 1996). This system has provided services for members only since January 1996. The members access the system through a microcomputer connected with modem and telephone line. It provides services in both Thai and English on computer hardware, computer software and data/communication in many areas as follows:

- Information searching and retrieving on:
  - personal computer hardware and software
  - LAN Novell Netware
- Telecommunication services:
  - electronics mail (email)
  - tele-conferencing
  - CYBERNET user discussion group
- On-line library:
  - utility software
  - application software: shareware, freeware and BETA application
  - Computerized dictionary of computer hardware and data/telecommunication
- Computer software and hardware shopping
- Training courses:
  - computer hardware courses
  - network course
Although these business services show the efficiency of the telecommunication technology available in Thailand through accessing the database or knowledge base telephone line, teachers in the provinces cannot use these services. Their schools have no budget for the high rate of membership fee or the expense of long distance dial telephone.

The technical, social, and economical improvement

At present, computer and telecommunication technology have reached a high state of technical, social, and economical improvement. For technical improvement of both computer and telecommunication, interfacing hardware is required to support data, graphic, and sound transferring. The advanced development of computer hardware from 80386 CPU to pentium III CPU, with 650 MHz speed, and the increasing number of telephone lines and mobile or wireless telephone, all support computer mediated communication (CMC) which can be used for educational development. CMC is a merging of computer and telecommunication technologies to form a computer network with installed communication interface card and communication software. There are several types of computer networks, which include local area network (LAN), telephone modem network, and satellite network. All of these types allow electronic communication among computers or computer terminals connected to the network (Lillie, D.L., Hannum, W.H. & Stuck, G.B., 1989, p.178). LAN connected a number of microcomputers by cables to the same file server. Telephone modem networks are used when a greater distance is involved, such as a network that links computer at home to a large file server located at computer center in a school. Telephone modem network actually can be used across any distance that is served by telephone. Satellite network system uses satellite communication to transfer computer software programs and information files from one location to another.

Most people agree that advanced technology- computer and telecommunication technology, plays a key role in improving our social activities. All sectors in Thai society tend to reengineer their organizations to increase both the efficiency of work processes and increase production. All commercial banks have already established online-banking, which can improve the banking system. Most business organizations
use an automation office consisting of a computer network for the running their business. Almost every factory uses the computerized controlled production process. All government agencies have now introduced computer and telecommunication technology in their workplace. Such advances in technology indicate an improvement for Thai society.

There is no doubt in saying that Thai economic development is based on the advance of technology. Thailand has sustained its growth rate since the Sixth National Economic and Social Development Plan because of the utilization of technology in the business and industrial sectors. Technology is used for both the work process and in communication. Lack of technology in an organization means it cannot survive in a competitive and information seeking society. We have seen that many organizations spend more of their budget on improvement by the implementation of technology. With a technologized working process, they can increase their production therefore contributing to the improvement of Thailand’s economy.

**Problems and potential of using technology in education**

The use of computer technology in the nation’s elementary and secondary schools, as well as colleges and universities, is increasing dramatically. This is due to computers being categorized as an instructional technology which possess a variety of important attributes. Computer education in Thailand has been in effect for 20 years (United Nations Educational, Scientific, and Cultural Organization [UNESCO], 1985). By 1990, 15 universities and 36 teachers colleges in Thailand provide computer courses for both graduate and undergraduate students.

In 1983, some secondary schools in Thailand acquired microcomputers and began offering elective courses in microcomputers. In 1985, the Ministry of Education implemented a computer curriculum for the upper secondary school level throughout the country. Computer applications in Thailand are rapidly expanding at all school levels. The Institute for the Promotion of Teaching of Science and Technology in Thailand (IPST) initiated a pilot project in 1987 to encourage the integration of computers in teaching mathematics and physics at the upper secondary level. Topics
in Mathematics and Physics at the upper secondary level were identified, for which computer software was to be written. The IPST has developed a number of computer programs in mathematics and Physics. This was the beginning of computer application in Thai schools.

However, Thailand as a whole lags behind developed countries in its use of computers in the school system. Most teacher training programs for computers in Thailand are concerned with the learning about or teaching of computers, rather than teaching with computers or computer applications in education (Talisayon, 1989).

In a pilot study in 1996 by the researcher, information derived from interviews with ten teachers, from five secondary schools in Khon Kaen indicated there are several problems concerning computer application in secondary schools. Firstly, the lack of qualified teachers to teach computer courses. All five schools have to assign the Mathematics and Physics teachers who are interested in computers to teach computer courses for students. Secondly, the lack of hardware. Although the price of microcomputers continues to decrease, many schools still cannot afford them. Five schools were faced with the problem that computers used were not up to date, so they could not teach from the latest software which needed a higher capability of hardware. They were able to only teach basic computer literacies and skills, such as DOS, Thai Wordprocessor, Spreadsheet, and Database for students. Thirdly, the lack of appropriate software and courses. All teachers who taught computer courses in five schools had to teach computer courses as the extra courses. So they not only had no time to plan lessons properly, but also could not develop the appropriate software and courseware for the computer classes. Lastly, some schools faced the problem of school principals not supporting the use of technology in the school. Most of the budget, apart from running costs and the academic and administrative work, was spent on buildings and landscape development for enhancing and for development of the school environment. Very little of the budget supported computer education projects. However, many school teachers did work to develop computer education in school independently because they are interested and volunteered to work.
In emphasizing the potential of using technology in education, there are three factors that increase the efficiency of using computers in schools. Firstly, to keep pace with the increasing use of computers, school systems and teacher training programs across the country have to initiate an array of new computer-technology training efforts. Teacher training programs now include a variety of noteworthy introductory computer courses. For the most part, these courses focus on how computers work, how to select appropriate software and hardware, and how to use some well-known applications packages. They also deal to some extent with issues raised in using computers in schools. Occasionally, courses include an introduction to a programming language.

Secondly, with the realization of the importance and necessity of teaching professional development, The National Education Commission has begun the Reform of Teachers and Educational Personnel Training and Development project which was approved by the Cabinet on December 14th, 1994 (Office of National Education Commission, 1993). One of the strategies of reform to the teacher training process is setting up a new educational culture, allowing learners to learn by themselves with guidance and follow-up from teachers, rather than teachers providing knowledge. This can be done through the improvement of libraries as information centers facilitating learners’ study with modern technology. Teaching aids such as media, computers, and VCRs should be sufficiently provided.

Lastly, the government, through the Ministry of Education, clearly show the policy to continuously support and promote this task until it reaches its goal, especially in providing a block grant of B20 million for the primary operation of the committee.
CHAPTER 4
THAI SCHOOLING: A CASE STUDY

When school teachers embark on the processes of introducing technology, especially computer and telecommunication technology, they find that there is very little information available to assist them. Decisions and plans are often made only on the basis of some general guidelines provided by administrators, or from teachers’ experiences results of trial and error. The goal of doing this case study is to answer the four significant questions as follows:

- What is happening in Thai schools?
- Why is it happening?
- What jobs are teachers using technology for?
- What kinds of professional development do teachers think computers could be used for?

Method of study

A case study was selected for this study because it is one of educational research methodologies that aims to describe a particular event in an interested context. I believe that a case study is an appropriate methodology for this study because it not only provides the information about telecommunication technology in a school in depth but also helps to refine and develop my understanding of the related events in the school. The procedures of data collection in the study included document analysis, face-to-face and/or telephone interviews, and workplace observations.

The data sources in the study were documents, from a school administrator and teachers. The documents provided by the school principal included annual school operation reports and some printed materials about academic activities in school. One school administrator and six teachers volunteered to work with the researcher. The different data sources were needed in the study for considering the data trustworthiness.
In a period of two weeks, the researcher arranged the interviews with one school administrator and six teachers using a set of unstructured interview questions. During that period the teachers’ behaviors while using technology in their work were observed to obtain the information about using technology in school.

The data was analysed at the end of data collection through the following procedures:

- Document analysis. Documents offered additional slices of data that proved very beneficial to me, especially the school annual report and some documents of teachers academic activities.
- Extract significant statements from interviewed records that directly pertain to the research questions.
- Formulate meanings as they emerge from the significant statements and formulate the description of the phenomenon in school related to the research questions.
- The results of the analysis were then gave back to the school administrator and the teachers who provided the information in order to clarify the findings.

**School background**

The selected school is the fifth secondary school of Khon Kaen located in a sub-urban area, about three kilometers from the town-hall. It was established by the agreement of the sub-district commission in 1982. At the time of the research, there were 54 classrooms with 2,337 students and 149 teachers. The school was selected to be one of the informal education centers in Khon Kaen.

School policies of the academic year 1995 were:
1. The student are the heart of education management. The student centered approach is used for education management.
2. The school is a part of the community, so the school has to be beneficial to the community.
3. The school has the knowledge market for people who can select what they want to learn.
4. An emphasis is on teachers’ and educators’ development to reach the highest efficiency of education management.

5. An emphasis is on educational technology and innovative developments to keep up to date with advanced technology. Establishment of an instructional media center in school.

6. The school has to improve the service atmosphere, academic atmosphere, and school environment for educational development.

The findings derived from observations and discussions with the school administrator and computer teacher provided useful information about Thai schooling described in the following sub-topics.

**Technology in Thai schools**

Educational use of technology in Thai schools can be divided into two major categories: instructional applications and administrative applications. Instructional application includes the use of computers as a topic of instruction through the teaching of computer programming and computer literacy, as medium for instruction by using various types of computer assisted instruction (CAI). Also it is a tool for managing instruction (CMI) including teaching material productions, analysis and scoring of tests, recording of attendance and academic progress, performance of class ranks, and storage of grades. Administrative applications of computers include the use of word processing, data base, test generator, and grading software. Thai schools use various types of technology for this two applications as followed:

**The satellite technology**

The selected school was chosen to be one of six schools in Khon Kaen for a pilot project using THAICOM 1 satellite school broadcasting TV programs, as an informal education system. The greatest application of this technology in the school is using the TV programs in the usual classes in three major courses, English, Mathematics, and Science. The Vice School Principal for Academic Affairs of selected school describes that:
Our school is one of six schools in the pilot project using satellite TV broadcasting programs which are operated by the Department of Informal Education (the Ministry of Education). The Provincial Informal Education supported the installation of all equipment for selected schools. There are three ways of using the TV programs. First, we use the live broadcasting program for the informal education classes. Second, we use the recorded programs for the usual classes as broadcasting times are not appropriate for the school timetable. Lastly, we use the knowledge fulfillment program for the Mathayom Suksa 6 (grade 12) students to prepare for the university entrance examination which is collaboratively operated by the Thaicom foundation, Chulalongkorn University, and the Department of Informal Education.

Anupong, a teacher who takes responsibility for running the application of satellite TV programs expresses there are many problems with the programs:

The broadcasting time is not appropriate for the school timetable so I have to record the programs on a video tape recorder for later use in the usual classes. But I have to teach about 18 hours a week so I always miss the program. I think, we need a technician to take responsibility for this task.

All three teachers, Anucha, Anupong, and Anuchit, who discussed with the researcher suggestions for the improvement of the usage of satellite TV programs:

The broadcasting time needed to change to be the same as school timetable. It will be much more convenient for teachers to use a live program for their classes.

However, all teachers in school agree that this project is very useful for educational development. It shows the next step in implementation of technology for classroom
activities. They all think that the Ministry of Education should give more attention and allocate more supported budget for this project.

The videotape recorder (VTR)
The VTR technology is the common technology which is widely used in Thai schools. In this school all 11 departments have their own VTR with the television and video, related to their subject areas. Teachers operate this technology within their classroom. The status of VTR usage in classrooms at this school is described by Anupong that:

It is very convenient and useful to use the videotape in classroom because the students have opportunity to extend their knowledge and experiences toward the content of the subject matters, especially about the abstract ideas and the content that we cannot find in the local area, such as science, social education, agriculture courses.

However, there are several problems in using the videotape for classroom activities because of the low budget for acquiring videotapes which is very expensive. Each department has to illegally record from the television programs instead of purchasing the business production. In so doing this, Anuchit states:

We mostly illegally record the business television broadcasting program for using in our classroom, but we are afraid that it prohibits the copyright of the program. If the Ministry of Education take responsibility for asking the business television production firm, for approvalment of recording the program for classroom use, we will be happy to do it.

Computer technology
The microcomputers are widely used for both, administrative and instructional applications in this school. A computer teacher, Anupong, explains about computer courses in school:
Our school provides computer courses for both the lower and upper secondary levels. For the lower secondary level (grade 7 - 9), we provide basic courses for grade 7 students and elective computer courses for grade 8 and 9. The courses take 2 hours a week for the basic courses and take 4 hours a week for the elective courses. For the upper secondary level (grade 10 - 12), we provide the elective courses followed by the computer curriculum developed by the IPST.

There is a computer laboratory installed with 20 stand alone microcomputers for students, and one computer for the teacher. The computer laboratory is well set up with instructional media. However, both computer teachers believe that there is not a sufficient amount of hardware services for students and teachers. As Anupong said:

The number of computers is not enough for students to practice after class because the lab is used full-time. If students want to practice outside the class, they have to use after school time in the evening. But it was inconvenient for students because their homes are far away from school. Moreover, there are many teachers who want to use computers for their instructional preparations, but cannot use the facility of the computer laboratory. So we plan to set up another computer laboratory to provide more services.

For the administrative work, eight computers are used in six school offices, administrators, planning, academic affairs, student affairs, Mathematic department, and Science department offices. The computers in these offices are mainly used for paper work and database for management. Anucha, the Vice School Principal for Academic Affairs explains that:

In the academic affairs office, we use computers for keeping student records about personal data, learning evaluation processing, printing the student name lists for teacher use, reporting the individual student achievement results. ... We also use computers for the student guidance system. But the lack of software for specific work is the
most important problem for us because of the lack of qualified and experienced teacher for software development. So we need outside experts helping to deal with this problem.

Most teachers in this school can use computers for their teaching preparations. They use word processors for academic documents within their classroom. They also use computers for instructional media productions such as slides and transparencies for specific content.

Copyprinter and photocopier
There is one copyprinter and one photocopier in this school. They are mainly used for test productions and school documentation. Teachers cannot use this technology because there is no budget to support them for instructional media productions. As, Anucha, the Vice School Principal for Academic Affairs explains that:

We provide a small budget for using the copyprinter and photocopier ... running these two machines is more expensive than using the roneo machine. So if teachers want to produce their instructional materials, we suggest they use the roneo machine instead of using the copyprinter and photocopier. Except if they want neat paper work, we allow them to use these two machines.

Telecommunication technology
There are two external telephone lines, one connected to the internal telephone system that extend to sixteen internal telephone lines and another line is installed in the school principal’s room, which also connected to a facsimile machine. These telecommunication technologies mainly used for administrative work and to communicate with outside organizations.

Other educational technologies
This school still uses the slide, overhead or transparency projectors in the classroom. The machines are enough for teachers use. Teachers make the slides and transparencies for their courses. There are a few sets of businesses which make slides
for which the school provides the budget for purchase them. However, the school administrators' policy is to encourage teachers to be more creative.

**The reason for using technology**

According to information from observations with teachers, it is found that they use technology in their workplace, because this assists most of their work more easily and faster than manually. They all agree that computers help them design and produce interesting slides and transparencies. Using the word processor software, helps them make interesting learning materials that are easy to edit later. For education evaluation, this software such as used for test production and item analysis helps them to work more easily than before. The grading and student achievement report software decreased the time for dealing with this work so that they have more time for teaching preparations.

For instructional applications, teachers agree that computers can assist with the development of students' problem-solving abilities and enrich activities for high ability students. A teacher, Anupong, expresses the reasons of using CAI for their teaching:

> Teachers in this school use computer in connection with mathematics, science, and computer literacy. The drill and practice CAI was used most often, followed by tutorial and problem solving, because they believe that CAI has a positive effect on student characteristics. They believe that computer education has a positive effect on cognitive learning, subject interest, motivation, self-confidence, achievement-test performance, attention span, and social status.

In conclusion Thai teachers possess a positive attitude towards computer use in their classroom.
Teachers' work and use of technology

Teachers in this school mainly use technology for their teaching preparation and as an instructional tool. In almost every department, teachers use videotapes, slides, transparencies, and CAI as the instructional media in their classrooms. As Anucha describes regarding school promotion of computerized instructional media production that:

Every year we have a conference on an instructional media production contest. We allocate a small amount of budget for each teacher to design and produce his or her instructional media and present at the conference. This project encourages our teachers to produce their instructional media. They ask for training courses on computer usage for instructional media productions. Computer teachers provide the training courses such as computerized document productions, computerized slides and transparencies productions for our teachers. This project is very useful for teachers because they can use computer for their teaching preparations. And they all happy with this project.

Teachers mainly use copyprinters and photocopiers for preparing the graphics included in their course document. The copyprinter is mostly used for test productions and to reproduce administrative paper work.

Teachers use telecommunication technology, such as telephone and fax machine, for internal and external school communications. Although these two technologies can be used for accessing to remote academic database, they never use them for this purpose. The reason is that there is a significant problem as Anupong says:

We know that we can use the fax machine for accessing to the remote academic database such as Learn English By Fax through Postflox which is free provided by the Sunday Magazine. But we cannot use this service because of the high rate of long distant dialling fee. Our
school has no budget to support this task. Using the telephone line is
difficult in Thai schools, I think, because the Communication
Authority of Thailand (CAT) has no idea about the dial fee
exemption for education activities. And, I think, this situation inhibits
our education development.

Kinds of professional development for which teachers think that
computers could be used

From the discussion of the topic of professional development and computer
technology, teachers have a positive attitude toward computer applications for their
professional development. They all agree that computer competencies are one of
necessary factors for them to improve the effectiveness of instruction. With the
increasing use of computers in homes, schools, and society in general, certainly, more
and more teachers, as well as students, come to the classroom already computer
literate. Consequently, the need to acquaint teachers with how to operate personal
computers is diminishing. The challenge that remains, however, is the development of
knowledge and understanding about why, when, and how computers can be used to
support the effective instruction. Anupong, a teacher, gives an interesting idea about
this task:

Using computers as tools for improving the effectiveness of
instruction in our school hinges on the capacity of teachers and
administrators to make informed curriculum decisions. I mean the
decisions that are grounded in knowledge about effective instruction
as well as about computers.

Another teacher, Anuchit, concludes about computer literacy levels for teachers that
facilitate improving their effective instruction:

Professional development for teachers concerned about developing
their effective instruction. Computer applications in education has
had significant effects on this task. So, I believe that there are three
computer literacy levels for teachers. The first level is *basic knowledge* or skills about using computers, this level includes the understanding of basic computer hardware and operating software. Ability to use basic application programs i.e., word processing, courseware, etc. is also included in this level. The second level, it may be called *instructional application*. Teachers who reach this level should have the first level skills plus the ability to select and match software with instructional objectives and individual needs of students, the ability to evaluate courseware in terms of effective instruction and instruction design principles. Another ability in this level, I think, is application skill in using courseware, instructional management software, and test-scoring software. Because, apart from instruction, these work tasks are teachers' responsibilities. The third and highest level of interaction between computer knowledge and discipline knowledge is *instructional design and development*. This level includes skills, competencies, and knowledge in the design and development of instructional software, as well as the ability to develop and communicate theories, principles, and methods that link the field of computer science and education.

Moreover, all ten teachers interviewed agreed that computers facilitate instructional media production. They all have the same idea as Chawalit:

I think, ... with rapid and greater advancement, computers have the capacity to let me work easily and correctly. I never use CAI, but I use computers in my instructional preparations. I can produce interesting course documents i.e., worksheets, article papers, with Microsoft Word for my classes. I also use Microsoft Powerpoint for transparency production. But many teachers in my school cannot use computers not even the word processor, so I think it is necessary to include computer training courses in the school professional development programs.
For the telecommunication technology and professional development for teachers study most interviewed teachers have the same problem that when they need a consultation from outside experts in education they do not know who can help them. Although, there is the Faculty of Education, Khon Kaen University which is located not far from town, school teachers can not ask for help from the lecturers. So, they need an education network between school teachers and university lecturers. As Boonsong gives the idea for establishing the network:

Although many teachers graduated from the Faculty of Education, Khon Kaen University, when they are faced with academic problems and need some help from educational experts, they do not know who can help them. Sometimes we know that the university lecturers can give teachers the suggestions to deal with their problems, but we have no time to meet them because all secondary school teachers have work overload. If it is possible, I think, we need the education network between school teachers and university lecturers for our educational development. In the past, there is no university lecturer who will come to talk with us, so we do not know how to establish a network. With the advanced computer and telecommunication technology, I think we can initiate the education network, using these technologies. It will be helpful for school teachers and education development. We would like all school teachers to participate in this project with collaborative work.

The significant findings

The information derived from the study, can be concluded by suggesting Thai school teachers use both CMI and CAI in their workplace. Educational satellite television programs via THAICOM 1 satellite are used for the usual classroom activities in English, Mathematics and Science. However, the broadcasting time needs to be changed to be in line with the school time table enhancing useful classroom activities. The microcomputers are widely used both for school administration and classroom activities. Telephones and facsimile machines are mainly used for school
administration. School teachers use technology in their workplace because it helps them work more easily and faster than by manual work. They mainly use computers for teaching preparation and for instructional tools. Most teachers have a positive attitude toward the application of computer technology in their professional development. They need more collaboration to establish the network between school teachers and outside experts for their professional development. And they believe that telecommunication technology can be used for education network establishment.
CHAPTER 5
PROFESSIONAL DEVELOPMENT IN THAI SCHOOLS

The information derived from interviewing and discussions with ten teachers from five secondary schools shows that Thai teachers have positive perspectives and attitudes toward concepts, beliefs, and techniques about their professional development. Although the Ministry of Education and the Khon Kaen Provincial General Education Department encourages them to attend many conferences and inservice training programs for their professional development, there are many limitations that inhibit their developments. Teachers all agree and believe that professional development and telecommunication technology have close interaction with one another.

Professional development: concepts, beliefs and techniques

All interviewed teachers had quite the same concept about professional development for teachers. They believe that once an individual becomes certified to teach, the effort to continue learning often stops. This phenomenon seems to be due to the prevailing image of teaching as an easy occupation, than to any personal lack of initiative. For professional development, Ekachai describes the motivation of professional development as:

A key source of motivation for professional development is the anticipation of being intellectually challenged in order to enter and then to function effectively in work place.

Since teaching has yet to gain a reputation as an intellectually rigorous field, those who enter it must take the initiative to continue to grow professionally. Because of this, new teachers need to overcome a certain inertia. This phenomenon always occurs in every school as a teacher, Chudapa, describes:

Not only teachers who work for long periods of time possess inertia, but also new teachers who work for a short period of time, ...... about
after a year or two, I think, start decreasing their activeness in their work.

To overcome this critical situation, teachers gave the ideas of the processes and techniques that should be used for professional development as followed:

- To become a member of professional organizations.
- Subscribe to one or more professional journals.
- Doing further study or continued learning which can be promoted by
  - teachers selecting to use their free time to observe reputedly talented and effective teachers in their own school
  - ask trusted colleagues to observe and critique their teaching
  - use evaluative questionnaires to tap the students’ perceptions about their teaching
  - reading books in education and related field by experts
  - attending conferences and workshop to strengthen specific skills
  - attending other resources providing by school system and universities such as inservice programs, teacher centers, graduate study, and acting as the supervisor of student teachers.
- Doing research for their instructional development.
- Writing articles or papers in their own subject areas and sending them to be published in related academic journals.

In describing their beliefs about the essential knowledge and skills for being a professional teacher, Thai school teachers expressed quite similar beliefs. As one teacher, Boutong, points out that:

I believe that there are three types of knowledge essential for teachers: content, educational theory, and teaching skills. For the first type of knowledge, teachers need to be knowledgeable in fields both inside and outside of their specialization if they are to be considered learned people and also on the opinions of those who regard teachers as transformative intellectuals. Without a knowledge of content, teachers
cannot affect change in others or assist others to become change agent themselves.

The educational theory is another factor which can be used for effective and appropriate instructional design for a specific group of students. Lack of this knowledge will cause the problems in teaching and will effect on students' achievements.

Being poor teaching skilled teacher is very dangerous for being a teacher. Although, teachers learned a lot of educational theories but cannot put them into practice, they cannot reach their teaching objectives.... students also cannot learn what teacher want them to learn...then,..I think, the low achievement students will be still in our education system.

Another teacher, Damrong, gave more details about his belief on the knowledge and skills that are necessary for being a professional teacher and also they are considered as the areas that should be included in the professional development program. He explained that:

With my experiences, I understand that being a good teacher is very complex and demanding. However, I believe that effective teachers use four kinds of knowledge, knowledge of self and students, subject matter, educational theory, and educational research, with highly developed teaching and interpersonal skills, to meet the challenges of the professional teachers.

From the viewpoint of a teacher who is also acting as a school administrator, he believed that apart from knowledge of content, research and instructional skills, the reflection and problem solving skill is another factor that will guide teachers to create optimum conditions for learning.
From the information above derived from Thai school teachers, it can be concluded that Thai teachers’ need in their professional development are divided into two categories. These categories are essential knowledge and essential skills as shown in Figure 1. The essential knowledge includes knowledge of self and students, subject matter, educational theory, and educational research. The essential skills include reflection and problem solving skills, teaching skills, and interpersonal skills.

![Diagram](image)

**Figure 1** Thai Teachers' need for professional development

**Limitations of professional development**

Although Thai teachers understand that there are many activities they should attend for their professional development, they cannot participate in those activities. The main difficulties that inhibit the professional development process are:

- The teacher’s real working hours
- The extensive nonteaching tasks
- The working conditions
- The budget support for professional developments
- The low income

Almost every teacher interviewed by the researcher have similar ideas and opinions about the difficulties of professional development. One of the critical issues is the teacher’s real working hours. As Boonsong points out:

The official working hours for teachers are attractive, but the real working hours are another matter. Because the after-hours or extra assignments are found at all levels of teaching. For example, the recess duty, faculty or committee meetings, supervision of various students’ activity clubs. Also not obvious are the hours of preparation that occur before and after school. Frequently, I have to stay late into the night and over the weekend for preparing my teaching.

Another inhibitor of professional development for teachers is the extensive nonteaching tasks which are time consuming. Teachers have to do this type of work to perform their professional discipline. Thai teachers have to spend much time on many nonteaching tasks. They cannot reject this work as it is presumed to be part of the teacher’s work load. As Danu, a teacher, explains:

Beside teaching in classes, the need to complete copious amounts of paperwork, most related to various forms of record keeping, may be the most burdensome of the teacher’s nonteaching tasks. Other nonteaching tasks include supervising student behavior at extracurricular events, in the hall, and in lunchrooms. Individually, such assignments and responsibilities may be enjoyable, too many of them at once, however, become a burden and consume the teacher’s valuable time.
These time consuming tasks cause a lack of time for teachers to attend professional development activities. They have no time to prepare papers, to attend professional development conferences, and teachers’ clubs. So they lose their opportunities to extend and update their knowledge and experiences.

The inconvenient work conditions are also another reason that teachers find difficult as these decrease their activeness in professional development. Many teachers ignore their teaching improvement. As one teacher, Erawadee, points out:

The work condition is very important for improving teachers’ work. In my school only a small amount of the budget is allocated for instructional media productions. Moreover, there is no hardware support us to produce videotapes, slides, and other instructional media that need expensive hardware to produce.

There are many conferences organized by many academic institutes every year, especially during the summer period. Unfortunately, there are only a few teachers who can attend these conferences because most Thai schools have only a small budget to support them. The majority of teachers in school have no chance to attend these valuable activities because it requires expenses for traveling, lodging, and high conference fees. School administrators cannot support these high expenses.

The low income of Thai teachers is one of the significant factors that inhibit professional development for teachers. In discussions with teachers in all five schools, they all agree with one teacher, Boonsong, who made a comment:

School teachers have an important role to play in improving the quality of their students. The sad truth is that many teachers are still poorly paid. They have to do other jobs apart from in-class teaching in order to make ends meet. I am also running my realty business after school hours.
Teachers themselves are criticized. Some people suggest in-class teaching is only a part-time job for teachers, who consider outside business as full-time work. I understand that we have no choice to refuse this criticism, but I think, we have done our best.

Many teachers work in tutorial schools after school. Some teachers agree that this event affects the good teacher image. As one teacher, Chawalit, who was still working in a tutorial school said:

Students who attend my classes at one tutorial school in town think that they hire me to help them complete their courses. Because of this conception, some students do not show respect to me and also other teachers who work in tutorial schools like me. They think it is business, it is not school system, so it is not necessary to give respect to tutorial teachers. But I think such attitudes exits mainly because of lack of ethics and poor moral standards in schools and family.

If both students and teachers think so, it is very dangerous to Thai education culture to do nothing about teachers' income. Certainly, The Ministry of Education and The Ministry of University Affairs need to develop teacher quality, but firstly we should pay them more.

In conclusion, the main important limitations of professional development for teachers are the lack of time and budget support. It is a teacher educator's responsibility to deal with these problems. With the advanced technology and base on these limitations, I think we should design an appropriate model for professional development program.

**Professional development and telecommunication technology**

"In the Industrial age, we go to school. In the Communication age, school can come to us. This is the message implicit in the evolution of distance education."
The above message is on the first page I found after using Hytelnet to access to The Online Chronicle of Distance Education and Communication, December 1994, volume #7, Issue #3. How can I gain access to this electronic journal via the Internet system? It is just the result of trial and error that I always find new knowledge from accessing the Internet. A note of welcome from the editors of this issue describe the characteristic of this online academic resource that:

Our third issue of the Online Chronicle is now on your screen. We continue to share vision of the future in the art of distance education through vision statement from our Advisory Board members. In addition, you can stay abreast of what’s happening in this field by reading the announcements, participating in the information exchange requests on our field through the brief articles and abstracts of published articles that describe where we are and where we are heading in the area of distance learning.

Your participation by submitting announcements, contributing abstracts of articles that have appeared in other publications, requesting or offering assistance to others in this field, sharing news, and sending comments on this issue to editors (chron@alpha.acast.nova.edu) will all help us produce an even more valuable chronicle of our field. .... If you react to something one of our Advisory Board members had to say, you can send e-mail directly to the individual and see if their reply leads to a new understanding of the topic.
Read on now and enjoy the rest of this issue. Feel free to share it with colleagues and on other networks.

After finish reading this welcome note, there are several questions come to my mind.

- What are the benefits of this electronic journal for teachers?
- How can I establish this telecommunication technology for professional development?
• What should be included in this technology for professional development?
• How can Thai teachers get the benefit from this telecommunication technology?

According to the limitations of professional development of Thai teachers, the lack of time and budget support, I found from doing my case study, I think this telecommunication might be one of the suitable solutions of this problem. It means that distance education and telecommunication technology might be used for professional development. Because teachers can learn at anytime and anyplace they are if they have the computer with a modem and telephone line for accessing to the host system. There are many projects that running successfully such as:

Audiographics-L is hosted on the UNIX server, by the Technology and Distance Education of the Ministry of Education, Victoria, British Columbia, Canada, in the interest of the advancement of distance education. Audiographics-L is intended to provide a forum for the discussion of issues related to use of audiographics in the context of distance education. It will support the exchange of fact and opinion to do with matters technical, methodological, developmental, and financial. The list is also intended to host a dialogue on problems, solutions, prospects and trends associated with such concern as infrastructure, copyright, instructional resources and finances. (The Online Chronicle of Distance Education and Communication, 1994).

Sagacity Learning Universe ... Here is some information on Sagacity Learning Universe, which is a virtual university launching officially in September of 94 but with some course offering starting in July of 94. ... Sagacity is a true asynchronous conferencing/seminar system using The Meta Net's Caucus system. Thus, people log on and off at will and see all previous remarks as if they had the classroom in suspended animation when they log in. Sagacity supports a library for class papers and lectures so topic area aren't cluttered with didactic information. It also support an online bookstore for all text and publication needs and interests. The seminar system allows full branching and parallel
discussions so the learning experience is amplified. (The Online Chronicle of Distance Education and Communication, 1994).

Certificate in Distance Education via E-mail: Online Courses

The NKI Electronic College now offers the following three distance education courses via international e-mail:
- Introduction to Distance Education
- Administration & Management
- Marketing

Completion of all three courses qualifies for a Certificate in Distance Education issued by The Association of European Correspondence Schools (AECS). (The Online Chronicle of Distance Education and Communication, 1994).

Another introduction of an interesting service via telecommunication technology which could be useful for professional development is the Spiney Press & Pearlfisher from New South Wales, Australia. As it published in the Online Chronicle of Distance Education and Communication that:

The Spiney & Pearlfisher is constantly on the lookout for relevant, timely and provocative material and they intend to add information gathered from online resources. ... They are seeking authors or eclectic contributors who can help them collate and disseminate text of lasting value specifically targeted to the general education market.

They are preparing an email list for all future releases and request that respond if you wish to participate in their discussion list and receive regular press releases. They presently release approximately three to six new books per quarter and will email you comprehensive information on each title. This will typically be around 200 lines.

In the near future, Spiney Press will be developing a World Wide Web information base, where browsers may view book covers, download
press releases, read sample excerpts, as well as participate in our global online ordering system. This is an open invitation for you, especially those working in the field of education, to help them customize their service and make them aware of our specific needs.

One of the telecommunication technologies applications that I found in the Internet at http://ultibase.rmit.edu.au/Articles/stace1.html, indicates the advantages of telecommunication technology for professional development. Stacey (1997) concluded the advantages of the Virtual Campus for staff and students:

Providing a high quality of academic support and provision of resources to postgraduate students who are often studying within the time constraints of busy working lives and family commitments is a difficult process for institutions even when students are within an accessible geographic distance from the campus. Deakin’s provision of electronic access through Deakin Interchange helps answer this problem while opening up access to students in other states and countries.

Such a system opens up new pedagogical possibilities of an interactive 'virtual' campus which suit the educational philosophy on which the Education Doctorate Course is premised. It also raises problems and issues of equality when attempting to bring all students online. However in evaluating this provision students were positive in their reception of all of the facilities Interchange offered. The community of researchers sharing their experiences and their resources has become a reality in the second year of the conference and continues to be an active and varied discussion space. Though some students are sometimes 'invisible' on the conferences, being readers not writers, it provides them with the support and information they need to reduce their isolation and make them feel part of an extended 'virtual' campus.
The above evidence indicates the possibility of implementation of telecommunication technology for professional development. Although Thai teachers have the limitations of English, the Thai host could encourage them to use this technology for their professional development.

Beside the Computer Mediated Communication (CMC), there are other telecommunication technologies that could be used for professional development such as telephone, fax machine, post mail, etc. If an appropriate model of professional development and telecommunication technology could be designed, it is a valuable process for teachers and education development.

**Teachers' beliefs about professional development and telecommunication technology**

All interviewed teachers from five schools in Khon Kaen agree that, at present, teachers cannot refuse the effects of telecommunication technology on their work. It is time for searching the appropriate process to develop our knowledge and skills for using this technology for our professional development. The traditional process for professional development includes attending conferences, is time consuming and costly as well as a slow process for teacher development. They all believe that telecommunication technology has a more positive effect on teacher development than the traditional process.
CHAPTER 6
RESEARCH QUESTIONS

Having discussion with ten teachers from five secondary schools in Khon Kaen, Thailand, it is found that Thai teachers are eager for professional development. Although there are many types of technology being used in their schools, there are many limitations about using these technologies for their work and professional developments. Closely examining the derived information from the study, I came across four interesting questions for further study. They are:

- Do Thai teachers have realistic expectations on professional development?
- What are the teachers’ needs about professional development?
- What support is available in school for professional development?, and
- What would be helpful for teachers?

These questions will be discussed in this chapter. They will lead to the initiation of an appropriate professional development model, which would benefit teachers and education development in Khon Kaen.

Thai teachers realistic expectations for professional development

The evidence of analyzed information derived from discussions show that most teachers expect to achieve a high standard of professionalism, they all express their awareness for the need of quality education in Thai schools. They try to develop their work and that of their students to reach their educational goals. They all agree that the teacher is one of the most important factors for the achievement of education. It means that teachers are a key factor in the efficiency of the curriculum implementation. To keep education products meeting the social demand, it needs to be reformed. The key person to achieve this goal is the teacher. Thus professional development is needed for improving our teachers to be in the real world of education with the following specific skills:

1. Diagnose student needs and learning difficulties
2. Manipulate the different kinds of knowledge
3. Motivate students and give them constant feedback about their learning
4. Negotiate interpersonal relations- teach conflict solution strategies and promote cooperative learning
5. Communicate with students, parents, and others
6. Utilize technological equipment
7. Judge appropriateness of instructional materials.

Although these specific skills are already included in the pre-service teacher training program, after working for a period of time, teachers need to refresh their knowledge and related skills to keep up with the change of subject matter and the advancements of science and technology. So Thai teachers expect to have opportunities for professional development, especially in the necessary skills for using and implementing new technology in their work.

**Teachers’ needs for professional development**

The interviewed teachers in the case study, believe that every teacher needs to refresh his/her knowledge and skills to keep up with the change of subject matter and the advancement of science and technology. They need to subscribe to one or more professional journals, read books in education and related field by the experts, attend conferences and workshops to strengthen specific skills, attend other resources provided by their school system and universities, improve research skills, improve classroom and academic paper writing, establish teacher networks, publish their paper in an education journal, and consult with the outside experts for dealing with their education problems.

According to the above information, it is shown that teachers understand that there are many activities they should attend for their professional development. They need to improve both essential knowledge and essential skills for being professional teachers. However, it is also found that teachers are faced with two difficulties, the lack of time and budget support for their professional development process. Thus, this information shows the relationship of teachers and professional development which could be drawn as the model shown in Figure 2.
All teachers’ needs mentioned above are the necessary knowledge and skills for education development, and they need helping from outside experts to lead them to answer their needs. Certainly, the Faculty of Education, Khon Kaen University is one institute that is ready to assist them. However, we need more collaborative work among other institutes concerned with education development.

![Diagram](image.png)

**Figure 2** Thai teachers and professional development model

**Available support in schools for professional development**

In this study, it was found that each of five schools have at least two telephone lines, one fax machine, one satellite television set, and more than twenty computers for computer courses and administrative work. The telephones and fax machines are mostly used for personal communication and administrative work, the satellite television is used for some courses. There are also no modems in the five schools, because teachers do not support the
computer mediated communication (CMC) which is the method for using computers with remote accessing to other computer units via modem and telecommunication systems. However they are interested in using CMC, but are limited with no experience in this technology. All teachers can acquire access to a modem, if it is possible to use CMC to access a computer host. Apart from the technology for supporting professional development for teachers, budget support is another factor that could be a stimulus or inhibiting factor for teacher development. All five schools have little budget to support teachers attending conferences and workshops for their professional development. Thus it is possible to draw a model of the relationship between the available supports for professional development and Thai school as shown in Figure 3.

**Figure 3** The available supports in Thai Schools for professional development

**The limitations of professional development for teachers**

Although Thai teachers understand that there are many activities they should attend for their professional developments, they cannot participate in those activities. The major difficulties that inhibit professional development process are:

- The teachers’ real working hours
- Extensive nonteaching tasks
• Working conditions
• Budget support for professional developments, and
• Low income

Almost every teacher interviewed by the researcher had similar ideas that overload of teachers’ real working hours is one of the most difficulties of professional development. Another inhibitor of professional development for teachers is the extensive nonteaching tasks which is time consuming. Teachers have to do this type of work to present their professional discipline. They cannot reject this work because it is considered that they are part of teachers’ work. Teachers have to spend more time for many nonteaching tasks. These time consuming tasks cause the lack of time for teachers to attend activities for their professional development. They have no time to prepare a paper, to attend conferences or workshops, and to attend teachers’ clubs. So they lose their opportunities to extend and update their knowledge and experiences.

The inconvenient work conditions are also another reason why teachers have difficulty finding time updating professional development. Due to the fact teachers have to use their own resources, many teachers neglect these strategies for improving their teaching ability.

There are many conferences organized by many academic institutes every year, especially during the summer period. Unfortunately, there are a few teachers who could attend these conferences because most Thai schools have too smaller budget to support them. The majority of teachers in schools have no chance to attend these valuable activities, because they need more expenses for traveling, lodging, and high conference fees. School administrators cannot find support for these high expenses.

The low income of Thai teachers is one of the most significant factors that inhibit professional development for teachers. In discussions with teachers in all five schools, they all have the same idea that many teachers work in the tutorial schools after school hours to get extra income. Some teachers agree that this event effects the image of a good teacher.
In conclusion, the main limitations of professional development for teachers are the lack of time and budget support. It is an educators' responsibility to deal with these problems. With the advanced technology and these limitations, I think we should design an appropriate model for professional development program.

What would be helpful for teachers?

To respond to teachers' needs and expectations, the Faculty of Education, Khon Kaen University, is a leader of education and pays more attention to the application of information technology in education development, and should take responsibility for this task. To cope with this situation the appropriate professional development for teachers program should be established in response to teachers' needs, with the advantage of new technologies.

Appropriate technology which may be used for professional development program, are telecommunication technologies, in fact, computer mediated communication in the form of personal computer bulletin board system (BBS) and/or the Internet should be used. My experiences in using the Internet, especially the World Wide Web (WWW), during my time as an EdD student for the last two years, has shown me that this technology could assist teachers in solving their limitations for professional development, especially the lack of time and budget support. This technology has many positive benefits for teachers such as:

1. Teachers can access a professional development program at any place and anytime they want;
2. They need not travel to attend face to face conferences. By using the conference space of the system, they can set up interesting discussion groups about their interests;
3. They need not travel to see outside experts for academic counseling by using email for consultations;
4. The Internet has the knowledge base that teachers can use to search and retrieve, so they need not to go to outside libraries for information;
5. The electronic journal set up in the BBS or WWW homepage can be used by teachers to publish their research and classroom papers.
The basis of setting up a BBS or WWW homepage for this specific purpose would encourage participating teachers in this program to work together in a collaborative way. Thus, they have the opportunity to improve their skills of working in group, as well as creating the teacher education network between schools in Khon Kaen. They would like to support this set up, but there is no key person to initiate the network. If the Faculty of Education, Khon Kaen University, takes responsibility for initiating this task, it will be very helpful for teachers. Lastly, it would be also helpful for Thai education development, particularly for the northeast of Thailand.

Discussion

Sarason (1996) wrote “Teaching is a Lonely Profession”, a characterization that is indeed apt. Unlike many other professions, teaching does not have a shared culture based on the movement of knowledge to experience in the company of one’s peer. Doctors, for instance, learn their profession through a graduated set of experiences, all shared with others. This is not so for teachers. Once they have graduated from a preparation program, teachers find themselves alone in the classroom with a group of students, without a peers or supervisors.

The world has recently gone through some particularly turbulent and demanding times. This is illustrated by matters such as: the rapidly changing international economy with a widening the gap between rich and poor communities; the development and widespread use of advanced technology in satellite communications and computers; the rapid rate of social and political change which creates feelings of helplessness and social dislocation amongst people. These social, economic and political developments have important implications for the type of education system required to best serve the needs both society and the individual. The innovative and far-sighted changes required in education and schooling also have important implications for the role of the teacher. This affects recruitment of teaching professional and teacher education, at both the pre- and in-service levels (Sinlarat, 1995).
As the reform continues in education, school systems are often purchasing computers and related technologies without the ability to incorporate them into the curriculum. Many papers clearly reflect that we have moved beyond discussion on how to teach information technology and how to incorporate information technology into the preparation of teachers and their professional development (Pairtrakul, 1985; Thitipoka, 1985; Panomwan Na Ayuhdthaya, 1987; Suwannakul, 1987). More importantly, these authors are critically reflective not only about what this means, but also about the implications it has for our responsibilities as teacher educators.

The professional development for teachers is an interesting and important issue in which it is necessary to find out ways to improve teaching. At present, technology use is high, and rapidly progressing. The business sector is rapidly changing and using high technology. On the other hand, in the education sector, especially in Thai schools, there are very few teachers using new technology in their work. Sinlarat (1995) emphasized and realized the impacts of technology on teacher preparation and the training of educational personnel in this decade of rapid transition and globalization. Impacts of technology also impose on educators at all levels of education to seriously, as a requirement of education innovation to ensure that teachers are adequately trained and educated to cope with the changing and demanding roles in society if they are to help education fulfill its role in national development.

There are two different beliefs about professional development. Some believe that teachers are non-renewable resources. After teaching for a period of time they should be thrown away, that professional development programs are not necessary for teachers. Others believe that teachers are a renewable resource. If energy is put into them regularly, they will work effectively for many years. This group believe that professional development program is necessary for teachers.

As we are educators who take responsibilities in education development, it is time for us to search for appropriate professional development for Thai teachers which fit with their needs and limitations. With the rapid advancement of technology, I believe, we can use telecommunication technology for establishing an appropriate professional development program to serve teachers needs.
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The Role of University Faculty on the Professional Development of Science Teachers

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An Elective Research Paper submitted in fulfillment of The requirements for the degree of Doctor of Education

Deakin University
PREFACE

In dealing with secondary school science teachers in Khon Kaen for many years, it reminds the researcher was reminded to rethink professional development for science teachers. In 1996, the Ministry of Education, Thailand launched the education reform, and the Faculty of Education, Khon Kaen University encourage all staff to think about their roles on this change. These encourage the researcher's findings on the role of university faculty in supporting and promoting the education reform.

The researcher would like to acknowledge to the following:

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To science teachers in Khon Kaen, Thailand for their providing information that the researcher needed for this study.
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CHAPTER 1

INTRODUCTION

Background and Statement of the Problem

For the past decade, the Ministry of Education has had to encounter a great number of accumulated problems which, while they have not been rectified, pose as obstacles for any effort to provide 6 years of good quality education. Moreover, they also make the task of expanding compulsory education from 6 years to 9 year and eventually 12 years, with the aim of reducing the gap between the rich and the poor and enabling everyone to lead a good life in society, extremely difficult to fulfill. The problems which have accumulated during the past decade can be mainly identified as follows:

1) Insufficient budget. As over 82% of the budget is spent on personnel salary and administrative costs, only 18% is left for educational development which does not correspond with the 40% the country has earmarked for the development budget as a whole;

2) No administrative unity;

3) Vague educational policies and plans which are not in line with economic development and the fact that the world has now become a global village;

4) Teacher shortage. The fact that no clear solutions have been made aggravates this problem in the rural areas;

5) Inefficient budgeting spending as well as low quality material and equipment procurement. Loose terms of specifications and a priority on lower prices at the expense of quality, result in the malfunction of materials and equipment for school usage;

6) Inappropriate curriculum and learning/teaching processes which do not correspond to the needs of society in relation to its present stage of national development. Thus, school graduates are unable to apply their acquired knowledge and skills in the field of work;

7) Inadequate remuneration and welfare benefits which make teachers struggle in the present day economic situation;
8) Educational expenses per head for students at various grades in government schools are not consistent with the amount of tuition fees and educational materials per head as stipulated by the Ministry of Finance. The existing rates of tuition fees were proposed by the Ministry of Education in 1977 and have been in operation ever since without any adjustment to the fluctuations of monetary value of baht currency. Financial support from the Ministry of Education to government schools per student is therefore insufficient for proper educational management;

9) Lack of utilization plans for maximum benefits. Emphasis on building new educational institutions while enrollment expansion in existing institutions is also a practical possibility;

10) Personnel administration system has often been under the influence of political power, thereby any merit consideration and promotion task is not based on meritocracy;

11) Lack of consistent teacher training and development;

12) Too many overlapping functions amongst various units within the organization, which hinder administrative co-operation. Too many positions are being created within each department of the Ministry of Education;

13) Active community participation in educational development has not been encouraged. School administrators tend to manage their institution according to their own policies;

14) Local wisdom has not been explored to enhance teaching and learning processes due to a lack of financial support;

15) Chronic problems concerning drug usage within educational institutions;

16) Lack of clear policy and plans to put the children of those whose income is below 50,000 baht per year into vocational institutions. These youngsters will be trained to become skilled workers, thereby alleviating the problem of personnel shortages in certain enterprises. The children from poor families have therefore, an opportunity to earn higher incomes;

17) No genuine attempts to monitor and solve the problems of the schools have been made by administrators from the Ministry of Education, be it at the district, provincial or ministerial level. They tend to solve various problems from written
documents without insightful practical data, while their inaccurate knowledge of rules and regulations often ironically deters any problem-solving endeavour;

18) Most of the schools have not been well maintained due to a lack of budget. Renovation is thus, urgently needed;

19) Shortages in teaching and learning materials and equipment as well as well as classrooms and laboratories;

20) No curricula which instills in learners desirable practices in relation to morality, ethics, discipline, environment protection and democracy

(Ministry of Education, 1997, p. 3).

According to the strategy document, "The New Aspirations for Education in Thailand Towards Educational Excellence by the year 2007" (Ministry of Education, 1997), its goal is to develop education in a manner which is conducive to economic development of the nation and corresponds to the Eighth National Economic and Social Development Plan (NESDP). At the same time it is to be adjusted in harmony with globalization to attain educational excellence by the year 2007.

The past seven NESDP’s have made such unprecedented economic progress that Thailand’s rates of economic growth remain amongst the highest in the world. This economic prosperity has unfortunately widened the gap between the rich and the poor resulting in disparities in quality of life. Consequently, the offspring of 40 million poor Thai citizens have unavoidably been deprived of good quality compulsory education. The matter is worsened when considering their lack of opportunity to undertake a 12 year continuing education, due to the financial difficulties of their parents.

One national policy must stipulate that the state shall render education to its citizens from the cradle to the grave, with the concept of providing every youth with a good quality 12 year continuing education, from pre-kindergarten, through kindergarten, primary, lower secondary, upper secondary, vocational or equivalent to higher educational level. Within this framework, compulsory education should therefore, be regarded as fundamental for everyone, in enabling them to earn their living and attain a desirable quality of life in society. For such reasons, the State has a policy to
expand compulsory education from 6 years to 9 years and eventually 12 years. It is the
mandate of the Ministry of Education to provide 12 year compulsory education for the
12 million youngsters studying within the formal system, and another 3 millions in the
non-formal system.

The Ministry of Education is a large organization which employs more than 600,000
teachers and civil servants who serve within 17 main departments and those with the
equivalent status. This workforce undertakes the task of administering education from
preprimary to higher educational level. There are more than 40,000 schools and
educational institutions covering all areas throughout the country.

In December 1995, after relevant data on the existing problems had been studied and
the goals in educational, religious and cultural administration were set, the Ministry of
Education has developed the following 4 approaches in order to attain its education
reform policy:-

1) School Reform
2) Teacher Reform
3) Curriculum Reform
4) Administration Reform

Education, by its nature, involves a great number of people. Hence, it is everyone’s
duty and responsibility to take part in educational development, especially when
considering the fact that schools and educational institutions of all kinds are the
closest organization to students, parents and the public alike. In January 1996, an
approach for school reform was laid down, stipulating that all schools under the
School Reform Project aim to become an ideal school, like the one prescribed by the
Ministry of Education's 10 Commandments. This approach encourages the school
administrators to create a desirable environment, with well equipped materials and
adequately functional classrooms which is conducive to teaching and learning
activities. Moreover, school curricula must be tailored to suit local needs while the
community should be encouraged to participate in school administration. The
problem of staff shortages must also be solved and finally, the school should prove to
be of high quality and a standard which is highly acceptable to the whole community.
University faculty, as resource people in the community, should take their roles in the national education reform process to reach its goal. Eventually, as a university faculty at Khon Kaen University who deals with secondary school science teacher preparations, the researcher is interested in finding:

What roles should university faculty take in science teacher development?

Objectives

Overall, this study was aimed to survey the science teachers' perceptions about the role of university faculty in the professional development of Science teachers. The study had two specific objectives:

1. To undertake a study of the role of university faculty affecting the success of science teacher development in promoting teacher reform.
2. To acquire appropriate guidelines for the development of an education development plan at the Secondary Education Department, Faculty of Education, Khon Kaen University.

Expected Outcomes

1. Information on the role of university faculty in the professional development of secondary school Science teachers in promoting a teacher reform process. Such information will be useful for further development of guidelines for effective provision of science teacher training programs in the Faculty of Education.
2. Policy recommendations to promote education reform among university faculty and secondary school teachers will be suggested from this study.

Scope of the Research

This study looks at five different areas of professional development of secondary school science teachers: subject matter, teaching strategies, teaching and learning resources, evaluation, and Information Technology. It also tries to explain the science
teachers’ expectations of the role of university faculty within those five areas of professional development.

Limitations of the Study

The fact that this study attempts to explain future phenomena requires future data. This leads to some methodological difficulties. For example, some science teachers could not provide the information responses to teacher reform policy because of a lack of understanding of professional development to promote science teacher reform. It is consequently necessary to note here that such data came from individual perceptions rather than from observation of actual phenomena. This may raise the issue of reliability of the data. The data obtained in this study may not be sufficiently clear nor detailed enough due to the use of an open ended questionnaire for data collection method.

Definitions

1. Science teachers are the teachers who teach science subjects in both lower and upper secondary schools in Khon Kaen.
2. Science subjects in the lower and upper secondary science curriculum include General Science, Biology, Chemistry, and Physics.
3. University faculty means staff at the Faculty of Education, Khon Kaen University.
sacrifice, perseverance, team spirit, adherence to democracy, and love for king, country and religion.

Education reform in Thailand is being conducted in 4 areas:

1. school reform
2. teacher reform
3. curriculum reform
4. administrative reform

Science teachers are concerning in two areas of education reform, teacher reform and curriculum reform which are described below.

**Teacher reform**

The production, recruitment and development of teachers will be reformed urgently and comprehensively both in public and private schools. Educational administrators and personnel will be developed continuously by:

1.1 Building awareness and professionalism in teachers, school administrators and personnel.

1.2 Emphasizing performance efficiency of authentic learning outcomes in evaluating teachers for their promotion, development of teaching/learning activities.

1.3 Providing training and skills development opportunities to every teacher continuously and comprehensively with the view to keeping them abreast with social and technological changes. A teacher should undergo some form of training at least once every two years. The training could be given by the Ministry of Education, and/or departments concerned, and training institutions, both public and private which are accredited, as well as by means of distance training. Participation in conferences, seminars and every form of self-development must be regarded as teachers' duties, to be assessed as part of their performance.

1.4 Encouraging teachers to choose to develop lesson plans that suit learners and enable them to develop life-long learning skills.

1.5 Allowing teachers under the jurisdiction of the Ministry of Education to teach with extra remuneration in more than a single educational institution.
belonging to their own department or to others. This extra teaching will be subject to their superior's consent and be considered part of their performance. Recruitment of new teachers must take into account their past experience in salary determination.

1.6 Creating job descriptions and opportunities for local intellectual leaders, teachers/experts from the private and public sectors, as well as retired officials, to teach with appropriate remuneration in educational institutions under the Ministry of Education.

1.7 Addressing the problem of teacher shortage by recruiting and appointing teachers to fill every available post as specified in the work-force plan of each educational institution which should be responsible for its own selection procedures and appointment of teachers according to ministerial rules and conditions, and should refrain from appointing teachers from private schools during an academic year. The teaching force should be proportionally and evenly distributed and the number of teachers on secondment minimized. Teachers who give instruction in subjects that lack qualified teachers will be given extra remuneration. Post-secondary institutions which are prepared to offer these much-in-demand subjects will be encouraged to extend to Bachelor's degree level.

1.8 Restructuring the job description of teachers in Ministry of Education schools and educational institutions in order to separate the career ladder of teachers from that of administrators under a clearly specified career pattern of each category. However, teachers must be able to advance up the career ladder through their own performances and achievements as teachers. Both teachers and administrators will be provided with manuals for their professional practices.

1.9 Standardising the teaching profession through the efforts of the Teachers' Institute, the Teacher Civil service Commission and teacher training institutions. relevant legislation will be amended while the teaching profession will be developed through the issuance of a teachers' license.

1.10 Reforming the welfare and social securities for teachers of all types and jurisdictions with the view to raising their quality of life, boosting their morale and strengthening their job security. Teachers' salary structure and welfare benefits
will be improved, while teachers working in remote and underserved areas and those who take on an extra number of classes will be promoted and supported.

1.11 Developing the selection system and admission mechanism of students to teacher training institutions as well as developing the curriculum and teaching/learning process for teacher production, including teachers who can teach several subjects and those who teach major subjects with emphasis on practical aspects. The final product of teacher training will be a teacher of moral integrity who is equipped with analytical and synthetical skills and abilities.

1.12 Stepping up the development of educational administrators by broadening their horizons, increasing their knowledge, their administrative and managerial skills, thus enabling them to develop quality schools and educational institutions in keeping with future changes.

1.13 Encouraging team work among supervisors of all agencies who should join forces in supervising and monitoring academic and technical activities of educational institutions under every agency.

(Ministry of Education, 1997, p. 3)

**Curriculum Reform**

Curriculum and teaching and learning processes will be reformed on an urgent basis in order to raise educational quality of all types and levels by:

2.1 Organizing teaching/learning processes that inculcate in youth the desirable traits as prescribed in the objectives of the education reform.

2.2 Creating activities for preparedness in the learner while developing curriculum of all types and levels based on the following major principles:

(1) Creating a happy learning environment for the learner at all levels;

(2) Organizing teaching and learning processes that require systematic thinking and emphasize practice rather than rote learning. The learner will be enabled to analyze, synthesize and build a core of knowledge that will form the basis for learning in the future world;

(3) Encouraging the learner to learn more from nature and the environment;
(4) Ensuring that the learner use the experience and knowledge gained from his/her family and community as part of teaching/learning activities according to the curriculum;

(5) Determining basic learning standards or requirements of the learner while encouraging each school and educational institution to develop and improve on the basic standards as appropriate. The basic standards of vocational education will be determined in conjunction with professional institutions;

(6) Allowing the local community and population to participate in curriculum development and textbook production in accordance with the needs of each locality.

2.3 Stepping up the improvement of teacher education curriculum that should contain more of the teacher-training content with the view to improving the quality of teachers.

2.4 Emphasizing the core subjects of Thai, Mathematics and Sciences in the teaching and learning activities of primary education that provide the basis for further development of knowledge and skills.

2.5 Reforming the learning of foreign languages by providing access to English Language learning to first grade primary pupils.

2.6 Accelerating the improvement of teaching and learning outcomes through developing teaching methods, technology and innovation, as well as through development of school libraries. A learning network must be created to provide a link between formal and nonformal education in order to offer extensive services to the learner.

2.7 Improving the teaching and learning process by creating diversity both in its form and content; promoting flexibility of school hours; and providing opportunities for learners to earn while they learn.

2.8 Accelerating the teaching and learning of democracy by developing a sustainable democracy curriculum and promoting democratic behaviour in teachers that reinforces the students' learning process by providing them with role models.

2.9 Reforming the testing system to ensure that it conforms to the test standards that put emphasis on the learner’s actual behaviour and use the test results to develop the learner and the teaching and learning process. Selection of learners of all types
and levels of education will be based more on continuous assessment rather than examination. Admission by quota will be increased.

2.10 Developing and promoting a network of educational institutions and agencies both in Bangkok and in the provinces for technical devolution.

(Ministry of Education, 1997, p.6)

Standards of teaching profession

The following standards developed by The Teachers Council of Thailand (TCT) are explained in detail after an initial summary listing.

Standard 1: Being an active and productive member of teaching professional organizations.
Standard 2: Judging all practices for the learners' benefit.
Standard 3: Aiming at learners' optimum development.
Standard 4: Developing effective lesson plans based on active learning.
Standard 5: Developing efficient and innovative learning materials responsive to learners' needs.
Standard 6: Practicing best instructional practices for learners' latent development.
Standard 7: Presenting systematic reports on learners' development based on objective and authentic measures.
Standard 8: Being a good behavioral model for learners.
Standard 9: Being a cooperative and productive member in school.
Standard 10: Being a cooperative and productive member in community.
Standard 11: Being a competent member in an informative and learning society.

Professional teachers continually make their contribution to the betterment of all members. They belong to one or more of the teaching profession organizations. The ultimate contributions is producing knowledge especially on best practice in teaching.
Usually classroom research is conducted and the findings are reported, preferably in the form of a professional seminar or convention. Professional teachers also serve as resource persons in various capacities.

Standard 2: Judging all practices on the learners' benefit.

Professional teachers always make wise decisions with firm orientation towards the learners' benefit. They express best wishes and positive regards for the welfare of the learners, taking learners' needs and interest into consideration. In selecting any practice, professional teachers have to judge it in terms of its good effect on the learners from the perspective of their own positive intentions.

Standard 3: Aiming at learners' optimum development.

Professional teachers set their teaching goal on well rounded learners' development. Considering learner as a developing identity, teaching has to enhance physical, intellectual, social and emotional development, Spiritual and moral development have to be the aim of total development so that the learners always express balanced and adequate personalities. Systematic practice on learners' potential assessment, responsive teaching and continuous improvement must be definitely assured. Individual progress monitoring is the most desirable practice.

Standard 4: Developing effective lesson plans based on active learning.

Professional teachers develop their own lesson plans with clear evidence of best instructional practices. The plans indicate critical learning activities for specified learning objectives. It is assured if the plans are utilized properly the learning activities will bring about the desirable learning outcomes. The effective lesson plans also take resources and constraints of the schools and the learners into consideration.
Standard 5: Developing efficient and innovative learning materials responsive to learners' needs.

Professional teachers develop their own learning materials. Various kinds of learning materials will be available for learners with different levels of learning capability, various learning styles, and individual interest. Good learning materials emphasize learning processes, learners' "hand-on" experience and use of local materials. It should be noted that innovative instruction must be clearly seen in these learning materials.

Standard 6: Practicing best instructional practices for learners' latent development.

Professional teachers always emphasize human development in their teaching. Character development is a final outcome of learning. Habit formation, spiritual, moral and personality development must be aiming at in all learning activities. Learners should be empowered to be able to construct knowledge, create strategic plan, and to anticipate future changes by making appropriate adjustment.

Standard 7: Presenting systematic reports on learners' development based on objective and authentic measures.

Professional teachers express their academic vision through a systematic report on learners' real learning needs, priority of needs, innovation responsiveness to real needs, evidence of learners' progress and intention of further improvement. Professional teachers always construct new knowledge through these procedures and adding effective best instructional practices into their innovation files for future use and dissemination to other teachers.

Standard 8: Being a good behavioral model for learners.

Professional teachers conduct their day-by-day actions in such a way that their behavior can be respected by the learners. Professional teachers should be a human model for learners therefore, they must uphold all codes of ethical conduct that are necessary and essential in human modeling and moral education.
Standard 9: Being a cooperative and productive member in school.

Professional teachers contribute to the advancement of their organization. They work cooperatively and productively with their colleagues, other teachers and school administrators for the benefit of the learners and the institutions so that the schools can become learning organizations (The Teachers Council of Thailand, 1997).

Standard 10: Being a cooperative and productive member in community.

Professional teachers make their contribution to society and community around the schools. They take an active role in the society, working cooperatively and productively with all community workers so that the communities can become a learning society.

Standard 11: Being a competent member in informative and learning society.

Professional teachers always look for ways and means in improving their practices. They are learning individuals who always follow world events. They are capable of utilizing information for new development and new practice. New knowledge is always acquired and utilized in new best instructional practices.

(The Teachers Council of Thailand, 1997, p.1)

Science teaching

As global economic competition has grown more intense, and the demand for highly skilled manpower is needed to assist the country's new stage of development, it is generally accepted that the education policy will emphasize science and technology. This means that teachers at every level must help to prepare young children to become science oriented. In doing this, the teachers themselves must be science oriented.
Most teacher educators have faced with two major problems. The first problem was to decide what general theory or model of teaching should be adopted as basis for science teacher education program. The second problem was to decide on what science specific theory we would like preservice science teachers to learn. The previous research on teaching has been criticized for the assumption that teaching of any one subject matter is like the teaching of any other subject matter (Shulman, 1989). This criticism is similar to the one of curriculum development by Schwab (1978). Even the most cursory examination of the epistemology of different disciplines reveals that the nature of knowledge from one domain is not the same as knowledge of the other domains. The critical concern is that if natural sciences are fundamentally different than the social sciences and humanities, then the subject matter dependent instructional strategies are required. That is, the instructional strategies that are employed should model the nature of discipline that is being taught, in the present case, the natural sciences. If one does otherwise, then there is a substantial risk that the nature of the subject matter will be misrepresented to students.

Recent philosophical and historical analyze of the nature of science have revealed that the natural sciences can be described as a rational process of constructing theories that are used to describe, explain and make predictions about the natural world that is carried out by a community of scholars. The phrase "rational process" is intended to mean an intellectual process in which knowledge claims and value claims are supported by specific reasons. The following are selected key features of the nature of science as described by Finley (1992) and Posner, Strike, Hewson and Gertzog (1982):

1. Observations are made and interpreted in light of current theoretical beliefs.
2. Theory usually precedes and guides observations.
3. Concepts and theories are produced by creative acts of human abstraction and invention as scientist attempt to construct descriptions, explanations, and predictions about natural phenomena.
4. Theories are supported by a variety of types of reasons that include observations, conceivable observations, the breadth of scientific problems that can be solved, the consistency of the one theory with the other
accepted theories, and the ability of the theory to be fruitful in general new productive research programs.

5. At any given point in time there may be different theories that are competing for acceptance within a community of scholars.

6. Fundamental conceptual changes in an existing theory are thought to occur when several conditions are met: a) scientist become dissatisfied with the descriptive, explanatory, and predictive power of the existing theory, b) a plausible alternative has been developed and, c) that alternative has been shown to be fruitful in resolving previously unresolved problems and providing new research directions to be.

7. The scientific enterprise is carried out by a community of scholars and influenced by both past and present personal, social, economical, and ethical concerns.

These ideas can be used to develop an instructional strategy that can guide teachers' thinking about teaching of science. The most important of the ideas are that people are continuously constructing an interpretation or understanding of the world around them; the construction that results is determined in large part by their prior knowledge of the phenomena they are attempting to understand and the social context in which their thinking occurs; and the most fundamental ideas change only when the conditions described in (6) above have occurred.

Teachers should have very strong training to be scientific in thinking. If Thai students since pre-school, primary education, secondary education, and higher education are trained to be more scientific in their thinking, we will have competent, logical technocrats to help Thailand's development.

**Professional development of science teachers**

Many argue that the needs of elementary school and secondary school science teachers are fundamentally different because of their preparation and classroom responsibilities. However, both kinds of teachers can improve their teaching skills and their students' learning by engaging in professional development programs. In most
elementary schools, the teacher is responsible for teaching all subjects, including
science. Because most elementary school teachers have had little or no preparation in
sciences, they do not consider themselves science teachers. In some elementary
schools, a science specialist is responsible for teaching science to all classes. That
reinforces the idea that science is a specialist subject rather than a core subject, or that
science is not accessible to the average teacher. Most secondary school teachers'
undergraduate preparation included a grounding in science content. However, many
teachers at this level have not experienced inquiry based laboratories or individual
research projects. Some might have knowledge of this approach but have chosen not
to use it, because of lack of class time, preparatory time, and resources.

For beginning teachers, effective professional development activities in the first few
years of teaching can help teachers to adapt their generic undergraduate preparation to
congcrete teaching situations. Activities can help new teachers to develop effective
teaching strategies, supplement their knowledge of both content and pedagogy, and
link them with experienced teachers. Each activity can help to reduce the frustration
and dropout rate of beginning teachers. As noted earlier, some teacher preparation
programs include follow-up activities that extend through the first few years of
teaching. Often, however, teachers take positions far from the institutions that
prepared them and are left without this support.

Secondary school science teachers might teach general science, biology, chemistry, or
physics. They might also teach other subjects and coach a sport during each season.
Beginning secondary school teachers are most likely to draw diverse subject matter
assignments and to have requiring a different class preparation, and have
extracurricular duties, such as monitoring the halls, cafeteria, or student activities.
They might or might not have their own classrooms; many must carry materials from
classroom to classroom every day.

Whether the elementary or secondary school teacher's undergraduate program was
stellar or mediocre, it was not adequate to prepare the beginning teacher for all his or
her duties during the first few years. For example, one of the most difficult tasks for
new teachers is to set up and sequence classroom activities in an efficient manner.
Preparation for class takes time that teachers do not have. In addition, teachers need to know a variety of techniques to teach students with different abilities. Teachers often learn these and other skills through on the job training. Many become overwhelmed by all the teaching and nonteaching tasks that they must juggle and with which they are unprepared to deal and drop out after a few years of teaching.

For experienced teachers, in addition to learning the needs of individual new students each year, teachers often master a repertoire of classroom management strategies and school politics. Like other professionals, experienced teachers need to stay up to date in their subjects. They also need to learn new teaching techniques and practice incorporating them into their classroom activities.

With the explosion of new scientific information, the veteran biology teacher, for example, has had to incorporate new information about DNA and recombinant-DNA techniques, accelerated extinction rates and endangered species, reproductive technology for humans and other organisms, and the discovery of much older fossils that has led to taxonomic reordering. The new information has been added, often with little integration, to curricula and to science textbooks. New information has also affected the development of teaching materials and local or state initiatives directed at improving science education.

Some teachers watch educational television and read scientific periodicals and professional journals. Others attend professional meetings and courses where they learn new subject matter. Still others work with other educators to develop ways to incorporate new information into K-12 curricula. In addition to learning new scientific information, teachers need to learn how to use the information in inquiry based activities that stress critical thinking by students.

Teachers who are science enthusiasts participate actively in professional development to increase their knowledge of science and to improve their teaching. A large percentage of both enthusiasts and less involved teachers, however, do not engage in professional development opportunities, because of other school duties, family obligations, prohibitive cost, lack of time, lack of interest, or burnout. Of the nearly
47,000 high school biology teachers and 46,5000 middle school science teachers in the United States (Blank and Gruebel, 1993), only about 10% belong to professional science teacher organizations and similar rate of membership is found in Thailand. Most professional development programs do not address the less involved teachers, but these teachers must be taken into account if efforts to improve science education are to reach the majority of students.

**Professional development and science education reform**

Science education reform is not being pursued on the basis of an integrated set of change designed to enhance the learning of science by all students. Professional development designed to promote reform would need to be more extensive than traditional programs. Effective professional development programs can prepare teachers to participate in reform or empower them to become leaders of reform. It takes time to adjust to the major changes in curricula and instructional materials called for by standards-based reform and to learn to use them effectively. The changes called for by the major science education reform efforts, require individual teachers to adopt new curricula and teaching strategies. In particular, standards-based reform requires teachers to be involved in the changes that result in new curricula and instructional materials and to implement those changes. Teacher leaders can become advocates of change and assist in the professional development of their colleagues. Although it does not consider curriculum specifically in this document, the researcher acknowledge that participation in curriculum development, implementation, and evaluation is in itself a rich professional development experience for teachers.

The eventual goal of systematic reform is to extend exemplary teaching and learning to the entire educational system. Although there is no consensus on its definition among educators, a common theme is that systematic reform efforts must address all students, encompass all components of the community, and cascade through all levels of education and school governance (Kober, 1993). The researcher used a systematic approach in a sense that the research applies to smaller elements of the system such as departments, individual schools, and school districts because professional
development programs designed for related groups of teachers have common elements irrespective of the size of the group.

Science education can be a starting point for systematic reform, and several efforts around the nation are working toward that end. Professional development activities can be designed to help science teachers to participate in systemic reform. If university faculty choose to become involved in this kind of professional development, they must have clear goals and understand how their efforts fit into the larger context of school reform. University faculty must know about needs of teachers and students, be aware of the level of commitment required, and solicit the support of both school and university administrators for systemic activities within universities, schools, and school districts.

*Information Technology and science teaching*

Technology has significantly reshaped our world in the past 30 years. Information that once might have taken months to find and retrieve now takes minutes. Live audio chats with another person anywhere around the world are quite easy on modest Internet connection, and we share our Internet electronic mail addresses as commonly as our phone numbers. Where once just knowing the data and facts were enough, we now must know how to access the latest data and be able to analyze and use it within minutes of receiving it or risk loss on our investments. That technology will continue to grow in capacity and volume is a given, and a citizen of our country not comfortable with and knowledgeable of variety of technology tools will be at a great disadvantage in the decades to come. Our communities will require workers and citizens who can use technology to communicate effectively, access and analyze information, and find collaborative solutions to problems. Including a technology goal in each school’s plan and science teacher development programs increase the probability of integrating technology into the curriculum efficiently and effectively.

University faculty who want to become involved in K-12 education have much to learn from the educational research community. Research on teaching and learning has identified numerous techniques and strategies that influence how teachers teach
and how students learn, for example, the benefits of cooperative and collaborative learning, the importance of active learning, and the value of recognizing different learning styles (Perrone, 1994). Most university faculty are not aware of this literature as it applies to their own college or university teaching and not aware of its value to elementary and secondary school teachers and their students. There are several reasons for that. Most university faculty do not have the inclination or training to be directly involved in education research themselves, nor are they motivated to read the available literature. They have difficulty in assessing the quality and applicability of the research. There is also a wide spread misperception that there is no good educational research out there anyway (Serim, 1997). That misperception is particularly strong in experimental researchers who design and interpret controlled experiments; they find it difficult to evaluate outcomes of research that deal with the complexity of the real classroom.

Framework of the study

The reviews of the above concepts: education reform, standards of teaching profession, science teaching, professional development of science teachers, professional development and science education reform, and information technology and science teaching, assisted the researcher to form the conceptual framework of this study that related to science teacher development as follows:

**Education reform**

The issues of education reform in Thailand that related to science teachers are teacher reform and curriculum reform. Their summaries are:

Teacher reform:

- Building awareness and professionalism in teacher;
- Development of teaching and learning activities;
- Providing training and skills development opportunities to teachers;
- Encourage teachers to develop lesson plan that suit learners;
- Standardizing the teaching profession; and
- Encourage teamwork among supervisors of all agencies.
Curriculum reform;

- Emphasize the core subjects: Thai, Mathematics, and Sciences;
- Reforming the assessment system;
- Developing and promoting a network of educational institutes;
- Reorganizing teaching and learning process;
- Improving of teaching and learning outcomes through the development of teaching methods, technology and innovations, and the scope of the school library.

*Standards of teaching profession*

The major standards in teaching that related to teacher development are:

- Developing effective and innovative learning materials;
- Practicing best instructional practice;
- Presenting systematic reports on learners' development based on objective and authentic measures;
- Being a good behavioral model for learners;
- Being cooperative and productive in school and community;
- Being competent members in the informative and learning society.

*Science teaching*

Science instructional strategies are required to develop learners' abilities in construction of an interpretation of the world around them from prior knowledge of phenomena and social contexts in which their thinking occurs.

*Professional development of science teachers*

The professional development programs are needed for both beginning and experienced science teachers. Beginning science teachers should attend professional development programs for extending their knowledge of content and pedagogy. But the experienced science teachers need to stay up to date in subject matter and learn new teaching techniques and practice from the professional development programs.
Professional development and science education reform
The professional development programs should promote preparation of science teachers to participate in reform or empower them to become leaders of reform.

Information technology of science teachers
Including information technology in schools' plan and science teachers' development programs will increase the probability of integrating information technology into the curriculum efficiency and effectively.

From the above summaries, the researcher used as a framework of this study that included (see Figure 2.1):

1. Teaching skills development;
2. Classroom research skills development;
3. Development skills of science instructional media design and production;
4. Science teaching and learning assessment;
5. Other supportive activities for science teacher development.
The roles of university faculty on:

1. Teaching skills development;
2. Classroom research skills development;
3. Development skills of science instructional media design and production;
4. Science teaching and learning assessment;
5. Other supportive activities for science teacher development.

Figure 2.1 Conceptual framework of the study
CHAPTER 3
RESEARCH METHODOLOGY

Research approach

The researcher used quantitative methods, with a set of open end questions, to collect science teachers’ thinking that covered 104 secondary schools in Khon Kaen. Using the open ended survey approach as an interpretative study by careful reviewing the answers and categorising them, the researcher received the wide information that could answer the questions of this study in general and could be used as a base line for further study.

The Sample

The samples of this study included 150 science teachers who were randomly selected from 1586 science teachers in secondary schools under the department of General Education in Khon Kaen during the 1996 school year.

Research Tools

An open ended questionnaire was developed by the researcher under the conceptual framework of this study (Figure 1) and used for data collection. The science teachers questionnaire is shown in appendix A.

Data Collection

The data collection took one month, in February 1996. The 250 questionnaires were sent to 25 secondary school principals, each school was asked to selected ten science teachers ( two general science teachers at lower secondary level, and two general science, two chemistry, two biology and two physics teachers at upper secondary level) to respond to the questionnaire, expressing their opinions about the roles of university faculty in science teachers development. A total number of 238 science
teachers from 25 schools responded to the questionnaire. Each teacher was asked to return the response in the provided stamp-posted envelope individually and directly to the researcher. The frequencies and percentages of the respondents' background are summarized in table 3.1.

Table 3.1 Frequencies and percentages of the respondents' background

<table>
<thead>
<tr>
<th>Respondents' background</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Frequency</td>
</tr>
<tr>
<td>Male</td>
<td>121 (50.84 %)</td>
</tr>
<tr>
<td>Female</td>
<td>117 (49.16 %)</td>
</tr>
<tr>
<td>Age</td>
<td>Frequency</td>
</tr>
<tr>
<td>20 - 30 years</td>
<td>48 (20.17 %)</td>
</tr>
<tr>
<td>31 - 40 years</td>
<td>63 (26.47 %)</td>
</tr>
<tr>
<td>41 - 50 years</td>
<td>67 (12.15 %)</td>
</tr>
<tr>
<td>51- 60 years</td>
<td>60 (25.21 %)</td>
</tr>
<tr>
<td>Experience in teaching science</td>
<td>Frequency</td>
</tr>
<tr>
<td>Less than 6 years</td>
<td>44 (18.49 %)</td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>10 (16.80 %)</td>
</tr>
<tr>
<td>11 -15 years</td>
<td>42 (17.64 %)</td>
</tr>
<tr>
<td>16 -20 years</td>
<td>62 (26.05 %)</td>
</tr>
<tr>
<td>More than 20 years</td>
<td>42 (17.63 %)</td>
</tr>
<tr>
<td>Teaching subjects and level</td>
<td>Frequency</td>
</tr>
<tr>
<td>General science at lower secondary level.</td>
<td>44 (18.49 %)</td>
</tr>
<tr>
<td>General science at upper secondary level.</td>
<td>46 (19.33 %)</td>
</tr>
<tr>
<td>Biology at upper secondary level.</td>
<td>50 (21.00 %)</td>
</tr>
<tr>
<td>Chemistry at upper secondary level.</td>
<td>50 (21.00 %)</td>
</tr>
<tr>
<td>Physics at upper secondary level.</td>
<td>48 (20.17 %)</td>
</tr>
</tbody>
</table>

As summarised in table 3.1 the sample was almost equally representative of male and female science teachers. The sample represented all age groups and levels of experience and was an equal spread of all fields of science teaching. There was a
greater proportion of teachers from upper secondary education (years 10 to 12) through questionnaires were sent to teachers at all levels of secondary school.

Data Analysis

The returned questionnaires were checked for completion. The background information were coded (see table 3.2) then put into the SPSS for Windows program for analysis. Statistical procedures employed include the frequency and percentage analysis. The information in section 2, the opinion toward the role of university faculty on science teachers development were examined for content analysis then categorized into groups. Each statement in each group was coded (see table 3.3) then put into the SPSS for Windows program for analysis. Statistical procedures employed include the frequency and percentage analysis.

Table 3.2 Coding of the background information

<table>
<thead>
<tr>
<th>Background information</th>
<th>Variable name</th>
<th>Value label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 - 30 years</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>31 - 40 years</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>41 - 50 years</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>51 - 60 years</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Experience in teaching science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 6 years</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>6 - 10 years</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>11 -15 years</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>16 -20 years</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>More than 20 years</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
Table 3.2 Coding of the background information (continued)

<table>
<thead>
<tr>
<th>Background information</th>
<th>Variable name</th>
<th>Value label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching subjects and level</td>
<td>V4</td>
<td>1</td>
</tr>
<tr>
<td>General science at lower secondary level.</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>General science at upper secondary level.</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Biology at upper secondary level.</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Chemistry at upper secondary level.</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Physics at upper secondary level.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.3 Coding of the responded opinions about the role of university faculty on science teacher development

<table>
<thead>
<tr>
<th>Responded statements</th>
<th>Variable name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Types of science teachers development program</strong></td>
<td></td>
</tr>
<tr>
<td>1. Lesson plan preparation</td>
<td>DP1</td>
</tr>
<tr>
<td>2. Subject matter</td>
<td>DP2</td>
</tr>
<tr>
<td>3. Science teaching strategies</td>
<td>DP3</td>
</tr>
<tr>
<td>4. Science instructional media design and production</td>
<td>DP4</td>
</tr>
<tr>
<td>5. Science teaching and learning assessment</td>
<td>DP5</td>
</tr>
<tr>
<td>6. Action research in science classroom</td>
<td>DP6</td>
</tr>
<tr>
<td><strong>B. Types of science teaching and learning media</strong></td>
<td></td>
</tr>
<tr>
<td><strong>B1. Science teacher resources</strong></td>
<td></td>
</tr>
<tr>
<td>1. Science lesson plan</td>
<td>LM1</td>
</tr>
<tr>
<td>2. Printed materials for science teaching</td>
<td>LM2</td>
</tr>
<tr>
<td>3. Science laboratory equipment</td>
<td>LM3</td>
</tr>
<tr>
<td>4. Classroom and standardized science tests</td>
<td>LM4</td>
</tr>
<tr>
<td><strong>B2. Students resources</strong></td>
<td></td>
</tr>
<tr>
<td>1. Computer assisted instruction (CAI)</td>
<td>LM5</td>
</tr>
<tr>
<td>2. Science tests centers</td>
<td>LM6</td>
</tr>
<tr>
<td>3. Web based science learning</td>
<td>LM7</td>
</tr>
</tbody>
</table>
Table 3.3 Coding of the responded opinions about the role of university faculty on science teacher development (continued)

<table>
<thead>
<tr>
<th>Responded statements</th>
<th>Variable name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C. Types of science instructional media services</strong></td>
<td></td>
</tr>
<tr>
<td>1. Science laboratory equipment design and production</td>
<td>MS1</td>
</tr>
<tr>
<td>2. Science instruction media design and production</td>
<td>MS2</td>
</tr>
<tr>
<td>3. Science experiment design and production</td>
<td>MS3</td>
</tr>
<tr>
<td><strong>D. Methods using in science teaching clinic</strong></td>
<td></td>
</tr>
<tr>
<td>1. Telephone</td>
<td>TC1</td>
</tr>
<tr>
<td>2. Fax</td>
<td>TC2</td>
</tr>
<tr>
<td>3. Electronic mail (E-mail)</td>
<td>TC3</td>
</tr>
<tr>
<td>4. Web board</td>
<td>TC4</td>
</tr>
<tr>
<td><strong>E. Activities of science teacher association</strong></td>
<td></td>
</tr>
<tr>
<td>1. Academic activities</td>
<td>TS1</td>
</tr>
<tr>
<td>2. Science tour</td>
<td>TS2</td>
</tr>
<tr>
<td>3. Science exhibition</td>
<td>TS3</td>
</tr>
<tr>
<td>4. Science camping</td>
<td>TS4</td>
</tr>
</tbody>
</table>
CHAPTER 4
ROLES OF UNIVERSITY FACULTY

This chapter is a report of the findings of a survey of science teachers' opinions about the roles of university faculty in science teachers' development to promote teacher reform under the education reform policy of the Ministry of Education, Thailand. The survey findings are presented in five topics according to the content analysis of data collected from the sample. The categories analysed include science teacher development programs, science teaching and learning resources centers, science instructional media design and production services, science teaching clinics, and science teachers association.

Science Teaching Development Programs

Science teachers described the role of university faculty on various skills developments for science teachers. The frequencies and percentages of science teachers development programs that the participants responded should be provided by the Secondary Education Department are presented in table 4.1.

Table 4.1 Frequencies and percentages of science teachers development programs

<table>
<thead>
<tr>
<th>Types of science teachers development program</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Action research in science classroom</td>
<td>203 (85.68%)</td>
</tr>
<tr>
<td>2. Science teaching and learning assessment</td>
<td>200 (84.87%)</td>
</tr>
<tr>
<td>3. Science teaching strategies</td>
<td>193 (81.06%)</td>
</tr>
<tr>
<td>4. Science instructional media design and production</td>
<td>190 (79.80%)</td>
</tr>
<tr>
<td>5. Subject matter</td>
<td>183 (76.86%)</td>
</tr>
<tr>
<td>6. Lesson plan preparation</td>
<td>171 (71.82%)</td>
</tr>
</tbody>
</table>

Table 4.1 shows that the majority of science teachers in the study stated that they need to develop their skills in doing action research in their classroom because the teacher reform emphasized teaching and learning development by an action research base. They also thought that they needed to develop other skills related to classroom
activities: teaching and learning assessment, teaching strategies, instructional media design and production, subject matter, and lesson plan preparation. They suggested that the staff at the university secondary education department, should take a role in these skills development by providing various professional development programs through the year. Some programs could be provided as a short course training, meeting, conferencing, workshop, and non credit enrollment in some graduate courses.

Science Teaching and Learning Resources Center

Science teachers suggested that the university faculty should provide the services of science teaching and learning media for both science teachers and students. The teaching and learning science media were presented in table 4.2.

Table 4.2 Frequencies and percentages of science teaching and learning media services

<table>
<thead>
<tr>
<th>Types of science teaching and learning media</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science teacher resources</strong></td>
<td></td>
</tr>
<tr>
<td>1. Classroom and standardized science tests</td>
<td>202 (84.87%)</td>
</tr>
<tr>
<td>2. Printed materials for science teaching</td>
<td>195 (81.90%)</td>
</tr>
<tr>
<td>3. Science laboratory equipment</td>
<td>186 (78.12%)</td>
</tr>
<tr>
<td>4. Science lesson plan</td>
<td>181 (76.02%)</td>
</tr>
<tr>
<td><strong>Students resources</strong></td>
<td></td>
</tr>
<tr>
<td>1. Science tests centers</td>
<td>204 (85.68%)</td>
</tr>
<tr>
<td>2. Computer assisted instruction (CAI)</td>
<td>186 (78.12%)</td>
</tr>
<tr>
<td>3. Web based science learning</td>
<td>174 (73.08%)</td>
</tr>
</tbody>
</table>

Table 4.2 shows that most science teachers are looking for science teaching and learning resources to support their classroom activities. They suggested that the Faculty of Education, Khon Kaen University should establish the Science teaching and learning resources center for providing instructional media and science assessment tools for both teachers and students. They believed that the university faculty should take this role as the leaders of science educators. This science teaching
and learning resources center will support and promote both teacher and curriculum reform.

**Science Instructional Media design and production services**

Science teachers stated that instructional media was necessary for science class activities. The education reform emphasized teaching and learning development. This forced science teachers to develop their teaching strategies. They believed that both instructional media and laboratory equipment were important factors in science education development. The staff at secondary Education department should take their roles in instructional media, laboratory equipment, and science experiment design and production, because the university faculty are working on finding the new theories and strategies of science teaching and learning. So these design and production services will support and promote school science teacher to develop their teaching and learning activities. Their suggestions were presented in table 4.3.

**Table 4.3 Frequencies and percentages of science instructional media design and production services**

<table>
<thead>
<tr>
<th>Types of science instructional media services</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Science instruction media design and production services</td>
<td>214 (89.88%)</td>
</tr>
<tr>
<td>2. Science laboratory equipment design and production services</td>
<td>197 (82.74%)</td>
</tr>
<tr>
<td>3. Science experiment design and production services</td>
<td>174 (73.08%)</td>
</tr>
</tbody>
</table>

Table 4.3 shows that the majority of science teachers need support from university faculty in design and production of instructional media, laboratory equipment, and science experiment for secondary school class respectively. In addition, they suggested that both school science teachers and university faculty should work in collaboration on this task. So the partnership project should be recognized for dealing with these services.
Science Teaching Clinic

As with other subject teachers, science teachers were frequently faced with the difficulties of classroom activity management. So they need outside experts in science education to help them dealing with those difficulties. The university faculty should take the opportunity to take this role. For some schools that have telephone and fax machines, science teachers could use them to consult with the university faculty who are expert in science education. For some schools that can connect to the Internet, science teachers could consult with university faculty through email and by Web board- an asynchronous conferencing software in the Internet that users can post their questions, opinions and make response to a particular question or opinion. These suggestions were presented in table 4.4.

<table>
<thead>
<tr>
<th>Methods using in science teaching clinic</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Telephone</td>
<td>204 (85.68%)</td>
</tr>
<tr>
<td>2. Web board</td>
<td>198 (83.16%)</td>
</tr>
<tr>
<td>3. Electronic mail (email)</td>
<td>190 (79.80%)</td>
</tr>
<tr>
<td>4. Fax machine</td>
<td>155 (65.10%)</td>
</tr>
</tbody>
</table>

Science Teacher Association

Another important finding from this study was the idea of establishing a science teacher association in Khon Kaen. Most science teachers recommended that a science teacher network should be established through the science teacher association. Furthermore, this association could provide many academic activities that will support and promote science teacher development. For example, hosting the science education research symposium, publishing of Science Education Journal, and hosting the conferences in science education. Science camping, Science exhibitions about the new technology and innovation of science education, and science tours for science teachers were also recommended to be included in the activity plan of science teacher association. Their comments were presented in table 4.5.
Table 4.5  Frequencies and percentages of science teaching clinic activities

<table>
<thead>
<tr>
<th>Activities of science teacher association</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Academic activities</td>
<td>210 (88.20%)</td>
</tr>
<tr>
<td>2. Science camping</td>
<td>192 (80.64%)</td>
</tr>
<tr>
<td>3. Science exhibition</td>
<td>161 (67.62%)</td>
</tr>
<tr>
<td>4. Science tour</td>
<td>148 (63.00%)</td>
</tr>
</tbody>
</table>

It was clear that science teachers looked to the university faculty as the leaders of science educators who could support and promote them being active leaders in the education reform. Their valuable suggestions remind the university faculty to recognize their role of academic services to the community, especially in education reform.
CHAPTER 5
RECOMMENDATIONS

The findings from this study suggested some policy recommendations related to science teachers development that support and promote teacher reform and curriculum reform under the education reform policy for the Secondary Education Department, the Faculty of Education, Khon Kaen University. These recommendations were divided into two sections according to the adoption of these findings: 1) the development of a science education development plan; and 2) the preparations of staff for the implementation of the science education development plan.

1. The development of a science education development plan.

In developing educational development plans and operational strategic plans at the Faculty of Education, the following recommendations should be considered:

(1) Selection of professional development programs. The selection of a professional development program should be based on the programs which were in accord with the role of faculty in science teacher development. These programs should be included in the science education development plan: science teaching strategies, action research in science classroom, science instructional media design and production, science teaching and learning assessment, lesson plan preparation, and subject matter for science teachers.

(2) Establishing the Science Teaching and Learning Resources Center (STLRC). The establishment of STLRC should be put in the educational development plan of the Faculty of Education as soon as possible because it takes time to work on. The aim of this STLRC is to provide the services to science teachers in ready made science lesson plan, science laboratory equipment, the printed materials of program text instruction, the classroom and standardized science test both in printed and in electronic forms. For students, they can request the services of computer assisted learning, sitting
the science test for self assessment, and attending the science Web based
learning. The teaching and learning media in the STLRC should be in the
various forms. For example, printed materials, computer diskettes, CD-
ROM, and Web pages.

(3) Establishing the unit for providing the services on science
instructional media design and production. The major roles of this unit
are design and production of science laboratory equipment, science
experiment, and science instructional media. Although establishing this unit
will cost much more of the budget, the Faculty of Education could profit
from the production of this unit. The important reason of this unit
establishment is to support and promote science education development in
Khon Kaen.

(4) Establishing the Science Teaching Clinic (STC). With the new
information technology at the Faculty of Education, it should be used for
an extended role in the faculty in science teaching consultation for
science teachers who need help in dealing with science classroom
problems. To promote science teachers participation in this unit, various
media such as telephone, fax machines, email and Web board should be
used for consultation.

(5) Initiation of Science Teacher Association (STA). The Faculty of
Education should be the leader of science education in Khon Kaen. So the
establishment of STC should be put in the science education development
plan. This STA will take a major role in organizing the academic activities
for science teachers in Khon Kaen. For example, organize the science
education research symposium, publishing the Science Education Journal,
organize the science camps, science tours, and science exhibitions.

2. Preparations of staff for the implementation of the science education
development plan.

The effectiveness and efficiency of the implementation of the science education
development plan depends on the readiness of the faculty. So the plan for staff
preparation should be prepared in relation to the implementation of science education
development plan. The staff preparation plan at the Faculty of Education should consider the following recommendations:

(1) **Skills developments.** All staff should select what activities they are interested in and develop their skills for operating the following activities: organizing the professional development programs; establishing and operating the STLRC, Science Instructional Media Design and Production Unit, STC and STA.

(2) **Team building.** Assign the staff to form the team for establishing and operating each project. The major member of the team should come from the Secondary Education Department who are teaching in general science, chemistry, biology, and physics. The staff from other departments should be included in each team according to their expertise.
REFERENCES


Appendix A

The Role of University Faculty on the Professional Development of Science Teachers
Questionnaire
The Role of University Faculty on the Professional Development of Science Teachers Questionnaire
(Translated from Thai)

Instructions

1. This questionnaire is to be answered by science teachers in secondary schools.
2. The information obtained in this questionnaire will be used for research purposes only. All information will be kept confidential. Please feel free to state your opinions and provide as much information as you can. Your cooperation is greatly appreciated.
3. The university faculty used in this questionnaire means all staff at the Faculty of Education, Khon Kaen University.

Section 1: Background information

1. Sex: □ Male □ Female
2. Age: .......... years.
3. Years of experience in teaching science: .......... years.
4. What subjects and level are you teaching, please check ☑:
   □ General science at lower secondary level.
   □ General science at upper secondary level.
   □ Biology at upper secondary level.
   □ Chemistry at upper secondary level.
   □ Physics at upper secondary level.

Section 2: Opinion toward the role of university faculty on science teachers development

Please state briefly your opinion toward the role of university faculty in science teachers' development that promote teacher reform in the following headings.
1. Teaching skills development:

2. Classroom research skills development:

3. Science instructional media design and production skills development:
4. Science Teaching and learning assessment skills development:

5. Other supportive activities (please specify):
Computer Education Curriculum for Student teachers:
Theory and Practice

Paisan Suwanno

An Elective Research Paper submitted in fulfilment of
The requirements for the degree of Doctor of Education

Deakin University
PREFACE

As students prepare for the information societies, traditional instruction in reading, writing, science, and mathematics needs to be coupled with practice in communication, critical thinking, and problem solving skills. "A basic objective of education is for each student to learn how to identify needed information, locate and organise it, and present it in a clear and persuasive manner" (Hashim, 1986, p.17).

The challenges and rewards of the teaching profession have never been greater. The range and type of information that students need to know far exceeds that of previous decades, and the academic expectation for all students are increasing in virtually every community. Most school systems seek to transform their schools to respond to a host of issues, ranging from these increased student expectations to the conditions that students must confront in their communities. It is clear that caring and competent teachers are vital to the success of each of these initiatives and equally clear that preservice and inservice teacher professional development must change to equip teachers to meet these challenges.

In order to be of greater value to teachers and students, preservice and inservice professional development must be reconceptualised. Rather than seeing each stage of a teacher's professional life as distinct and separate, a more holistic view of the development of teacher from novice to advanced practitioner is needed. Smylie and Conyers (1991) suggest that we must recast preservice and inservice programs to reflect the following paradigm shifts: from deficit-based to competency-based approaches in which teachers' knowledge, skills, and experiences are considered assets. Professional development organised according to this approach will shift teachers away from dependency on external sources for the solution to their problems and toward professional growth and self-reliance in instructional decision making.

The school of Scientific and Developmental Studies within the Faculty of Education at Deakin University offers postgraduate courses in Information Technology Education which aim to develop understandings and professional expertise in the use of computer technology in education. A close examination at the Information
Technology Education program can help the Faculty of Education Khon Kaen University, in developing computer education curriculum. The results of this study can provide the answers for the following questions:

- What is the appropriate structure of the preservice teacher development program in computer education?
- How to manage the preservice teacher development program in computer education that support teachers to develop their information technology literacy?

Paisan Suwanno
Faculty of Education, Khon Kaen University
1996
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- Students who enrolled in the Computer for Teachers in the first semester of 1997
  at Khon Kaen University.
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CHAPTER 1
INTRODUCTION

Background and Statement of the Problem

Schools, colleges, and departments of education may be placed along a continuum in their integration of technology. There are two points of the continuum, to one end is the Office of Technology Assessment (1995) report that states that technology is not central to the teacher preparation experience and most technology instruction is teaching about technology, not teaching with technology across the curriculum. However, Pellegrino and Altman (1997, p.96-99) have captured the other end of the continuum in three design dimensions. These dimensions illustrate changing courses and changing thinking and provide a conceptual framework in incorporating technology in teacher education. The first design dimension involves moving students from consumers and participant observers of technology-based learning applications to producers of content applications appropriate for their own teaching. The second design dimension involves the shift of technology applications from supplementary to central in given course's learning activities. The third design dimension represents a gradual and progressive increase in the sophistication and complexity of the technology-based applications that students experience in a course. This dimension captures the fact that over the length of their teacher preparation program students mature in their own understanding and sophistication with respect to content knowledge, pedagogical content knowledge, and knowledge of technology.

The economics, political, cultural and social crisis has caused all concerned to realise the expediency for the reform of Thai education. According to the National Education Act of B.E.2542 (1999), section 8 stated that the educational provision is based on the following principles: (1) lifelong education for all; (2) all segments of society participating in the provision of education; and (3) continuous development of the bodies of knowledge and learning processes. The implementation of technologies of education is one of the important factors that need to be reformed as it stated in Chapter 9 Technologies for Education as follows:
Section 65 Steps shall be taken for personnel development for both producers and users of technologies for education so that they shall have the knowledge, capabilities, and skills required for the production and utilisation of appropriate, high-quality, and efficient technologies.

Section 66 Learners shall have right to develop their capabilities for utilisation of technologies for education as soon as feasible so that they shall have sufficient knowledge and skills in using these technologies for acquiring knowledge themselves on a continual lifelong basis.

Section 67 The State shall promote research and development; production and refinement of technologies for education; as well as following-up, checking, and evaluating their use to ensure cost-effective and appropriate application to the learning process of the Thai people.

(Office of the National Education Commission, 1999)

According to Deakin University Undergraduate Studies Handbook (1996) Deakin University is one of Australia's largest universities, offering undergraduate, postgraduate, professional training and industry-based programs to more than 46,000 award and non-award students. Deakin students can be found in Victoria, interstate and overseas (Deakin University, 1996). Deakin is committed to excellence in teaching, research and consultancy. Five Faculties -- Arts, Education, Health and Behavioural Sciences, Management, and Science and Technology deliver a range of on and off-campus courses. Within each Faculty are Schools, which concentrate on specialist areas of study. The University has six distinct campuses - Burwood, Geelong, Rusden, Toorak, Warrnambool and Woolstores (Deakin University, 1996).

The School of Scientific and Developmental Studies within the Faculty of Education at Deakin University offers postgraduate courses in Information Technology
Education which aim to develop understandings and professional expertise in the use of computer technology in education.

The courses offer a wide range of experiences and applications to primary and lower secondary school teachers and provide for personal and professional development. The program is flexible and can accommodate individual needs.

The courses in Information Technology aims to develop:

- understanding of developments in computer technology and the recent progress in computer systems;
- understanding of the impact of computer-based technology on society in general;
- understanding of the wide range of computer applications in education available now and in the foreseeable future;
- ability to use computers and programming principles in the development of logical processes and problem-solving techniques;
- ability to develop and implement strategies for the use of computers in primary and secondary schools;
- professional expertise in selected aspects of computer in education.

(Deakin University, 1996)

In response to the National Education Act of B.E.2542 (1999) and the education reform, the Faculty of Education, Khon Kaen University plans to develop the preservice program in computer education to prepare computer teachers for primary and secondary schools in the Northeast of Thailand. To develop an appropriate computer education program for Thai school teachers preparation and development, it is necessary to find out:

What is an appropriate preservice program of computer teacher preparation for Thai school context?
Aims of the Study

The aims of the study were to:

- examine the structure and management of the computer education curriculum at Deakin University;
- identify the students’ perceptions about computer education curriculum for student teachers: course description and practice;
- identify the advantages and disadvantages of the computer education curriculum for student teachers;
- propose the suggestions about computer education curriculum development, a preservice teacher professional development at Khon Kaen University.

Definitions

To clarify and understand the words used in this study, it is useful to learn more about the definition of the following words:

Student teachers

Students who were studying the Computer Application I and II in the semester 2, 1996 at the Faculty of Education, Deakin University.

Undergraduate studies

The level of course at which a university student first studies. A person studying for their first degree is called an undergraduate student, as is a student who already holds a degree but is taking a second or subsequent course at the same level.

Postgraduate studies

These are the postgraduate courses which students are eligible to undertake after first completing an undergraduate degree.

Semester
Semester refers to the organisation of the teaching year. At Deakin there are three teaching periods: first semester, second semester and summer at Deakin: Semester Studies. First semester runs from March to July, second semester from July to November, and the summer study period from December to February.

Unit
A unit is a component of a course, such as Developmental Psychology or Images of Human Existence, which is normally one or two semesters long. Units may have a value ranging from a fraction of a credit point to 4 credit points.
CHAPTER 2
RESEARCH METHODOLOGY

As described in Chapter 1 this study aims to: (1) examine the course structure and management of the computer education curriculum at Deakin University; (2) identify the students’ perceptions about computer education curriculum for student teachers; (3) identify the advantages and disadvantages of the computer education curriculum for student teachers; and (4) propose the suggestions about computer education curriculum development for student teachers at the Faculty of Education, Khon Kaen University.

In order to achieve these aims various studies and related research had been reviewed to formulate conceptual framework, used as broad guideline for the data collection and analysis of this study.

The curriculum: A theoretical framework

The curriculum has much to do with knowledge, but contrary to what scientism has been proposing, that knowledge is not neutral. Apple (1993) has repeated his earlier thesis that knowledge is:

Always part of a selective tradition, someone’s selection, and some group’s vision of legitimate knowledge. It is produced out of the cultural, political, and economic conflicts, tensions, and compromises that organise and disorganise a people. The decision to define some groups’ knowledge as the most legitimate, as official knowledge, while other groups’ knowledge hardly sees the light of day, says something extremely important about who has power in society (p. 222).

It is those with power whose values, stories, perspectives and interests get included in the curriculum, the program of work that teachers and learners experience in any educational setting - school, college, university. Usually the program deals with what
is to be taught and learned, how the teaching is done and when the various teaching activities take place (Wilson, 1996). Thus there are three curriculum pillars: content or subject matter, method of instruction and order of instruction. This is approaching an understanding of curriculum from the viewpoints of the curriculum planner and the teacher. Similar to the students' viewpoints, the important aspect of curriculum is what are learned (outcomes) and what are the activities (processes) that will contribute to attaining recognisable outcomes.

A New Paradigm of Student Learning

Increasingly, movements to consider student outcomes, to improve student assessment, and to refocus institutional missions onto student learning are gaining prominence. Some see these changes as signs of a potentially larger systemic shift in paradigms, away from what has been labelled the "instruction paradigm" toward the "learning paradigm" (Barr & Tagg, 1995, p.13). Paradigm shifts occur when "difficulties or anomalies begin to appear in the functioning of the existing paradigm which cannot be handled adequately" and when there exists "an alternative paradigm that will account for all that original paradigm accounts for...and [that] offers real hope for solving the major difficulties facing the current paradigm" (Barr, 1995).

The learning paradigm is more than incremental changes in an institution's organisational procedure or priorities. Rather, it involves a holistic and system-wide change away from the instruction paradigm and the organisational structures that reflect it. The purpose of the learning paradigm is to "place learning first in every policy, program, and practice in higher education by overhauling the traditional architecture of education" (Boggs, 1995-1996, p. 22). This shift in perspective requires numerous changes:

- Judgement of institutional success on the quality of student learning;
- Shared responsibility in student learning between the college and the student;
- A seamless system of delivery, "providing access to educational services for learners as they need them, when they need them, and wherever they need them" (Wingspread Group, 1993, p. 19);
• The vision of the institution itself as a learner in that over time, "it continuously learns how to produce more learning with each graduating class, each entering student" (Barr & Tagg, 1995, p. 14);

• An institution that "creates environments and experiences that bring students to discover and construct knowledge for themselves" instead of one that merely transfers knowledge from faculty to student (Barr & Tagg, 1995, p. 15);

• The continual identification, development, testing, implementation, and assessment of a range of effective learning technologies including new applications of computer and information technology;

• Faculty whose primary responsibility is the design of learning methods and environments, with less emphasis on the traditional responsibility of instruction especially in the form of lecturing;

• Cross-disciplinary or nondisciplinary teams of specialists who work collaboratively to devise programs to increase student competency;

• Education that is tailored to the needs of individual students;

• Education that involves "the mastery of functional, knowledge-based intellectual frameworks rather than the short-term retention of fractionated contextual cues" (Barr & Tagg, 1995, p. 22); and

• An organisational climate that fosters the belief that student learning is the central objective of all employees of a college—no matter if they are faculty members, financial officers, or administrative assistants.

Many of the changes listed above have been implemented in the past and are, indeed, in place today. However, whether the integrative and system-wide transformation of higher education to the learning paradigm will occur is questionable since many of the traditional administrative and instructional structures are steadfast and deeply entrenched. Dominant paradigms are not easily changed due to the fact that teachers and administrators have been trained and students have been schooled within the old paradigm (Boggs, 1995-1996). O'Banion (1996) suggests that the "key challenge for those who wish to launch learning colleges is the redesign of the current learning environment inherited from an earlier agricultural and industrial society—
environment that is time bound, place bound, efficiency bound, and role bound" (p. 1). To wholly implement a learning-driven system, the entire structure would require reform, including: the measurement of units of learning based on knowledge instead of time spent in class; the reconceptualisation of instruction beyond the traditional classroom model; the redirection of administration away from issues of resources and reputation and toward issues of student success; and the redefining of the very concept of efficiency and production itself in higher education from cost per hour of instruction to cost per unit of learning.

In spite of the challenges that this shift undoubtedly represents, there is a vocal and active group of supporters of the learning paradigm. For example, promoters of instructional and computer technology are advocates of reform; they are aware of how these innovations stand to play an integral role in the curriculum and pedagogy under the learning paradigm. The private sector of the technology industry recognises the opportunity that the learning paradigm would present for the incorporation of innovative instructional technologies. Partnerships between the technology industry and community college associations are being forged to address the subject of technological change as a catalyst for learning (Johnson & Lobello, 1996). If advocates continue to promote these reform efforts and colleges see the need to change their methods of instruction and learning, it is more probable that new approaches to teaching and learning such as those described above will be implemented.

**Information literacy and Education**

Educational reform and restructuring make information literacy skills a necessity as students seek to construct their own knowledge and create their own understandings. Educators are selecting various forms of resource-based learning (authentic learning, problem-based learning and work-based learning) to help students focus on the process and to help students learn from the content. Information literacy skills are necessary components of each. The process approach to education is requiring new forms of student assessment. Students demonstrate their skills, assess their own
learning, and evaluate the processes by which this learning has been achieved by preparing portfolios, learning and research logs, and using rubrics.

Information Literacy Efforts In K-12 Education

Information literacy is a learning process by which one identifies a need or defines a problem; seeks applicable resources; gathers and consumes information; analyses and interprets the information; synthesises and effectively communicates the information to others and evaluates the process. Information literacy skills are lifelong learning skills which require a student to apply higher level thinking (Plotnick, 1999). In K-12 education, information literacy skills are not to be taught in isolation but rather continuously integrated throughout the curriculum. They are most meaningful when taught within an inter-disciplinary unit or within a unit addressing an authentic, real-life need or problem.

Information literacy efforts are underway on individual, local, and regional bases. Imaginative Web based information literacy tutorials are being created and integrated with curriculum areas, or being used for staff development purposes. Library media programs are fostering information literacy by integrating the presentation of information literacy skills with curriculum at all grade levels. Information literacy efforts are not being limited to the library field, but are also being employed by regional educational consortia (Plotnick, 1999).

Information Literacy in Higher Education

The inclusion of information competencies as a graduation requirement is the key that will fully integrate information literacy into the curricula of academic institutions. Information literacy instruction in higher education can take a variety of forms: stand-alone courses or classes, online tutorials, workbooks, course-related instruction, or course-integrated instruction. Individual colleges and universities are undertaking strategic planning to determine information competencies, to incorporate instruction in information competence throughout the curriculum and to add information competence as a graduation requirement for students. Academic library programs are preparing faculty to facilitate their students' mastery of information literacy skills so
that the faculty can in turn provide information literacy learning experiences for the students enrolled in their classes.

**Technology and Information Literacy**

Information Technology is the great enabler. It provides, for those who have access to it, an extension of their powers of perception, comprehension, analysis, thought, concentration, and articulation through a range of activities that include: writing, visual images, mathematics, music, physical movement, sensing the environment, simulation, and communication (Carpenter, 1989, p. 2). Technology, in all of its various forms, offers users the tools to access, manipulate, transform, evaluate, use, and present information. Technology in schools includes computers, televisions, video cameras, video editing equipment, and TV studios. Two approaches to technology in K-12 schools are technology as the object of instruction approach, and technology as the tool of instruction approach. Schools are starting to incorporate technology skills instruction in the context of information literacy skills. Technology is changing the way higher education institutions are offering instruction. The use of the Internet is being taught the contexts of subject area curricula and the overall information literacy process. There is some empirical indication that students who use technology as a tool may become better at managing information, communicating, and presenting ideas. “In this next century, an 'educated' graduate will no longer be defined as one who has absorbed a certain body of factual information, but as one who knows how to find, evaluate, and apply needed information” (Breivik, 1998, p.2). Teachers' ability to be information literate depends on their willingness to be lifelong learners as they are challenged to master new technologies that will forever alter the landscape of information.

**The Advantages of Information Technology in Education**

In Thailand more than two decades ago, computers and related information technologies were introduced to educators as educational tools. Today, there are computers of various descriptions in nearly all Thai schools. Teachers, school administrators, government officials, and others faced with the costs involved in
technology implementation must constantly evaluate the educational benefits of technology. There are many research and other evidences that indicate computers and advanced telecommunications are worthwhile investments for education. This section summarises the observed benefits of technology implementation. The importance of evaluating the effects of technology on learning is also addressed.

Applications of Technology to Basic Skills

Using educational technology for drill and practice of basic skills can be highly effective according to a large body of data and a long history of use (Kulik, 1994). Students usually learn more, and learn more rapidly, in courses that use computer assisted instruction (CAI). This has been shown to be the case across all subject areas, from pre-school to higher education, and in both regular and special education classes. Drill and practice is the most common application of CAI in elementary education, the military, and in adult educational settings. Fletcher, et al (1990) reports that in the military, where emphasis is on short and efficient training time, the use of CAI can cut training time by one third. In the military, CAI can also be more cost-effective than additional tutoring, reduced class size, or increased instruction time to attain equivalent educational gains.

Applications of Technology to Advanced Skills

The application of educational technologies to instruction has progressed beyond the use of basic drill and practice software, and now includes the use of complex multimedia products and advanced networking technologies. Today, students use multimedia to learn interactively and work on class projects. They use the Internet to do research, engage in projects, and to communicate. The new technologies allow students to have more control over their own learning, to think analytically and critically, and to work collaboratively. This constructivist approach is one effort at educational reform made easier by technology, and perhaps even driven by it (Kosakowsi, 1998). Traditional lecture methods are often left behind as students collaborate and teachers facilitate. Students, who often know more about technology than the teacher are able to assist the teacher with the lesson. Since this type of instructional approach, and the technologies involved with it, are recent
developments, it is hard to gauge their educational effects. Still, an increasing body of evidence as presented by Bialo and Sivin-Kachala (1996) for example, suggests positive results. The Apple Classrooms of Tomorrow (Dwyer, 1994), a 10-year project where students and teachers were each given two computers, one for school and one for home, illustrates some of the gains made in students' advanced skills. ACOT reports that students:

- Explored and represented information dynamically and in many forms
- Became socially aware and more confident
- Communicated effectively about complex processes
- Became independent learners and self-starters
- Worked well collaboratively
- Knew their areas of expertise and shared expertise spontaneously and
- Used technology routinely and appropriately.

Another effort called the Buddy Project (Indiana's Fourth Grade, 1990) supplied students with home computers and modem access to school. Positive effects included:

- An increase in writing skills
- Better understanding and broader view of math
- Ability to teach others, and
- Greater problem solving and critical thinking skills.

Effects of Technology on Student Attitudes

Numerous studies over the years, summarised by Bialo and Sivin-Kachala (1996), report other benefits enjoyed by students who use technology. These benefits involve attitudes toward self and toward learning. The studies reveal that students feel more successful in school are more motivated to learn and have increased self confidence and self esteem when using CAI. This is particularly true when the technology allows the students to control their own learning. It's also true across a variety of subject areas, and is especially noteworthy when students are in at-risk groups (special education, students from inner city or rural schools).
Online Technologies

The Internet and advanced networking technologies are comparative newcomers to the classroom. Efforts such as SchoolNet Thailand project, which is served and managed by Network Technology Laboratory (1998), make it easier for many classrooms around the country to connect to the Internet. Although a large body of research on the effects of the Internet in the classroom does not yet exist, recent studies illustrate some observed positive effects. A study by the Center for Applied Special Technology (1996) shows significantly higher scores on measures of information management, communication, and presentation of ideas for experimental groups with on-line access than for control groups with no access. Also, students in the experimental group reported significantly increased use of computers in four different areas—gathering information, organizing and presenting information, doing multimedia projects, and obtaining help with basic skills.

Use of Technology by Teachers and Administrators

Teachers and administrators use computer and information technologies to improve their roles in the educational process. Some examples include:

- Using computer tools to streamline record keeping and administrative tasks, thereby helping to free up time for instruction or professional development;
- Decreasing isolation by using e-mail and the Internet to communicate with colleagues, parents, and the outside world; and
- Increasing professional development activities by taking distance education courses, accessing educational research, and accessing classroom materials such as lesson plans (Kosakowski, 1998).

Factors That Help Technology Succeed

Some of the observed benefits associated with educational technology have been reviewed above, but what are the factors that help technology succeed in bringing about these benefits? Glenna & Melmed (1996) and the Technology Counts analysis suggest the following factors observed in successful technology-rich schools:
• Evidence of a detailed technology plan. Such a plan should consider funding, installation and integration of equipment, ongoing management of the technology. The plan should also express a clear vision of the goals of the technology integration.

• Teacher training and continuing education. Teachers should know how to operate the technology and how to integrate it into the curriculum.

• Support from administration. Administrative support can come in the form of funding, or in restructuring schedules and physical space to reflect the new learning environment.

• Support from the community. Parents, businesses, and community members can use technology as a springboard to become more involved in the activities of neighbourhood schools. All can help with wiring or technical support. Parents can use e-mail to facilitate communication with teachers and administrators. Businesses can use e-mail to help mentor students and help them prepare for the workplace.

• Support from government. Adequate funding and appropriate policy making can help to assure that technology is accessible to all schools on an equal basis.

These factors suggest that to succeed, technology, like any educational tool, cannot exist in isolation, but must be made an integral part of the entire instructional process.

Evaluating the Impact of Technology

Traditional methods of evaluating the effectiveness of educational technology present a number of problematic issues. Glenna & Melmed (1996) state these succinctly:

• Most available tests do not reliably measure the outcomes being sought. The measures that are reported are usually from traditional multiple-choice tests. New measures need to be developed which would assess the higher-level skills and other effects often affected by technology.

• Assessments of the impact of technology are really assessments of the instructional processes enabled by technology, and the outcomes are highly
dependent on the quality of the implementation of the entire instructional process. Crucial elements include instructional design, content, and teaching strategies associated with both the software and the classroom environment.

- The very dynamic nature of technology makes meaningful evaluation difficult. By the time long-term studies are completed, the technology being evaluated is often outdated.

Conceptual Framework of the study

According to the above reviews, information technology has been shown to have positive effects on the instructional process, on basic and advanced skills. Information technology is also changing the instructional process itself. To be effective, information technology cannot exist in a vacuum, but must become part of the whole educational environment. The researcher proposes the framework of the study as shown in Figure 2.1

Methods of the Study

To achieve the four aims of this study the four methods: document analysis, questionnaires, classroom observations, and interviews were used for data collection. The details are as follows:

*Document analysis:* The documents and related materials of the computer units offered at the Faculty of Education, Deakin University were used for content analysis to examine the structure and management of computer education curriculum. The course descriptions of each computer units were also used in the content analysis to examine the management of the units.

*Questionnaires:* The researcher developed two open-ended questionnaires (see Appendix A) for data collection from 12 Deakin University Education Faculty students and two lecturers from two computer units—Computer Application I and II, in
semester 2, 1996. The students and the lecturers were asked to send the answers to the researcher via email because it was very convenient for them.

Classroom observations: The researcher asked for the permission from the lecturer to observe the classroom activities of the Computer Application 1 unit. The aims of classroom observations were to examine the management of the unit and the students’ participation in the activities of the unit. The observations took place on:

- July 31, 1996  Word processing and Graphics
- August 21, 1996  e-mail and Netscape
- September 11, 1996  Desk top publishing project
- September 18, 1996  Introduction Spread sheet
- October 9, 1996  Introduction databases.

Interviews: Six of the 12 surveyed students and one lecturer of the Computer Application I were interviewed to examine their perceptions about the management and the outcomes of the unit.

Students who enrolled in the Computer for Teachers in the first semester of 1997 academic year at Faculty of Education Khon Kaen University were interviewed to collect the information about computer education curriculum at Khon Kaen University.
Figure 2.1 The framework of the study

CONTENTS: The structure of computer education curriculum
- Word processing
- Presentation
- Database
- Programming
- Computer network and Internet

PROCESS: The management of computer education curriculum
- Hardware and software
- Course materials
- Course activities

Computer Education Curriculum: Course description and practice
- The advantages and disadvantages of the computer education curriculum for student teachers
- Computer education curriculum and student teachers' future work
- Students' attitude toward the computer units
- Do the computer units serve teacher preparations?

An appropriate computer education curriculum for teacher preparations
CHAPTER 3
MANAGEMENT OF THE COMPUTER EDUCATION CURRICULUM

...all intending teachers should be helped to develop skills and confidence in using word processors and databases in their own learning and in the classroom ... (NCC, 1991)

The elements of an Information Technology entitlement for student teachers not only include skills and confidence in using word processors and databases (NCC, 1991), but they also include other skills related to information technology and education:

- hands-on work with a curriculum-related core of Information Technology applications use of Information Technology with children
- learning to use Information Technology for general educational purposes and in personal study
- consideration of Information Technology issues, including its role in education
- learning to recognise and to develop curriculum opportunities for the use of Information Technology wherever they may arise.

Curriculum requirements in Information Technology itself, which are detailed and demanding, are at present in a kind of limbo where responsibility for teaching them in schools is concerned. In the case of initial teacher education, students should be trained to teach the elements of the curriculum program in Information Technology. At present each secondary school has the task of distributing responsibility for teaching the core Information Technology applications between subjects, or between teachers. The initial teacher education program at Deakin University considered the possibility of planning an ideal distribution of core Information Technology applications across school subjects. School teachers seem likely to continue to work with a variety of subject patterns for the distribution of responsibility for the core Information Technology applications.
Computer Education Unit offered for student teachers

The computer education units offered at the Faculty of Education Deakin University (http://www.deakin.edu.au/course/course.html, 1996) may be grouped into 5 categories as follows:

- Using computer applications
- Computer implementation in Education
- Educational software development
- Communication software
- Programming

There were 29 computer education units offered for student teachers. There were five units for the using computer applications, sixteen units for computer implementation in Education, two units for educational software development, two units for communication software, and four units for the programming. The details of all units are shown in Appendix B.

The usage of computer application units, focus on practical work in educational computing. The units were designed to enable students to acquire further skills with computer in areas of particular interests and aiming to develop in students specific computer application skills and understandings including the development of skills with the use of word processing, graphics, database, and spreadsheet applications. The five units considered here are as follows.

Learning the New Technology
Technology and Learning
Project in the Application of Computer
Computer Application 1
Information Management

The computer implementation in education units focused on integrating computer into classroom curriculum and administrative context in schools. Students explored ways in which computers can be used in the process of learning and teaching to enhance
current practice in the curriculum and explore new areas of application. The units also offered students the opportunity to explore the appropriate strategies to teach with Internet technology including other issues related to the use of technology within education. The units in this group were:

- Post-primary Curriculum Study A Teaching Science and Technology
- Teaching Technology in Schools
- Teaching with Computers
- Students, Learning and Computers
- Computer in the Primary Curriculum
- Computers and Junior Primary Children
- Computers in Science and Science Education
- Computers in Education
- Internet and Curriculum
- Computers and Educational Administration
- Project in Computer Education
- Computer Applications 2
- Recent Developments
- Teaching VCE Information Technology
- Computers, Students and Theories of Learning
- Computers in Music

The educational software development units, develop skills in using packages and programs for creating educational software, educational material and hypermedia. Students practice more advanced principles of design and programming in electronic publishing, authoring software, and hypermedia to create materials and multimedia products for the educational purposes. The two units were:

- Hypermedia and Authoring
- Multimedia and Its Applications in Education

The communication software units provided students with the systematic study of the educational practices that now abound on the Internet. Students investigate the
curriculum implications of significant changes in which the new information technologies are implicated. The two units were:

**Education Elective: Global Networks and Education**

**Curriculum and the New Information Media**

The programming units focused on the principles of programming. Students gained experience with a variety of BASIC and PASCAL programming techniques and identify tasks for their application. Logo applications in the curriculum were explored. The four units were:

- **Introduction to Programming**
  - Programming Logo and Logowriter
  - Programming BASIC
  - Programming PASCAL

**Hardware and Software**

Deakin University takes pride in being at the forefront of the application of technology to its teaching and administrative activities, and clearly identified strong support for these activities is critical. Information Technology Services (ITS) are responsible for development and support of administrative systems, support of academic activities including centrally supported computing laboratories, networking and communications, end user support and information technology research and advice. (http://www.deakin.edu.au/its/itshome.html, 1996)

**Computer Laboratories**

Information Technology Services manages modern computer facilities for the use of all students. The facilities include computer laboratories, printing and networking. The services are available at each campus on a 24 hour basis:

- Burwood Labs
- Rusden Labs
- Warrnambool Labs
- Toorak Labs
- Geelong Labs.

These computer labs provide all teaching and learning computer courses for student teachers. The hardware and software installed in each lab provide students with the resources to word process, desktop publish, create web sites, analyse data, and graphic process (See Appendix C for details).


Course materials and activities

Computer application 1

Computer application 1 unit that was offered for graduate diploma of Education (Information Technology) in semester 2, 1996 was one of the two computer education courses I chose for this study. Six students who enrolled in this unit had to attend the class every Wednesday at 4.30-6.30 p.m. All activities in the semester was shown in the proposed program as follows:

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>July 24</td>
<td>Introduction to system</td>
</tr>
<tr>
<td>Class 2</td>
<td>July 31</td>
<td>Word processing and Graphics</td>
</tr>
<tr>
<td>Class 3</td>
<td>August 7</td>
<td>Saving and Printing</td>
</tr>
<tr>
<td>Class 4</td>
<td>August 14</td>
<td>Communications exercise</td>
</tr>
<tr>
<td>Class 5</td>
<td>August 21</td>
<td>e-mail and Netscape</td>
</tr>
<tr>
<td>Class 6</td>
<td>August 28</td>
<td>Draw environment and desktop</td>
</tr>
<tr>
<td>Class 7</td>
<td>September 4</td>
<td>Clip art and columns</td>
</tr>
<tr>
<td>Class 8</td>
<td>September 11</td>
<td>Desk top publishing project</td>
</tr>
<tr>
<td>Class 9</td>
<td>September 18</td>
<td>Introduction Spread sheet</td>
</tr>
<tr>
<td>Class 10</td>
<td>September 25</td>
<td>Spread sheet project</td>
</tr>
<tr>
<td>Semester Break</td>
<td>October 2</td>
<td></td>
</tr>
<tr>
<td>Class 11</td>
<td>October 9</td>
<td>Introduction database</td>
</tr>
<tr>
<td>Class 12</td>
<td>October 16</td>
<td>Database project</td>
</tr>
<tr>
<td>Class 13</td>
<td>October 23</td>
<td>Database project.</td>
</tr>
</tbody>
</table>
At the first class, introduction to system, the instructor distributed the document providing the detail of the unit to students. The document provided students with detail about content, guidelines for assessment tasks, place for class activities, and sample references. The instructor also collected students' information for unit administration. The details of the information gathered are: student name, student ID, homes and schools address and phone, and students' experiences about computer applications.

**What contents offered for students**

The unit offered the relevant contents to develop students' skills in computer literacy. The unit commenced with the use of word processing and graphics applications for the presentation of educational documents. Computer communications, including e-mail using Deakin Interchange software, on-line library access, and educational uses of the Internet were introduced. During the unit, students were encouraged to develop keyboarding skills. A desktop exercise was developed, sufficient to create short reports, newsletters and student newspapers.

**References used in the unit**

The instructor listed the sample references which students had to study before attending the class. These references provided a wider background in application of computes into education as well as providing skills support (see Appendix D).

**Guideline for Assessment Tasks**

There are five assessment tasks for the unit. They are:

1. Skill development tasks in word processing and graphics 20%
2. The use of electronic communications 20%
3. Production of desk top publishing exercise 20%
4. Development of spread sheet 20%
5. Development of small-scale database 20%
What knowledge and experiences the students learn from the unit

The contents and activities of the computer application 1 unit could be divided into five categories. They are:

- Introduction to system: word processing and graphics
- Communication: e-mail and Netscape
- Desktop publishing: ClarisWorks or Page maker
- Spread sheet
- Data base

Introduction to system: word processing and graphics

Between the first and third classes, in the semester after an introduction to system, students had the opportunity to practise their basic skills in using Windows, Apple menu and word processing. The basic skills included working with the Windows desktop, Apple Menu, Menu Bar, Claris Works, and Microsoft Office. Students had to learn the detailed components of operating Macintosh computers because they are important basic skills to use other software that run on Macintosh platform.

After the demonstrations, students were able to practise their computer skills. The student chose the software with which he/she was familiar. Some students chose to work with ClarisWorks, but some preferred to work with MS Word. After the practice, students started to work on their first assignment. If the students were unable to finish the assignment in class, they could continue their work by using the computers in the computer lab. The first assignment was skill development tasks, in word processing and graphics. The details are described below.

Skill development tasks in word processing and graphics: 20%

Due date: after class 3

Produce a word processed document that includes both text and graphics.

The word process file may be a worksheet suitable for use with a group of students or another form of document appropriate for use in an educational setting. You should include the following basic features of the word processor:

- Different fonts: type and size,
Different character effects - bold, italic, underline, outline,
Different paragraph styles - left, center, justified, single space, double space,
Single line headers and footers on each page,
Different page layouts,
The document should be spell checked (Whitworth, 1996).

Students could work freely with the wide range of graphic applications and techniques. Students were assigned to create graphic files with ClarisWork or MS Word which show they have developed skill with the range of tools and illustrate a range of several techniques available from the menus.

The instructor tried to encourage students to comprehensively create their work by using the extra marks motivation as was described in the assignment details:

"For assignment 1, you may include extra features. If you indicate what they are, and where you used them, you will gain extra marks for the use. Some suggestions are: automatic table of contents, automatic page numbering, indented, hanging and side by side paragraphs, drop caps, bulleted text, tables, frames and borders, templates and wizards, word art and clip art" (Whitworth, 1996).

Communications - e-mail and Netscape
At the class 4 and 5, the lecturer introduced the communication software to the students. The lecturer started showing demonstration of the usage of the Eudora, an e-mail software. Then the lecturer distributed the instructions for running Eudora from a floppy disk. Students learned to use Eudora with a floppy disk so that their mail was not left on the lab computers to destroy their privacy. They also learned skills to set up the Eudora, send and check mail.

The students practised with Eudora for a period of time, the lecturer then introduced the Netscape to students. The lecturer demonstrated how to open the particular location, how to search for the particular topic. Then let the student practice, using the Netscape by following the assignment and the notes for communications.
Maurer and Davidson (1998) suggest that teaching and learning are more effective when experienced and assessed in natural contexts using authentic learning materials:

Natural contexts are teaching and learning environments in which children use authentic learning materials which are relevant to their own experience. Natural and real learning materials and assessments are based on the proposition that effective learning is grounded in contextualised rather decontextualised teaching. Constructivist-based, contextualised skill development and assessment depends upon strategies that integrate skills and use real learning materials for practice (p.11-12).

According to Maurer and Davidson’s suggestion, the lecturer prepared informative and practical directions of practice using the communication software in the notes for communications assignment. These guided the students through the use of Eudora software in a step by step way and helped them complete the assignment while implementing these tasks.

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**Notes for Communications Assignment.**

1. Start Eudora from the settings file on your floppy disk. When you want to take the disk out at the end, don’t forget to quit Eudora from the File menu.

2. You might want to write to others in the class:
   - list of students’ e-mail address

3. In Eudora, explore the following:
   - Under Help: Attached Documents, Making a Nickname, Creating and Sending a message.
   - Under Window: Ph, Signature.
   - Under Message, use: Reply, and Attach Document
   - Under Edit: Check spelling.
   - Under File: check mail and send queued messages.
   - Under ? help: use balloon help to find the meanings of the icons at the top of a message.

Remember to quit Eudora when you want to remove your disk.
4. The library catalogue and Netscape are the best accessed from Deakin Interchange.
   - Start Deakin Interchange by opening the Deakin Interchange folder, then the Launch Pad folder, then click on the rocket.
   When you find library references, you can copy them and paste them into your Email message. You will need to swap between applications, using the applications menu in the top right corner.

5. For Netscape
   - Open: Use the Open button to open a particular location.
   - Search: Use the Find button to search for a particular topic. This is often more successful if you use Internet search, under the directory menu.

Some Universal Resource Locations (URL’s were also included for student reference.

The assignment for communication section was prepared by the lecturer. It was an integrated activity that support students to develop their skills in using Eudora and Netscape. The details of the assignment are shown below.

<table>
<thead>
<tr>
<th>The use of electronic communications</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication exercise</td>
<td></td>
</tr>
<tr>
<td>Date due: after class 5</td>
<td></td>
</tr>
<tr>
<td>Demonstrate a range of techniques using computer communications. Use Eudora to send an e-mail to your lecturer and include the following:</td>
<td></td>
</tr>
<tr>
<td>1. The document for assignment 1 as an attachment.</td>
<td></td>
</tr>
<tr>
<td>2. Access the library catalogue through Deakin Interchange. Cite two references that will be useful for this unit.</td>
<td></td>
</tr>
<tr>
<td>3. Use Netscape to locate two sources which will be useful to your teaching in using computers across the curriculum. Cite the address of these sources, and briefly state why they will be useful. Download or save some information to include in the e-mail.</td>
<td></td>
</tr>
</tbody>
</table>
For assignment 2, you may include extra features. If you indicate what they are, and where you used them, you will gain extra marks for their use.

**Desk top publishing- ClarisWorks or Page maker**

From the class 6 to 8, the lecturer demonstrated how to use desk-top publishing techniques in ClarisWorks. The techniques range from the basic to advanced features such as linking frames, adding text to linked text frames, linking spreadsheet or paint frames, adding pictures as objects, layering pictures with text, wrapping text around pictures. Students who familiar with PageMaker can choose to work with it. Students learnt more techniques from PageMaker Tutorial. For the more advanced feature of the ClarisWorks, the students studied from the ClarisWorks help files and practised by themselves. In addition, the lecturer prepared the hard copy of the ClarisWorks help file, which he explained in more detail in some the complex features.

After introducing the ClarisWorks, students practised and worked on the assignment.
The assignment for desktop publishing, consisted of relevant practical activities that are useful for students' future work. The details are shown below.

| Desktop publishing exercise: 20% |
| Date due: after class 8 |
| Produce a several page document suitable for educational or community leadership setting (range 2-4 pages). The production should illustrate several key features of the Draw Environment in Claris Works (or "PageMaker"), such as the use of columns; frames; text; title and graphics blocks linking of text across text blocks; wrap around of graphics with text. The documents should illustrate general principles of graphic design with respect to layout and appropriate font, size and style suited to the message to be conveyed. |

Again you may include extra features. If you indicate what they are, and where you use them, you will gain extra marks for their use.

**Spread sheet**

The activities for class 9 and 10 of the unit were about working with spread sheet. The lecturer demonstrated using the spread sheet with ClarisWorks to the class. After
practising the basic feature skills, students worked on the spreadsheet project described in the guidelines for the spreadsheet assignment, as follows:

<table>
<thead>
<tr>
<th>Development of spreadsheet exercise: 20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date due: after class 11</td>
</tr>
<tr>
<td>Develop a spreadsheet which includes values and formulas in cells for labels of about ten row names and five column names. The spreadsheet you develop will have the most use for you if it is a working tool with some practical, professional or personal reference. A common set out for a spreadsheet is time series across the columns and categories of expenditure or budget down the rows. Teachers find a table of students’ marks useful. Clearly explain the names of tables, the decisions you have taken, the calculations you have made, and the significance of the results.</td>
</tr>
</tbody>
</table>

Your submission should include:

1. a print of the original data in spreadsheet form.
2. a print of the data after using formulas to generate cell entries
   - the use of copy and paste to apply similar formulas to different columns,
   - an explanation of relative and/or absolute values within formulas.
3. a print showing formulas - ‘show formulas’ or ‘display formulas’ - For MS Works or Excel, make sure you print the row and column headings. The application will label the row 1 2 3 4 ... and column A B C D... or the print out so the formulae can be understood. This isn’t necessary in ClarisWorks
4. a print showing the result of changing several values within the spreadsheet to generate a “what if?” exploration.
5. a print showing the use of the chart menu item to make a visual representation of some of the data.
   a) Pie chart on vertical column
   b) Series chart of one row or any two chart options that sensibly suit your data.

You will need accompanying documentation to explain:

- the objectives of your spreadsheet,
- your use of formulas,
- the meaning of the values, absolute or relative,
- the result of the “What if?” exploration,
- and the visual representation from the chart menu.

Submit the pages in a single plastic folder so the pages can be taken apart and compared.
Again you may include extra features. If you indicate what they are, and where you use them, you will gain extra marks for their use.

**Data base**

The data base task was held from class 11 to 13. The lecturer demonstrated how to create a small scale database and how to work with some features that are suitable for education task. For example, the use of database for storing, organising, manipulating and maintaining information about survey investigation data, student records, class lists and assessment records. The project that students have to do was shown in the assignment as follows:

<table>
<thead>
<tr>
<th>Development of small scale of database: 20%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date due:</strong> after the final class</td>
</tr>
<tr>
<td>Develop a data base including about 20 records with about 10 fields, including at least 2 numeric and 2 non-numeric fields.</td>
</tr>
<tr>
<td>Design suitable layouts and produce prints of:</td>
</tr>
<tr>
<td>- the entire file of the original order. (You may need to change the orientation and size in Page Setup.)</td>
</tr>
<tr>
<td>- the file sorted by one numeric field.</td>
</tr>
<tr>
<td>- the file sorted non-numeric field.</td>
</tr>
<tr>
<td>- the file sorted by two fields.</td>
</tr>
<tr>
<td>e.g. by score, and if equal score then by order of alphabet. (Here sort the alpha field first and then sort the numeric)</td>
</tr>
<tr>
<td>- a selection based on a numeric field.</td>
</tr>
<tr>
<td>- a selection based on a numeric field with a range of values.</td>
</tr>
<tr>
<td>- a selection based on a non-numeric field.</td>
</tr>
</tbody>
</table>

For sortings and selections rearrange the order and layout of fields so that significant fields are displayed to advantage.

Include information on each particular listing and state what sort of data manipulation you have used, e.g. Sorted by one numeric field in ascending order of age.

Provide documentation in terms of a brief (1 Paragraph) introduction to make the use of your database, the reasons for the number and names for fields and records, decisions made particular fields because of the need to sort or select later, and how
you have dealt with null data. Give a brief explanation of each data manipulation. In addition provide a view of other capability and potential usage of your database.
Submit the pages in a single plastic folder so the pages can be taken apart and compared. Submit the final file on disk.
Again you may include extra features. If you indicate what they are, and where you used them, you will gain extra marks for their use.

Computer Application 2

This unit was one of the four electives units for students who enrolled in the information technology education program. The unit was designed to develop and enhance students’ skills and understanding of the computer applications encountered in the core units of the course, especially the unit Computer Application 1. This development include advanced features of word processing programs, examination of features of a document processing program (D.T.P.) and the use of an editing program to develop an Internet Web page (Deakin University, 1996).

The topics selected for inclusion in the course included:

Word Processing:
- mail merge
- outlines
- paragraph styles
- scanned images
- wizards
- templates
- master pages
- slide shows
- development of web pages

Desk Top Publishing:
- Page Maker software
- typographic concepts and controls
- layout and design principles
- design and layout of small publication
Assessment

The students who enrolled in the computer application 2 unit were assessed through five exercises. They were:

- Mail merge exercise 20 %
- Desk top publishing exercise 30 %
- Advanced word processing exercise 30 %
- Slide show exercise 10 %
- Internet page exercise 10 %

The details of assignments and due date was distributed in the lectures during the semester (Whitworth, 1996).

What knowledge and experiences the students have learnt from the unit

The computer application 2 unit aimed to develop student skills in advanced features of word processing, desk top publishing program and the use of an editing program to develop an Internet Web page. The selected topics covered five major activities as described above.

Word processing: mail merge

This topic encouraged students to prepare a merged document which involved two files, the main document and the data source. The lecturer demonstrated the main document and the data source creations, through a computer projector. The examples of the main document and data source structure were distributed to students. After giving a lecture, students practised creating a document by following the given direction. The major skills that students had practised are using mail merge helper to set up the main document and data source, creating main document, creating data source, insert merge fields, merging the files- to printer and to new document, and sorting the data source. Students were asked to work through the online tutorial about form letters, envelopes and labels under examples and demos under the help menu.
This activity helped students understand the usage of different forms of printout which are suitable for specific work.

At the end of exercise, students were asked to create a mail merge project suitable for an education setting, which contained about ten records, with about eight fields in each record and to print and submit each of the documents.

Students had to finish the mail merge assignment before class week 4. The details of the assignment in table:

**EME452 COMPUTER APPLICATIONS 2**

**Mail Merge Assignment**

Create a Mail Merge project suitable for an education setting, which contains two or three records, and about eight fields in each record.

An example of a Mail document from a Mail Merge project follows:

October 15, 1996

<<Parent(s) Salutation>>,  
<<Address>>,  
<<City>>, <<State or Province>>, <<Zip Code>>

Dear <<Parent(s) Salutation>>:

We are at the end of semester, and all parents will receive report cards for their children during parent-teacher meeting next week. This letter is an early notice to you of <<FirstName>>'s grade in Language Arts and an indication of how <<FirstName>>'s individual performance compares to the performance of the class as a whole.

We have focused on the following topics in recent weeks:

- Reading for main idea
- Reading for details
- Writing for specific audiences
- Writing to provide necessary details
- Study skills—creating an environment for study

<<FirstName>>'s average for this marking periods is <<Grade Average>>.

<<Comment>>

I hope that by your receiving this information about <<FirstName>>'s performance, we can maximize our time together in discussing for the next term. I will be happy to answer any questions you may have.

Sincerely,

Teacher
- Print the Main Document, the Data Source, and the Merged documents. Also print a page of address labels from the Data Source.
- Create the project firstly in Word 6.
- Then create the project in ClarisWorks 3.
- Refer to ClarisWorks Users Guide pp. 8-7 to 8-11.
- You may be able to copy your main document from Word into ClarisWorks, but you will probably have to create the Data Source as a Data Base document in ClarisWorks.
- To prepare the mailing labels, see p7-12 ClarisWorks Users.
- Write a half page comparison of the facility of the two different applications to complete your project.
- Date Due: Before Class Week 4, August 12 or August 15

**Desk top publishing**

This session provided an opportunity to students to create several quality documents related to the teachers work. The details were described in the Desktop Publishing Assignment as in table.

<table>
<thead>
<tr>
<th>Computer Application 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop Publishing Assignment</td>
</tr>
</tbody>
</table>

This assignment will allow you to combine your design skills with your facility with word processing programs to produce customised documents of the highest quality. The terms used to describe the assignment are defined in the handout *DTP On the Apple Macintosh Computer* (a HyperCard version is available on computer in the labs in Building M) A page-processing program must be used—PageMaker 5.0 is recommended.

**Part 1**

Use A4 paper with a right angle fold or a single fold to produce an invitation to parents to attend a school function (social, parent-teacher meeting, school camp meeting, etc etc.). The information in the card must be complete yet succinctly presented.

**Part 2**

Use A4 paper with gate fold to produce a brochure describing your school. Information must be printed on both sides of the paper and careful consideration should be given to design aesthetics. Headings and sub-headings should be used to prompt the reader and appropriate graphics should support the text. Typography, graphics and page layout must be combined to convey to the parents of potential students the benefits of attending the
Advanced Word processing

This session extended students experiences and skills in using the word processing program. The advanced features of word processing were introduced to students, for example, outlining view in Word, footnotes and endnotes, using captions, line numbering, paragraph formatting, formatting frames, call outs and tables.

The assignment required students to demonstrate their abilities to use various features of the Word processing program to produce a document with some educational application. The following features were included: built-in styles, outlining at least three levels, graphics, with captions and a table of the contents. Additionally, students could choose to incorporate an index, a customized paragraph style, footnotes or endnotes, automatic line or paragraph numbering, columns and headers and footers. If students required further information about any of these topics, they could consult the examples and demonstrations in the help menu, or the help files which are accessed from the help button on the ruler. The content of the document should be related to some of the curriculum area to enable the logical application of outlining (a hierarchy of headings) to be utilized.

The lecturer suggested students submit their assignments as follows:

- the final version of their document
• copies of the document to demonstrate the use they have made with outlining
• a list of features they use in the document's production
• a disk copy of the document.

Internet Web Page
The lecturer demonstrated creating a new home page using Claris Home Page, and students then completed Claris Home Page tutorial. The hands-on, step-by-step tutorial that students completed in one session or one section at a time, covered the following topics:

• Creating a New Page and Saving Your Work
• Inserting Images
• Assigning Styles to Text
• Creating Lists
• Inserting Horizontal Rules
• Working with Links and Anchors
• Creating Tables
• Viewing and Editing HTML Source Code
• Putting Your Pages on the World Wide Web
• Where to get More Information

For the WWW Homepage design and construction assignment, students were assigned to complete the ClarisWorks Homepage tutorial. This required students to complete a demonstration homepage and to save it on their own disks. Students needed to use the techniques acquired from the tutorial program and their considerable word and page processing skills. In addition to design a homepage where the content should relate to an educational course, institution or curriculum learning area. Some possibilities included an advertisement for a course, details of a curriculum topic (dinosaurs, steel industry in Australia, measurement topics, data collection and presentation etc.), or information about an educational institution (advertising, information for parents etc.).
The students’ page should demonstrate their ability to utilise the text, insert images, use styles, create lists, work with links and anchors and to create tables. As links must be created, students needed to design and create a second page, containing the information to which the main page refers.

Students could use Claris Homepage or other similar homepage editor to finish their assignments. The submitted assignment included:

- A brief description of the pages which includes pages and file names and the purpose of the page;
- Disk copies of the pages;
- Printed copies of the pages;
- A list of the features students have used, together with an indication of where they are used.

**Slide show**

The lecturer described and demonstrated how to prepare a slide presentation to students. He prepared a five page “Preparing a Slide Presentation” for students to follow his lecture. The printed material provided details about:

- Slides
- Creation of Slides
- Adding a background to slides
- Adding a background or border to pages
- Organization of your presentation
- How to run a slide show

After the demonstration, students were asked to complete their assignments by following the details of assignment five described in table.

<table>
<thead>
<tr>
<th>Computer Applications 2: Assignment Five</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content:</strong></td>
</tr>
<tr>
<td>The content may be similar to that used for Assignment four. It should relate to an educational course, institution or curriculum learning area. Some possibilities include:</td>
</tr>
<tr>
<td>• an advertisement for a course, or</td>
</tr>
</tbody>
</table>
• detail of a curriculum topic (dinosaurs, steel industry in Australia, measurement topics data collection and presentation etc.), or
• information about an educational institution (advertising, information for parents etc.).

1. Read through Preparing a Slide Presentation.
Using the techniques suggested and your considerable word and page processing skills, design a slide presentation which contains from five to ten slides.

2. Some suggestions for the structure of the presentation are:
• making a proposal or recommendation
• outlining a course, educational service or idea
• giving a lesson or instruction
• reporting process or status of a project
• book report

3. Make sure that each slide is not overloaded with information. The slides should contain headings, leaders, and perhaps diagrams or graphics. Most of the information on the topic would be given verbally, each slide should be numbered.
It is suggested that ClarisWorks Draw environment be used with View Slide Show, however any similar presentation software may be used.

Submit for assessment:
1. A document with a brief description of your slide presentation, include the title and outline of how the slides fit into the content of your topic. This should be brief, but provide just enough information so the content of the slides can be understood without a verbal presentation;
2. Disk copy of the file;
3. Printed copy of the slides;
4. A list of the features you have used, and enough information to run the slide show from the disk copy.

Note: You may like to present your slide show to the class during the last lesson.
CHAPTER 4

COMPUTER EDUCATION CURRICULUM AT DEAKIN UNIVERSITY

Computer Education Curriculum: course description and practice

The particular contents which have been described in the Computer Application 1 unit, were designed to provide the development of skills with the use of word processing and graphic applications for the presentation of educational documents. During the unit, students will be encouraged to develop keyboarding skills to enhance their capabilities with a desktop publishing application so they could create short reports, newsletters and student newspapers. The use of database and spreadsheet applications were investigated for storing, organizing, manipulating and maintaining information such as survey investigation data, student records, class list and assessment records. Techniques for transferring information between computers and via modem with bulletin boards were investigated.

The Computer Application 2 unit, has its foundations in the Computer Application 1 and extended some of the topics in that unit. In particular, the topic of communication and desktop publishing, which was pursued to an advanced level with the emphasis on their use in educational contexts. As an example of an alternative method of accessing information, and one that is expected to having educational application, expert systems were introduced.

Having discussed through the interviews with six students who enrolled in Computer Application Unit 1 in the second semester of the year 1996, it was found that they were satisfied with the activities. These covered what was originally described in the unit activities and the descriptions were well matched as some students comments on the unit:

The unit description and the activities were well matched, I am very satisfied with them. I think they give me some good skills that I will be able to use in the future (Male/Age 28).
I am satisfied with the unit activities for Computer Applications (Female/Age 30).

The activities that were covered in the class were the same as what was originally described. These activities provide a broad basis for using and also learning more computer applications (Female/Age 24).

I have been very satisfied with the units in this subject (Male/Age 29).

We seemed to cover all topics that were mentioned in the unit description. I think many of the students chose Application 2 as a natural progression from the core unit applications 1. I think all the activities we covered were most useful, some very time consuming to learn, but better now when a student than later when teaching! Of particular value was the Desktop Publishing and the Word Processing activities. I can see immediate uses in the educational perspective (Female/Age 25).

The students stated that they not only found the activities well matched with the unit description, but they also provided a broad basis for using and learning more computer applications. One student confirmed that the unit can develop the student’s skills as follows:

After completing the unit activities, I can confidently say that yes I am happy with these activities. They enabled me to use and understand the relevant software, how to use them to their fullest potential, and understand their relevant functions (Female/Age 26).

However, a couple of students suggested that the lecturer should give more time to students to complete their work on the computer and should assist those students who would like to use PC software application. They commented that:
The only suggestion I would like to make would be to give it a bit more time, because a lot of time was needed to complete the work on the computers (Female/Age 26).

I am satisfied with what has been presented during the unit, however I feel there has been no contribution or thought to those students who would like to use/experience PC software applications; only Macintosh usage is discussed and no efforts are given to encourage or support PC uses (Male/Age 31).

The advantages and disadvantages of the computer education curriculum for student teachers

The Computer Application units provided students with the advantage of developing their computer usage skills in an educational setting. For some students the advantages they obtained from the units were flexibility of activities and the various relevant topics, that not only deal with everyday use of computers in education but also in other areas. The comments of three students are as follows:

The advantage is that there is a degree of flexibility that allows individuals to learn to use a program if it is a similar program to the one that was to be used and it is used in their school (Female/Age 24).

An advantage to this unit of study was that we covered a lot of relevant topics, many that you would come across in everyday use of computers in education, but also in other areas. These being the private sector of employment (Female/Age 26).

An advantage of this unit to my study is that the topics covered, have enhanced my skills and therefore I'm more confident with the use of a computer and the applications of certain software (Female/Age 30).
Some students pointed out the advantages of the units, which provided an opportunity to understand and learn a variety of computer skills. In addition, the activities helped to develop their confidence in using computer software. The students commented:

The advantages of this unit were that it gave me a better understanding of how to use computers and resulted in a lessening of the anxiety that I initially had about them (Male/Age 28).

The advantages of this unit of study is that we learnt many different computer skills - mail merge, advanced word processing, desktop publishing, slide presentations and making web pages (Male/Age 29).

We have learnt how to use all those little timesaving devices which usually go unused - outlining in word processing ... etc. Inserting graphics and images to create more interesting pages. I have learnt how to use computers within the school situation (Female/Age 25).

The advantages are that you experience and learn how to apply your skill to a higher standard (Male/Age 31).

There were some disadvantages within Computer Application units as some of the students complained about the limited time, software and hardware, and the printing problem from the network printers. Some of the complaints are as follows:

The main disadvantage to this class is there is so many things that could be covered and only a limited amount of time (Female/Age 24).

A disadvantage of the unit has been computer access to the software used for some of the topics. The only place I was able to do work was at University which for me is an hour drive from my home. Although this has sometimes been a hurdle I'm glad that I've had the opportunity to use different software such as PageMaker (Female/Age 30).
One disadvantage was the problems faced when we tried to print our final submissions. Some days the printers would debit our copytext cards and no print would appear, other days the printers would not even accept the copytext cards. On regular days the printers were not working at all, with most of them jamming the paper (Female/Age 26).

The disadvantages there was a large amount of content to cover in the unit and possibly not enough time to do complete all areas (Male/Age 31).

**Computer Education Curriculum And Student teachers’ Future Work**

Initially, there was uncertainty about computers when first introduced to schools, due to computers not being part of the school curriculum. However, teachers were finding computers to be an advantage within the classroom. Teachers were stimulated to reconsider the theories and philosophies which lay behind their teaching practices and their content, to question their beliefs and their habits, even, in some cases, to become open to change.

Computers have been around in many schools for ten or more years. They are no longer a novelty. A considerable amount of practice and to a lesser extent research, which has accumulated over this period has given us a firm foundation on which to base our use of computers in the classroom. However, it remains quite true as Dowling (1991) described:

We have come a long way. Now everyone knows that drill and practice is bad, computer studies is a bit old fashioned, programming is ideologically suspect (depending a lot on the language chosen), word processing is a good idea but there aren’t enough computers to go round, simulations are good for oral language and decision making, people with only one computer use adventure games, desktop publishing and a range of other commercially oriented applications reign supreme because this is what people do in the real world,
hypertext gives new dimensions to reading and writing, multimedia is the key to providing for a range of learning styles and strategies, and above all we must never forget that we are processing information. Dowling, 1991 (p.9)

Dowling pointed out the new direction of computer applications in an educational setting that not only used computer assisted instruction and computer managed instruction, but also computer mediated communication which is now being used in schools. The beliefs of most students who enrolled in computer application units were similar to Dowling’s beliefs. The students think the units help prepare them for future work in schools. Some of them indicated that all school teachers are expected to be comfortable with computers, and can use the relevant computer applications within a school. As four of the students stated:

The skills learnt will certainly help with any future work as it covered a wide range of relevant computer applications (Male/Age 29).

I think that the unit will help prepare me for future work as all teachers these days are expected to be comfortable with computers, and some of the skills taught, such as making graphs, can be used in the classroom (Male/Age 28).

The unit covered a lot of relevant points, many of which prospective employees regard necessary to obtain employment. From Word Processing to Database Use, these are all relevant and a necessary skill in obtaining employment (Female/Age 26).

This unit will help me prepare for work in the future as I know that the applications of computers is an issue in schools at present. Having the opportunity to develop and enhance skills in topics such as Mail merge, desk top publishing, advanced word processing and developing an Internet page are relevant applications for the use of computers within a school (Female/Age 30).
Other students thought that skills and experiences gained from the units would help their future work in the areas of communication, teaching tools, and in administration. Two other students commented:

I think this unit will help in future work. The advantages will mainly be in the areas of communication and administration. The skills that have been covered will allow the presentation of more professional work and access to more information via email and the Internet (Female/Age 24).

Assuming my future employment is that of a Primary Teacher (in whatever field), I will use computers to their utmost capability - either as a teaching tool, administration tool, or both (Female/Age 25).

**Students' Attitudes Toward the Computer Application Units**

Observing the class activities of the computer application 1 unit, it is fair to conclude that most of students were very happy with the units activities. They paid attention at lecturer's demonstrations, taking notes while following the demonstrations. Some students asked questions when they could not follow with the demonstrations. Some students asked the lecturer to use some features of the software in different ways to see what would be happen.

Whenever the students arrived at the period of time for finishing assignments in the class, they showed positive attitudes toward the units. Some students started with drafting their work on a paper before working with the computer, while others started working on the computer. Although some students needed more help from the lecturer, most of them were happy with their work. There appears to be no doubt that students achieved their study goals, as they had such positive attitudes toward the units, evidenced by the following students views:
I thought that the unit was excellent, well thought out and presented in a clear unhurried manner. I have no other suggestions (Male/Age 28).

I thought this unit was excellent and was thoroughly enjoyable as well as learning many new skills. The lecturer was very good and explained all new concepts well (Male/Age 29).

One important lesson, was that learnt from my peers, most of who are, were or will be teachers. We discussed our projects amongst ourselves and shared many ideas - it was great as everyone had different approaches to things. I thought it was especially good to see other people's work, not so much for the 'how to do it' but for the 'wow - you used that tool - how, why... ?' I thoroughly enjoyed Applications 2 and gained a great deal from the course in general (Female/Age 25).

In addition, it is worth noting that some students provided valuable suggestions for improvement of the units. Suggestion were that the units should cover the PC and Macintosh applications equally. Also students should have more opportunity for discussion with the other students as they can learn so much from the experiences of others. Two students recommended as follows:

The only suggestion I have for this unit is that it covers the application of PC software and not just that of the Macintosh computers. This would certainly give the students a wider understanding of computer applications (Female/Age 30).

To have time to have discussions to share with others what they found good to use, and what problems they came across in different applications. Example: A student sitting next to me one week had no idea about 'word art' until I showed her! It was something simple but without communication between each other knowledge and ideas don't get generated (Male/Age 31).
Do the Computer Application Units serve teacher preparations?

In 1992 an Australian wide survey was undertaken to determine the most appropriate and effective ways by which classroom teachers have acquired the necessary skills and knowledge to use technology in their curriculum. The survey examined current and changing practice and identified factors which the teachers considered promoted or hindered the effective integration of computer technology. Many teachers felt that their teacher training (preservice and inservice) did not prepare them to effectively integrate computers into their teaching, that it did not include enough time for them to become comfortable with the software, nor did it include support to help them troubleshoot during the early implementation stages (Sherwood, 1993).

The findings of this study would indicate that the Faculty of Education Deakin University is trying to improve the preservice teacher training. All computer units offered at the faculty cover the necessary skills and knowledge to use technology in schools. However, more research or studies are needed to follow up the effectiveness of the computer education program.
CHAPTER 5
WHAT DOES THE FACULTY OF EDUCATION
KHON KAEN UNIVERSITY LEARN?

When a classroom is equipped with technology equipment, it is unrealistic to expect that the teacher will automatically utilize it as a resource to its fullest potential. The successful integration of technology into the classroom depends on several interrelated factors, including the technological competencies of the teacher, the hardware and software available, compatibility with learning objectives, and access to technical support. The elements most crucial to the successful integration of technologies are teachers and their ability to use all their skills to inspire, motivate, challenge, and enrich their students. The computer education units offered at the Faculty of Education Deakin University lead its student teachers to develop their relevant skills and ability to integrate technology in education settings. At this point the Faculty of Education Khon Kaen University can not only learn what happened, but can get the conceptual framework for future curriculum development from this experience.

Computer Education Units at Deakin University

Close examination of the computer education curriculum at the Faculty of Education Deakin University, shows that the computer education units offered to student teachers could be categorized into the following areas:

*Using the computer as an administrative tool.*

Many computer education units developed students’ skills in using various technologies to help with the operating and management components of teaching. Word processing is the most basic computer application. Teachers can use a word processor to create teaching materials and tests, as well as letters, memos, and other documents. With the inclusion of clipart and graphics, basic word processing can progress into newsletters, flyers, banners, and certificates.

As word processing is mastered, other aspects of the operating system such as file management can be introduced. Spreadsheets and databases are also good basic
computer applications that offer many time saving features providing more opportunity of the teacher and student contact. These applications can enhance the productivity of the teacher, while building a fundamental computer knowledge base. Before teachers integrate technology into their classes, they must attain a level of comfort in using technology for their own work.

Using technology as a presentation tool.
Teachers can use technologies to increase delivery medium options. With this application, the teacher is still the source of information and simply uses technology as an information presentation aid. A computer with a computer projector may be used as replacement of chalkboard or overhead transparencies. This presentation style is much more visually engaging, versatile, and flexible. Technology-aided presentation can include video clips, photographs, sounds, charts, and other objects that can greatly enhance the instructional process. Students in today's classrooms are technologically sophisticated and are more responsive to information presented in multimedia format. In addition, technology-aid lecture presentations are easily updated, revised, or customized to a specific group.

Using technology to enhance communication.
Features such as email, listservs, and video conferencing facilitate communication. These applications allow teachers to easily and efficiently communicate with colleagues and students. The Internet also provides access to people all over the world, thus expanding the classroom into the global community. Using email, teachers can communicate individually with students or relay information to entire classes in a direct and timely fashion. Having more methods to communicate can strengthen and broaden interactions between teachers and students. The shy or introverted students may feel more comfortable using email as a basis for forming a relationship with teachers. Listservs are email based correspondence groups devoted to sharing information about specific topics.

Using technology as an unlimited information source.
A computer with educational software or Internet access may become an invaluable source of information. There is a wide range of innovative available that includes
tutorials, CD ROM based encyclopedias, drill and practice exercises, simulation games, problem-solving programs, and assessment techniques. Teachers can choose the software and Internet sites that best enable their students to meeting identified learning objectives.

Professional organizations, universities, government agencies, and many other organizations make a wide range of information available on WWW home pages. To facilitate the acquisition of knowledge, teachers and students can design a home page that supplements classroom activities and links to other relevant home pages. When technology becomes an important source of information, the role of the teacher changes from an information provider to a facilitator or director of learning experiences.

*Using technology as a student productivity tool.*

Students can use all the administrative applications that are available to teachers. A word processor can be used to write reports, compositions, and other documents. With the inclusion of clipart and graphics, basic word processing can progress to newsletters, flyers, banners, and certificates. Students can also use presentation or authoring packages to build multimedia presentations. At this practice the students’ focus is not on the technology, but on the medium to display what they have learnt. Using technology motivates students to build presentations is not as important as the content of the presentation.

The five areas concluded above offer teacher education programs a conceptual framework of the different ways technology can be used in the teaching and learning processes. This framework can assist student teachers to develop a comprehensive understanding of the potential implementation of technologies in their classrooms. Student teachers need to go beyond having just a basic knowledge about relevant technologies. It is essential for student teachers to develop the expertise and confidence to make wise decisions about how to use best technologies in their classrooms. Technologies need to be integrated with solid learning and teaching theories. Student teachers must develop customized plans to utilize the technologies that best augment their teaching style and learning goals. Teacher education programs
must provide quality training in educational technologies to ensure that their graduates are equipped to offer the best services to their future students.

**Computer Education Curriculum at KKU**

The Faculty of Education, Khon Kaen University offers four undergraduate programs, Bachelor of Education (Primary Education), Bachelor of Education (Secondary Education), Bachelor of Education (Physical Education), and Bachelor of Education (Arts Education). There is no computer subject offered for Primary Education students. There are three computer subjects offered for students enrolled in Secondary Education program, Programming in COBOL Language, Programming in FORTRAN Language, and Programming in Pascal Language. There is one computer subject, 212 380 Computer for Teachers, offered for students enrolled in Arts Education and Physical Education programs.

Computer hardware and software at the Faculty of Education Khon Kaen University available for teacher education program is suitable at the time. There is a computer laboratory with twenty PCs connected to LAN server and the KKU network. Not only the students enrolled in the subject, Computer for Teachers, use this laboratory but also several computer training courses use this laboratory regularly. However all students have the right to use the facility at all times in their spare time. The software installed in the machines are both in DOS and Windows platform. For example, Foxbase, Thai words, CAI Authoring packages, Communication software, and Web browser.

The course materials and activities are organized in a variety of ways according to the course objectives. However, all computer programming courses and computer for teachers course introduce students to the computer language syntax. The students experienced with the computer programming development process which consists of system analysis, flowchart design, and source code programming. The interviewed students suggest that the course activities are too hard and not of direct benefit to them to utilize the computer in their work. They need the skills to apply the computer in educational material preparation, teaching activity, and to communicate with the
others. But most available computer courses do not provide these experiences. They have to spend more time and money to attend a private computer school in the town to broaden their experiences. The comments of two Khon Kaen University Education Faculty students are pertinent here:

There is no choice to enroll the computer course that I would like to broaden my experience with the computer application in education. As I am a teacher student, I would like to learn more about how to utilize the computer in educational settings. But I only have the opportunity to enroll in the computer programming course. Although it gave me a better understanding of how to do programming with several computer languages, it resulted in the more anxiety with using computer because the computer programming is too hard and not of benefit to me to work as a teacher (Male/Third year student in Mathematics Teaching).

The computer programming courses provide me with the experience of computer program development. But I would like to learn more in the different computer skills- advanced word processing, computer presentation, and using the Internet. There are no such computer courses available at the faculty of education. I have to attend the private computer school in the evening to broaden my knowledge and experience. However, the private computer school introduces me only to how to use the computer application. I have to find out myself how to apply the computer application in educational settings, especially in the school (Male/Third year student in Chemistry Teaching).

The students gave many more valuable ideas about how the computer courses provided for student teachers at the faculty of Education, Khon Kaen university. According to their complaints, it is time to rethink the curriculum structure for student teachers.
What should the Faculty of Education KKU do?

Effective faculty development programs are not standalone, institutional efforts. Their intent and consequences serve a much broader academic and intellectual function. Two elements that should be included in the near future development plan are curriculum reform and computer laboratory rearrangement.

Curriculum reform
The faculty of Education should start working on curriculum reform. The main thing that should be determined is the development of computer literacy for student teachers. The irrelevant courses in the current curriculum should be skipped out. The curriculum development committee should consider what are the relevant knowledge and skills that are appropriate for the present teachers’ work. In an informative society which changes rapidly, answers are elusive and many must be tentative, so we need teachers who can help students ask questions and explore the possible answers to the questions that they ask or should ask. Asking questions require a different thinking, so we need educated teachers who know how to think and how to teach others to think (Yaxley, 1991). In a recently prepared report at Brock University in Ontario, Canada, (1993) the image of the beginning teacher was advanced. In the preamble the following statement about a teacher was made:

... the teacher must be intellectually alive, authoritative yet compassionate, critical, reflective, flexible and ever-tentative to the demands of a changing society. We want teachers whose claim to professional expertise equips them to discern consequential educational questions and issues and enter into public discussion of them (p.14).

The education of teachers must build on this fundamental image of the educated person. The office of the National Education Commission, Office of the Prime Minister attempts to do this in the reform of teachers and educational personal training and development (1993) focused on what teachers should know and be able to do. The report summarised the reform of teacher training process under the following five strategies:
1. Set up a new educational culture, allowing learners to learn by themselves with the guidances and follow-up from teacher rather than teachers’ providing of knowledge. This can be done through:
   - improvement of libraries as information centers facilitating learners’ study with modern technology. Teaching aids such as media, computers, VCRs should be sufficiently provided.
   - encouraging group dynamics for furthering study.

2. Let learners learn about themselves, their communities, rural and urban ways of life, nations and the world. They should be able to analyze different problems in their local communities in order to encourage learning in real conditions and create understanding of and commitment to the community. This can be done through:
   - preparation of teaching staff of teacher training institutions to broaden their knowledge about sociology, anthropologies, culture, economics and politics by inviting qualified personnel in these areas from universities to help planning.
   - providing knowledge about local communities in the curriculum.
   - seeking additional budget for organizing field research projects to let students and teachers learn about local communities, as well as providing academic services in the area which they are capable of doing.
   - providing academic forum for teachers and students to develop their continuing learning.

3. Set up and develop learning network by:
   - developing and building up master teachers and set up a learning network system, so that knowledge and expertise can be passed on to teachers in the same subject areas intensively and continuously.
   - searching for local expertise to provide resources for teachers and students.
   - setting up groups or organizations to be responsible for studying and developing learning networks which are should always be updated.
4. Promote the teaching staffs of teacher education institutions to gain more knowledge and experiences by:

- providing mechanism and incentive for teaching staffs to go out and teach or do research in primary, secondary of different kinds of school to obtain new experiences appropriate for modifying teaching techniques which will reflect the solutions of the present problems
- setting up exchanging program between teaching staffs and teachers in schools at different levels to share experiences.

5. Improve evaluation methods emphasizing on analytical abilities, including the ability to synthesize and organize information, rather than abilities to pass content-oriented achievement tests.

The office of the National Education Commission, 1993 (p.18)

A question that emerges at this point in the debate is whether or not the current curriculum at the Faculty of Education, Khon Kaen University, has capacity and resources for educating this kind of teacher. How much we can do with the new curriculum to support this kind of teacher production, especially, the revision of computer curriculum structure for student teachers. Some new computer courses that are relevant for teachers’ work, such as computer and educational administration, information technology application in classroom and school, and other courses focusing on computer use in educational settings, should be included in the curriculum.

*Computer laboratory rearrangement*

In 1996 there was only one computer laboratory with twenty PCs at the Faculty of Education, Khon Kaen University. All computers connected to the network LAN and KKU-Net. Students could gain access to the KKU-Net and Internet if they had communication software and a WWW browser installed on the machines. Unfortunately, not all machines had hard disks so the necessary software such as Microsoft Office, Netscape browser, and other communication software could not available for students. The hard disk should be installed in all machines and all
necessary software mentioned above should be installed on the machine to support all computer courses.

Thailand is evolving economic systems based on information and knowledge as primary ingredients. But there are other dimensions. Society as a whole is extending and deepening its knowledge base in all fields of life. Improving learning outcomes for all are not only desirable, they are a necessary. To achieve improved learning outcomes we need to develop an education and training system dedicated to the notion of people learning how to learn across the life span. An objective of teacher education must be to produce a teachers as self-directed, lifelong learners. Such development empowers teachers with significant and continuous choices. To make this happen we must have a range of opportunities for student teachers to acquire the skills to pursue lifelong learning through the information technology.
REFERENCES


Appendix A
Questionnaires
Faculty of Education, Deakin University Burwood Campus,  
221 Burwood Highway, Burwood, Victoria 3125  

11 October 1996  

Dear Student,  

My name is Asst. Prof. Paisan Suwanno from Khon Kaen University, Thailand. I am studying for Doctor of Education at Deakin University. One of my interests is Computer Education Curriculum for Teacher Students: Theory and Practice. My research questions are:  

- What is the typical course structure of Bachelor of Education at DU?  
- How do the course team/unit chair manage the computer education curriculum?  
- What are the students' and course team's perceptions about Computer Education Curriculum for teacher students: course description vs practice?  
- What are the advantages and disadvantages of the computer education curriculum for teacher students?  
- What does the Faculty of Education KKU learn about computer education curriculum from DU-Burwood Campus?  

It will be very helpful, if you could give me an opportunity for collecting the data through email about unit EME445 Computer Applications 1. The following questions are a rough idea about what I would like you to answer.  

After enrolling in unit EME445 Computer Applications 1:  
1. Could you please compare the unit activities to its description. Are you satisfy with the unit activities? Why? Would you like to include other activities or topics?  
2. What are the advantages and disadvantages of this unit to your study?  
3. Is this unit help you to prepare for your future work? How?  
4. Other opinions and suggestions for this unit?  

Would you please send your answer to me at: suwanno@deakin.edu.au  

Best Regards,  

Paisan Suwanno  
Office Room N107 Tel : 9244 6437 Fax : 9244 6752  
E-mail : suwanno@deakin.edu.au
Faculty of Education, Deakin University Burwood Campus,
221 Burwood Highway, Burwood, Victoria 3125

11 October 1996

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- What is the typical course structure of Bachelor of Education at DU?
- How do the course team/unit chair manage the computer education curriculum?
- What are the students’ and course team’s perceptions about Computer Education Curriculum for teacher students: course description vs practice?
- What are the advantages and disadvantages of the computer education curriculum for teacher students?
- What does the Faculty of Education KKU learn about computer education curriculum from DU-Burwood Campus?

It will be very helpful, if you could give me an opportunity for collecting the data through email about unit EME452 Computer Applications 2. The following questions are a rough idea about what I would like you to answer.

After enrolling in unit EME452 Computer Applications 2:

1. Could you please compare the unit activities to its description. Are you satisfy with the unit activities? Why?
   - Would you like to include other activities or topics?
2. What are the advantages and disadvantages of this unit to your study?
3. Is this unit help you to prepare for your future work? How?
4. Other opinions and suggestions for this unit?

Would you please send your answer to me at: suwannoi@deakin.edu.au

Thank you for your time and providing the valuable information.

Best Regards,

Paisan Suwannoi

Office Room N107  Tel : 9244 6437  Fax : 9244 6752
E-mail : suwannoi@deakin.edu.au
Faculty of Education, Deakin University Burwood Campus,  
221 Burwood Highway, Burwood, Victoria 3125  

11 October 1996  

Dear (Lecturer's name)  

My name is Asst. Prof. Paisan Suwanno from Khon Kaen University, Thailand. I am studying for Doctor of Education at Deakin University. One of my interests is Computer Education Curriculum for Teacher Students: Theory and Practice. My research questions are:  

- What is the typical course structure of Bachelor of Education at DU?  
- How do the course team/unit chair manage the computer education curriculum?  
- What are the students’ and course team’s perceptions about Computer Education Curriculum for teacher students: course description vs practice?  
- What are the advantages and disadvantages of the computer education curriculum for teacher students?  
- What does the Faculty of Education KKU learn about computer education curriculum from DU-Burwood Campus?  

It will be very helpful, if you could give me an opportunity for collecting the data through email about unit EME445 Computer Application 1 and EME452 Computer Applications 2.  

1. As an unit chair or unit team, how do you manage your unit in the following topics: unit descriptions, personnel management, unit materials, hardware, software, class activities, and others.  
2. Could you please compare your practice of your unit to its description in the last semester? Are you satisfied with your practice? Why?  
3. What are the advantages and disadvantages of your unit to your students?  
4. Other opinions and/or suggestions about computer education curriculum for teacher students at Burwood Campus  

Would you please send your answer to me at: suwanno@deakin.edu.au or let me come to see you to collect your answers.  

Thank you for your time and providing the valuable information.  

Best Regards,  

Paisan Suwanno  
Office Room N107 Tel: 9244 6437 Fax: 9244 6752
Appendix B
The Computer Education Units at Deakin University

Using computer applications

EAE463 Learning the New Technologies (X)
Whole year, 2 credit points
Note: Students who have completed ECT460, ECT341, SCP717 or SCP754 may not enroll in this unit.

Content
The unit is an introduction to the culture of educational computing and related technologies in education. It focuses on practical work in educational computing and cultural criticism, aiming to develop in students specific computer application skills and understandings, and an informed practical theory of the relationship between curriculum and computing. The unit focuses on word processing, Logo, and database software within a broad practical coverage of available resources in the educational computing field.

Note: Students enrolling in this unit will require access to a microcomputer and printer, as well as word processing, Logo and database software. Students should not attempt this unit unless they have at least one person locally available who can help them with the technical aspects of their microcomputer.

Assessment
Three major written assignments, equally weighted. Assignments will total a minimum of 4000 words or equivalent in each semester.

ETE406 Technology and Learning (B)
First or second semester, 1 credit point

Content
The unit will focus on practical strategies. It is designed to give teachers from various backgrounds and with a range of technical literacy further knowledge and skills in the use and selection of technology in workplace education programs. Participants will be
able to plan, implement and evaluate educational programs appropriate to the workplace using computers and related technologies, develop a level of computer literacy which will enable them to take advantage of emerging technologies in the workplace; use the computer to store, analyse and present data; use computer technology to promote effective communications and use computers to write individualised learning programs.

Assessment
Survey of workplace and analysis 30%, hands-on-projects based on the content area selected 50%, report on technology and learning in a particular workplace context 20%. Assessment will total a minimum of 3000 words or equivalent.

ETE426 Project in the Application of Computers (X)
First or second semester, 1 credit point
Prerequisite: EME443 or equivalent.

Content
This unit is designed to enable students to acquire independently and at their own level, further skills with computers in areas of particular personal interests.
In the past students have undertaken the following kinds of projects:
1. developed skills in the use of software, equipment, word-processing packages, databases, graphics and other educational applications;
2. developed curriculum support materials;
3. devised computer-based classroom and school materials; and
4. learned and applied computer-based administrative systems to the school setting.
Topics for study are negotiated directly with the lecturer.

Assessment
Satisfactory completion of a project equivalent to 5000 words negotiated between lecturer and student 100%.
EME445 Computer Applications 1 (B)
First or second semester, 1 credit point

Content
The unit will include the development of skills with the use of word processing and graphics applications for the presentation of educational documents. During the unit, students will be encouraged to develop keyboarding skills. Capabilities with a desktop publishing application will be developed, sufficient to create short reports, newsletters and student newspapers. The use of database and spreadsheet applications will be investigated for storing, organising, manipulating and maintaining information such as survey investigation data, student records, class lists and assessment records. Techniques for transferring information between computers and via modem with bulletin boards will be investigated.

Assessment
Five assignments, 20% each. Assignments will total approximately 5000 words or equivalent.

EME450 Information Management (B)
First or second semester, 1 credit point
Prerequisite: EME445

Content
To provide a context for the information revolution and the nature of information as a resource, the history of computing and the changing patterns of access to information will be considered. While a variety of information storage methods will be discussed emphasis will be placed on the development of spreadsheet models, the entity-relationship modeling of data and the expression of database queries. Associated topics such as data collection, validation techniques and the interpretation of results will be considered in conjunction with the techniques.
Assessment
Three equally weighted assignments. Assignments will total 5000–6000 words or equivalent.

*Computer implementation in Education*

**EME212 Post-primary Curriculum Study A Teaching Science and Technology (B)**
First semester, 1 credit point
Prerequisite: EME213

Content
The unit will examine issues and practices related to the teaching of science and technology in the post-primary school. State and national curriculum initiatives will be addressed in terms of their meaning at the classroom level. The unit will focus upon the development and school-based trialing of practical student activities.

Assessment
Three minor assignment tasks each worth 10%, one major project 70%. Assessment will total a minimum of 4000 words or equivalent.

**EME220 Teaching Technology in Schools (B)**
First semester, 1 credit point

Content
The topics to be addressed in this unit include:
1 technology as an area of learning;
2 the nature of 'technology' in different contexts in education;
3 local, national and international technology guidelines and curricula;
4 developing appropriate pedagogies;
5 ethical and equity issues; and
6 developing curriculum resources.
Assessment

Two assignments, each 50%, equivalent to about 2000 words each:

a. Critical analysis of an issue about 'Technology in Education'; and
b. Curriculum development task.

**EME230 Teaching with Computers (X)**

First semester, 1 credit point

Incompatible with: EME207 or EME208

**Content**

The topics addressed in this unit include:

1. the impact of converging technologies on classroom practice;
2. the development of personal informatics competencies with a range of software;
3. the methodology of software evaluation; and
4. the use of informatics in the curriculum.

**Assessment**

Two assignments, each 50%, equivalent to about 2000 words each:

a. development of a personal competencies portfolio;

b. curriculum development task.

*Note: Off-campus students must have access to Deakin Interchange using Deakin's remote access software.*

**EME303 Students, Learning and Computers (B)**

Second semester, 1 credit point

**Content**

The topics to be addressed in this unit include:

1. an examination of the ways in which computers are used in schools;
2. models of teaching and learning with computers;
3. developing appropriate pedagogies; and
4 issues in studying and evaluating computer-based learning.

Assessment
One assignment equivalent to about 3500 words—a case study of student learning with computers.

**ETE422 Computers and Junior Primary Children (B)**
First or second semester, 1 credit point

Content
Concerns and issues relating to the use of computers by young children will be addressed. Teachers examine computer software for its consistency with learning theory and explore ways in which the use of the computer may provide unique learning experiences and opportunities for young children's cognitive, physical, social and emotional development in a technological age.

Assessment
One major practical task consisting of analysis and application of selected software 50%, preparation and presentation of 'off computer' material to enhance the use of computers in the classroom 25%, compilation of a compendium of relevant literature and review 25%. Assessment will total a minimum of 4000 words or equivalent.

**ETE405 Computers in the Primary Curriculum (B)**
First or second semester, 1 credit point
Prerequisite: EME443 or equivalent

Content
A unit for teachers interested in integrating computers into their classroom curriculum. Students will explore ways in which computers can be used in the process of learning and teaching to enhance current practice in the curriculum and explore new areas of applications. Students will observe children interacting with computers and will develop and share curriculum resources.
A part of each session will be devoted to hands-on computer applications.

Assessment
Report on observations of children with computers 40%, curriculum project 60%. Assessment will total a minimum of 4000 words or equivalent.

Preliminary reading

ETE422 Computers and Junior Primary Children (B)
First or second semester, 1 credit point

Content
Concerns and issues relating to the use of computers by young children will be addressed. Teachers examine computer software for its consistency with learning theory and explore ways in which the use of the computer may provide unique learning experiences and opportunities for young children's cognitive, physical, social and emotional development in a technological age.

Assessment
One major practical task consisting of analysis and application of selected software 50%, preparation and presentation of 'off computer' material to enhance the use of computers in the classroom 25%, compilation of a compendium of relevant literature and review 25%. Assessment will total a minimum of 4000 words or equivalent.

EME411 Computers in Science and Science Education (X)
Second semester in alternate years 1997, 1999, 1 credit point

Note: Saturday workshops are offered on the Burwood campus in support of this unit. Students unable to attend these will be offered teletutorial support.
Content
The unit analyses the way in which computers are now used by scientists and how these applications can be integrated within primary science education. Candidates are introduced to some of the most recent applications of computer use available to schools, for example, interactive video disc, CD-ROM and computer-controlled systems, such as Lego, TC, Logo.
A wide range of software suitable for science education is reviewed and strategies for encouraging learning with computers are examined.

Assessment
Two 2000 word assignments 50% each.

EME443 Computers in Education (B)
First or second semester, 1 credit point

Content
The unit will focus on the day-to-day use, management and trouble-shooting with computers and routine peripherals in an educational setting. Computer packages from a range of curricular areas and levels will be examined including an analysis of those characteristics relevant in any prediction of their likely effectiveness as a learning package. Evaluation of packages will be considered in a context of learning theory and instructional design and administrative requirements of various classroom and school structures.

Assessment
Four assignments 25% each. Assignments will total approximately 5000 words or equivalent.

EME446 Internet and Curriculum (B)
Second semester, 1 credit point
Prerequisite: EME440, EME443 or equivalent
Content
The unit offers students the opportunity to explore some of the many applications of computer technology within society and the role of technology within the Curriculum. The activities provide a focus for discussion of appropriate strategies to teach with internet technology including other issues related to the use of technology within education, for example, multimedia and global learning, are also examined.

Assessment
Two assignments, 50% each. Assignments will total approximately 5000 words or equivalent.

EME449 Computers and Educational Administration (B)
First or second semester, 1 credit point
Prerequisite: EME445

Content
The unit will focus on the use of computers in an organisational and administrative context in schools. Comparisons will be drawn with models of use in other organisations. The issues covered will include ways of enhancing staff productivity and efficiency, legal requirements, ethical access to privileged data and the management of administrative computer systems. These issues will be raised in the context of the student's own institution.

Assessment
Two assignments, 50% each. Assignments will total approximately 5000 words or equivalent.
**EME451 Project in Computer Education (B)**
First or second semester, 1 credit point

Content
This elective unit will normally be undertaken in the final semester of the course and will allow students to demonstrate an application of skills and understandings obtained in compulsory and elective studies earlier in the course. Students will work individually under the direction of a staff adviser and focus their project on one of the following: the production of educational software; the production of curriculum materials utilising available software; an evaluation of classroom effectiveness of available software; an investigation of the effectiveness of some aspect of computer-based education; an investigation of some aspect of the administrative use of computers in schools; an investigation of current issues in the teaching of information technology; or any other project acceptable to the supervisor and the course coordinator.

Assessment
A 5000-word submission or agreed equivalent 100%.

**EME452 Computer Applications 2 (B)**
First or second semester, 1 credit point
Prerequisite: EME445

Content
The unit has its foundations in the unit EME445 and will extend some of the topics in that unit. In particular, the topics communications and desktop publishing will be pursued to an advanced level with an emphasis on their use in educational contexts. As an example of an alternative method of accessing information, and one that is expected to have an evolving educational application, expert systems will be introduced.

Assessment
Three equally weighted assignments. Assignments will total 5000–6000 words or equivalent.
EME454 Recent Developments (B)
First or second semester, 1 credit point
Prerequisites: EME443 and EME445

Content
This unit will focus on newly emerging technologies in the development of computer based curriculum materials using a variety of pedagogical models. Theoretical perspectives and issues drawn from the literature will be used to develop a conceptual framework with which to study the place of these technologies in education. Detailed content will change annually as new developments appear. Potential impacts including effects on classroom practice and curriculum will be examined from both educational and technological perspectives. There will be a focus on developing practical skills wherever possible.

Assessment
Two assignments, 50% each. Assignments will total approximately 5000 words or equivalent.

EME645 Teaching VCE Information Technology (B)
First or second semester, 1 credit point
Prerequisites: EME443 and EME445

Content
The unit is provided in response to the demand from secondary teachers for specialist studies in the area of senior information technology curriculum and pedagogy. Students will examine the teaching of information technology in post-primary schools: the nature of technology education in general; the place of information technology within technology education (Victorian and National curricula); modes of computer use in schools; the role of information technology in integrated curriculum projects; the development of curriculum materials; development of hardware and software skills appropriate for secondary school students; management issues.
Assessment
Two assignments, 50% each. Assignments will total approximately 5000 words or equivalent.

**EME646 Computers, Students and Theories of Learning (B)**
First or second semester, 1 credit point
Prerequisites: EME443 and EME445

Content
Students will develop detailed understandings of the ways in which computers can be used as tools for studying the conceptual development and thinking processes of learners and how such use relates to the psychological understandings of human cognition.

The unit will be activity-based, involving software development and may include periods of field work in schools in conjunction with the lecture program. A comparison of relevant psychological developmental models will be included, for example Piagetian and post-Piagetian constructivism, diSessa's aggregation model, Lawler's microviews and Papert's constructionism, in the context of case studies of computer based learning. Assumptions about the nature and models of cognition will be explored with software such as Boxer, SemNet and MicroWorldsTM.

Assessment
Three assignments of equal weighting. Assignments will total 5000–6000 words or equivalent.

**AAC465 Computers in Music (B)**
Second semester, 1 credit point
Prerequisite: Computer literacy using the Macintosh platform.
Note: This unit is available to students enrolled in the Bachelor of Education (Primary) (Fourth Year), and to any fourth year student subject to approval of the Unit chair.
Content

This unit provide students with an introduction to the use of computers in music, particularly with a macintosh platform. Students will explore the processes of digital sound recording using a computer-based sequencer and sound module, together with aspects of computer music notation. The basic principles of arranging and composing will be also addresses, as well as issues concerning music computing and its use in music teaching and learning.

Assessment

Workshop journal, 10 %; five recording and notation assignments, 50 %; essay, 2000 words, 40 %.

Educational software development

EME644 Hypermedia and Authoring (B)

First or second semester in alternate years 1998, 2000, 1 credit point

Prerequisite: EME445

Content

The unit develops skill in using packages and programs for creating educational software, educational material and Hypermedia.

Students will engage in more advanced principles of design and programming in Electronic Publishing, Authoring software and languages, and Hypermedia. They will use computer-based technology to link informatics, telematics, audio and video and develop Hypermedia software, educational software and Electronically Published material across a range of curriculum topics, school levels and non-educational settings.

Assessment

Four assignments, 25% each. Assignments will total approximately 5000 words or equivalent.
EME6—Multimedia and Its Applications in Education (B)
First or second semester, 1 credit point

Content
The unit introduces the conceptual framework of instructional multimedia. This framework focuses on the synthesis and assembly of multimedia elements and media resources to create a multimedia product for an instructional purpose. The content of the product will be decided after discussions between students and lecturer. The course will be taught on a Macintosh platform and familiarity with its basic features and functions will be assumed. Students will use Macintosh application programs to systematically create an instructional multimedia product for teaching and learning purposes. They will also be exposed to the technical, design and development perspectives of multimedia creation.

Assessment
Students will be assessed using the following criteria: proposal and storyboard sheets 20%, final multimedia project 50%, and presentation 30%.

Communication software

EAE308 Education Elective: Global Networks and Education (B,R)
Second semester, 1 credit point
Prerequisites: Education studies major, four core post-primary curriculum studies units.

Content
The unit provide student teachers with a systematic study of the educational practices that now abound on the Internet. Locating these educational developments in the classroom will be the means by which the intersection of ‘virtual’ and ‘real’ classrooms are studied. An important focus of this unit is to gain practical experience of global networks and develop some understandings of the world they have shaped. The unit will comprise workshops and field work in schools developing the use of appropriate network navigation tools.
Assessment

Assignment task A 30%, task B 70%. Assignment will total a minimum of 4000 words or equivalent.

**EAE464 Curriculum and the New Information Media (X)**

Whole year, 2 credit points

Note: Students who have completed ECT461/462 may not enrol in EAE464

Content

The unit investigates the curriculum implications of two significant changes in which the new information technologies are implicated: the emergence of new information media deriving from the coalescence of computing, publishing and broadcasting; and the growth in global computer and communications networks. The unit is based upon a study of local computing practices and curriculum in schools and their connection with social, cultural and economic changes that are underpinned by the new information media and global computer networks. It is designed to cater for students with broad curriculum and learning interests as well as for students with particular interests in computing.

Assessment

Written assignments 100%. Assignments will total a minimum of 4000 words or equivalent in each semester.

**Programming**

**EME440 Introduction to Programming (B)**

First or second semester, 1 credit point

Content

The unit will allow students to apply programming principles fundamental to problem solving with a computing system. Design of algorithms and the production of structurally sound and well documented programs will be emphasised. Introductory programming experiences will be based on Logo language as it embodies the concepts
of structured programming and is appropriate for later use with children. Content will include top down program design, editing and debugging, use of variables in graphics, size and counters, and recursion techniques. Dialects of Logo such as Logowriter will be introduced.

Assessment
Four assignments, 25% each. Assignments will total approximately 5000 words or equivalent.

EME447 Programming Logo and Logowriter (B)
First or second semester, 1 credit point
Prerequisite: EME440

Content
This unit will investigate Logo applications such as list processing, music, multiple turtles and animation. Curriculum units featuring Logo-based microworlds will be developed for demonstrations, simulations, databases and tutorials. Advanced file handling, the mathematical functions of Logo and the capabilities of various dialects, such as Logowriter, will be explored.

Assessment
Four assignments, 25% each. Assignments will total approximately 5000 words or equivalent.

EME448 Programming BASIC (B)
First or second semester, 1 credit point

Content
Students will become familiar with a variety of programming techniques and will be able to identify situations for their application.

The development of algorithms and the design of modules will be illustrated in the BASIC visual basic language and all programs will be accompanied by documentation prepared to a defined standard. Problems from an educational context will be
presented for computer solution and will illustrate some of the types of problem that are amenable to solution by computer.

Assessment
Three equally weighted assignments. Assignments will total approximately 5000 words or equivalent.

EME455 Programming PASCAL (B)
First or second semester, 1 credit point

Content
The unit will focus on the use of the PASCAL programming language as a tool for teaching structured programming and problem-solving techniques in secondary schools.

Comparisons will be drawn with the Logo language. Students will explore data structures and techniques which are not available in Logo. The content will include text processing, graphic programming and file handling techniques. Students may elect to work independently on individual projects or to participate in a formal instructional program.

Assessment
Two assignments, 50% each. Assignments will total approximately 5000 words or equivalent.
Appendix C

Hardware and Software at
Burwood Computer Laboratories

Building M204 Lab

Computers:
There are 17 Networked PowerMac 6200's, all with CD-ROM Drives

Software: Macintosh
- MS Office 4.3
- Interchange
- Adobe PageMaker v5
- Adobe Photoshop v3.0
- Ahlan Wa Sahlan
- Chipmonk Basic
- Claris Home Page
- ClarisWorks v3
- Cubase Lite
- Cyberdog
- Director 4.0.4
- FileMaker Pro 2.1
- Finale 3.2
- GNUnpress
- Hyper v3.2
- LWprim
- Mavis Beacon 2.0
- MicroWorlds Project Builder
- Palace
Building M210 Lab

Computers:
There are 19 Networked 486 IBMs, some with Double Speed CD-ROM Drives, some with 5.25" FDD as well as 3.5" FDD.

Software: IBM
- MS-DOS v6.22
- Windows For Workgroups 3.11
- MS Office 4.3
- Interchange
- MS Visual Basic v3
- SPSS Release 6.0.0
- GNNPress - HTML authoring tool
- Vet 9.1
- Pace2000
- Attache v5
- Taxation software
- General Ledger 1.6
- Sybiz Elite Two
- Consolidation Accounting Program
- Exsys Professional Design Demo software
- Biology software


Building M211 Lab

Computers:
There are 8 Networked 486 IBMs, some with Double Speed CD-ROM Drives, some with 5.25" FDD as well as 3.5" FDD and 6 Networked PowerMac 6200's, all with CD-ROM Drives.
Software: IBM
- MS-DOS v6.22
- Windows For Workgroups 3.11
- MS Office 4.3
- Interchange
- MS Visual Basic v3
- SPSS Release 6.0.0
- GNNPress - HTML authoring tool
- Vet 9.1
- Pace2000
- Attache v5
- Taxation software
- General Ledger 1.6
- Sybiz Elite Two
- Consolidation Accounting Program
- Exsys Professional Design Demo software
- Biology software

Software: Macintosh
- MS Office 4.3
- Interchange
- Adobe PageMaker v5
- Adobe Photoshop v3.0
- Ahlan Wa Sahlan
- Chipmonk Basic
- Claris Home Page
- ClarisWorks v3
- Cubase Lite
- Cyberdog
- Director 4.0.4
- FileMaker Pro 2.1
• Finale 3.2
• GNNpress
• Hyper v3.2
• LWprim
• Mavis Beacon 2.0
• MicroWorlds Project Builder
• Palace

**Printing:** Located in Room M210 Apple Laser Writer on CopyTex and Free Dot Matrix printer.

**Building M216 Lab**

**Computers:**
There are 19 Networked PowerMac 6200's, all with CD-ROM Drives.

**Software:** Macintosh
• MS Office 4.3
• Interchange
• Adobe PageMaker v5
• Adobe Photoshop v3.0
• Ahlan Wa Sahlan
• Chipmonk Basic
• Claris Home Page
• ClarisWorks v3
• Cubase Lite
• Cyberdog
• Director 4.0.4
• FileMaker Pro 2.1
• Finale 3.2
• GNNpress
• Hyper v3.2
• LWprim
- Mavis Beacon 2.0
- MicroWorlds Project Builder
- Palace
Appendix D
References used in the unit

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TEACHERS’ PERCEPTIONS OF THE ACADEMIC LINK
PROJECT BETWEEN SCHOOLS AND UNIVERSITIES
FOR TEACHER PROFESSIONAL DEVELOPMENT

Paisan Suwanno

An Elective Research Paper submitted in fulfilment of
The requirements for the degree of Doctor of Education

Deakin University
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CHAPTER 1
THE STUDY AND ITS APPROACH

1.1 Introduction

The current education reform in Thailand was launched in 1996. Its existing operational approaches are being revised and amended with the view to mitigating or eliminating problems and enhancing the quality of education to reach the educational excellence in the year 2007 (Ministry of Education, 1996). The goal of education reform is to realize the potential of Thai people to develop themselves for a better quality of life and to develop the nation for peaceful co-existence in the world community.

Its objectives are to create learning individuals, organizations and society. An educated person who achieves an authentic learning outcome should possess the following abilities and characteristics which are based on Thai cultural heritage and appropriate level of education: good physical and mental health, critical thinking, intellectual inquisitiveness, professionalism, a sense of responsibility, honesty, self-sacrifice, perseverance, team spirit, adherence to democracy, and love for king, country and religion (Ministry of Education, 1996, p3).

The education reforms are being conducted in four areas: school reform, teacher reform, curriculum reform, and administrative reform. For the teacher reform, the production, recruitment and development of teachers are reformed urgently and comprehensively both in public and private schools. Educational administrators and personnel are developed continuously by:

1. Building awareness and professionalism in teachers, school administrators and personnel.

2. Emphasizing performance efficiency with authentic learning outcomes in evaluating teachers for their promotion and development of teaching/learning activities.
3. Providing training and skills development opportunities to every teacher continuously and comprehensively with the view to keeping them abreast with social and technological changes. A teacher should undergo some form of training at least once every two years. The training could be given by the Ministry of Education, and/or departments concerned, and training institutions, both public and private which are accredited, as well as by means of distance training. Participation in conferences, seminars and every form of self-development must be regarded as teachers' duties, to be assessed as part of their performance.

4. Encouraging teachers to choose or develop lesson plans that suit learners and enable them to create and develop their learning in a truly life-long fashion.

5. Allowing teachers under the jurisdiction of the Ministry of Education to teach with extra remuneration in more than a single educational institution belonging to their own department or to others. This extra teaching will be subject to their superior's consent and to be considered part of their performance. Recruitment of new teachers must take into account their past experience in salary determination.

6. Creating job descriptions and opportunities for local intellectual leaders, teachers/experts from the private and public sectors, as well as retired officials, to teach with appropriate remuneration in educational institutions under the Ministry of Education.

7. Addressing the problem of teacher shortage by recruiting and appointing teachers to fill every available post as specified in the work-force plan of each educational institution which should be responsible for its own selection procedures and appointment of teachers according to ministerial rules and conditions, and should refrain from appointing teachers from private schools during an academic year. Teachers who give instruction in subjects that lack qualified teachers will be given extra remuneration. Post-secondary institutions which are prepared to offer
these much-in-demand subjects will be encouraged to extend to Bachelor's degree level.

8. Restructuring the job description of teachers in Ministry of Education schools and educational institutions in order to separate the career ladder of teachers from that of administrators under a clearly specified career pattern of each category. However, teachers must be able to advance up the career ladder though their own performances and achievements as teachers. Both teachers and administrators will be provided with manuals for their professional practices.

9. Standardising the teaching profession through the efforts of the Teacher Institute, the Teacher Civil service Commission and teacher-training institutions. relevant legislation will be amended while the teaching profession will be developed through the issuance of teachers' license.

10. Reforming the welfare and social securities for teachers of all types and jurisdictions with the view to raising their quality of life, boosting their morale and strengthening their job security. Teachers' salary structure and welfare benefits will be improved, while teachers working in remote and underserved areas and those who take on an extra number of classes will be promoted and supported.

11. Developing the selection system and admission mechanism of students to teacher-training institutions as well as developing the curriculum and teaching/learning process for teacher production, including teachers who can teach several subjects and those who teach major subjects with emphasis on practical aspects. The final product of teacher-training will be a teacher of moral integrity who is equipped with analytic and synthetic skills and abilities.

12. Stepping up the development of educational administrators by broadening their horizon, increasing their knowledge, their administrative and managerial skills, thus enabling them to develop quality schools and educational institutions in keeping with future changes.
13. Encouraging team work among supervisors of all agencies who should join forces in supervising and monitoring academic and technical activities of educational institutions under every agency (Ministry of Education, 1996).

According to the goal and objectives of education reform as mentioned above and experiences in working with school teachers for about five years the researcher believed that the Faculty of Education, Khon Kaen University could help them achieve the goal and objectives of the education reform by collaboratively working with them. Especially the academic link projects, collaborative activities that focus on teachers' skills and educational development, between schools and the Faculty of Education should be established in the form of partnership. But there is very little basic information about teachers' perceptions of the schools and university partnership as it is necessary for establishing the appropriate linkage project. The researcher try to work for gathering more information on this issue.

There are also the pressing needs which arise from the problems confronting Thai public schools, especially in the provincial areas. If public education is indeed in academic and economic crisis, then one might expect that universities, as centers of research and advanced learning, would be both a logical and appropriate resource for assistance. To the extent that this is not occurring in Khon Kaen, the Khon Kaen University faculties must also ask themselves why.

1.2 Purpose of the Study

The researcher has taken both quantitative and qualitative approaches to this study. Simply stated, this means that the researcher was not only interested in how many teachers have the same perceptions about school and university partnership for professional development but also in what they are thinking about in order to gather the information for future planing and developing the academic link project successfully. For this reason the researcher has given a lot of attention to discussion with teachers as well as using the questionnaire for collecting the related data.
The purpose of this study then, is to create a base of descriptive information about the perspectives of school teachers toward academic link projects between schools and universities partnership which can assist in its establishment. The researcher was aware that this type of project had rarely occurred in Thailand and school teachers have had very little experience with it.

In this report, the researcher's intention is to present the information about teachers' perceptions of the academic link between schools and universities partnership for professional development. The findings enable the researcher further work on the school-based professional development project in partnership with Faculty of Education, Khon Kaen University. The researcher would like to examine more closely in the following questions:

(1) What are the teachers' perceptions on the formats of the academic link project between schools and universities for professional development?
(2) What formats of the academic link project activities do teachers need?
(3) What types of the academic link project activities do teachers need for their professional development?
(4) In what ways may the partnership establish the foundations for a systematic partnership between practicing teachers and university faculty that support the school reform?

1.3 Approach to and Conduct of the Study

The researcher's task has been to gather the teachers' perceptions of the academic link project in order to establish and develop an appropriate school-university partnership. This is a qualitative and quantitative study. The researcher hopes it will enable teachers to think about and share their experiences in the academic link project to reflect on what may need further establishing and development.

In order to accomplish the purpose of the study, a questionnaire was constructed to collect data. The questionnaire was administered to school teachers. Five hundred and thirty school teachers were randomly selected from schools in the educational region 9, comprised of six provinces: Sakolnakorn, Udornthani, Nongkhai, Khon Kaen,
Loei, and Nhongbualampoo. The semi-structured interviews were conducted with five school principals and ten school teachers from five secondary schools in Khon Kaen in order to get a picture of how the academic link project fits into the goal of school reform.
CHAPTER 2
THE LINK PROJECTS BETWEEN SCHOOLS AND UNIVERSITIES

This chapter describes current thinking and practice about the link projects between schools and universities. It is rather a pointer to conceptual overviews and cases which assists the researcher forms the conceptual framework of the study. Many link projects were reviewed to gather the information from their practices in relation to professional development.

2.1 The Current Thinking and Practice

According to a worldwide survey, at least 1,200 partnerships have been established between schools and universities (Wilbur & Lambert, 1990). The goals of partnership are (1) staff development about educational technology, (2) staff development with distance education technology, (3) research on education, and (4) development of new educational technologies. For example, Balajthy (1991) used a model of consultative consultation in which a team made up of a consultant from the college, a classroom teacher, and several student teachers worked together to create and implement lessons using technology. Byrne, Hittleman, and Marchisotio (1989) designed a voluntary staff development experience in which classroom teachers learned to use telecommunications as a vehicle for student writing. Roseman and Brearton (1989) trained teachers in basic computer use for science education, and then trained a core subset of the original group as trainers and change agents at their school sites.

Collaborative staff development has also been carried out with distance education technology as the medium of delivery, rather than as the content. Pitcher, Rule, and Stowitchschek (1986) used two-way audio and video to consult with and train teachers at distant sites on several special education topics. Similarly, Knapczyk (1991) used an audiographic system and fax machines to deliver special education training.

Several partnerships have been established to collaborate on research. These partnerships go beyond the more common arrangement of schools simply granting
permission for university researchers to study their classrooms. Instead, an effort is made to jointly establish the goal of the research to the benefit of both sides.

Typically, school sites provide input into the design process by articulating their needs, testing prototypes, and giving formative feedback of the partnership projects. Manatt (1991) describes the creation of a computer-based management system to implement the school improvement model. Burger and Stevenson-Burger (1989) built a computerized management tool for schools, while another project (Ritchie & Dodge, 1992) developed a tool for student-authored adventure games. The benefit to the school partner in these examples was the possibility of having software customized to their needs. To the university partner, having a field-based source of ideas and evaluation is what made the collaboration work.

An important network of school-university partnerships in United States of America is the Christopher Columbus Consortium established by Apple Computer in 1989. Each of the over 40 consortium sites represents a partnership between a university and one or more schools. With Apple serving as the catalyst with an equipment donation, the partnerships each undertook projects intended to improve education at the school site (Ritchie and Dodge, 1992; Balajthy, 1991).

The press for the professionalization of teachers is based on the assertion that a strengthened profession will more effectively meet students' needs and improve the overall quality of education. Three school-university partnerships included the Learning Consortium at the university of Toronto, the Southern Maine Partnership and the University of Southern Maine's Extended Teacher Education Program, and the Benedum Project at West Virginia University, which all undertook comprehensive reform initiatives with focus on preservice training, inservice training, and working conditions (Swanson, J., 1995). They believed that systematic reform in the professionalism of educators is one of the important factors in achieving the goal of education reform. And this could be done through the school-university partnerships. A group of university personnel and public school superintendents in Kansas (Bailey, 1988) also believe it is time to reexamine the role and function of existing partnerships to increase the quality of education. Public schools and universities are
more influential and effective when working as partners rather than as independent agencies (Bailey, 1988).

Wiseman and Cooner (1996) discussed the basic tension between theory and practice of school-university partnership. The result was a collaboratively delivered methods course that became the foundation for a complex school-university relationship. The partnership changed the school, provided meaningful inservice for practicing teachers, and impacted on university teacher preparation.

Hutchison and others (1994) describe the status of school-university collaborative efforts in Mississippi. Many school-university partnerships are classified into 15 categories: inservice education/faculty development/academic alliances; programs offering college-level instruction to precollege students; services for minority, disadvantaged, and at-risk students; gifted and talented; preservice/training new teachers; articulation; curriculum development; research on teaching and learning; programs for administrators; adopt-a-school; consortia; coordination of collaborative activities; national writing project; tutoring programs; and miscellaneous. They conclude that the programs stand as testimony of the fact that gulfs can be bridged when educators from schools and colleges regard one another as equal partners having overlapping missions. The participants have to emphasize the importance of communicating the existence of the projects and their success.

The Faculty of Education, Khon Kaen University is at a point in time when important decisions should be made about the nature and extent of its relationship with public schools in relating to teacher education. Presently, and for many years, Faculty of Education personnel have seen the public schools as little more than places for student teachers to practice newly learned skills. Public schools-university relationships must be assessed and improved so that the two are equal partners in the process of preparing educators and renewing schools. Reforms proposed by the recent education reports for either the public schools or for teacher education programs will be of limited value and effect without fundamental changes in public school-university relationships (Smith, 1986).
2.2 Professional Development through the school-university partnerships

Actually, the reasons for establishing school-university partnership might seem obvious in Australia, the United States of America, and the other European countries but there are relatively few examples in Asia (Wilbur & Lambert, 1990). Schools provide universities with some of their students, and universities prepare and train the majority of future teachers. Both institutions are devoted to the pursuit of learning and intellectual development, and both play a major role in socializing and preparing youth for future roles in society. Obviously, the successful partnerships between schools and universities aimed at mutual development and improvement is very useful for national education development.

While some real differences of opinion exist regarding the governance of teacher education, many new organizational patterns including new and more sophisticated patterns of school-university partnerships are appearing on the professional scene. Teacher empowerment and participation is essential for successful reform of education. Many school-university partnership projects are providing staff development activities both for school teachers and university faculties. For example, Island University (New York) and a New York City school district (Friedman, 1987), the Iowa State University School Improvement Model (Manatt, 1989), the Johns Hopkins University and the Baltimore City Public Schools (Roseman and Brearton, 1989), and the Learning Technology Center at Texas A and M University and three K-12 Texas public school districts (Burger & Stevenson-Burger, 1989) are the school-university partnership projects in the last decade that both partners were satisfied with the outcomes. In addition, the projects provide the information about the activities characterizing the partners' relationship, project development program, collaboration results, and recommendations for ensuring successful future collaborations.

A study examined a new collaborative consultation process to enhance the classroom implementation of whole language science units that make use of computers and multimedia resources. Balajthy (1991) described on using a model of collaborative consultation, the team developed and taught science units that were based on whole language philosophy. The results indicated that the team approach, drawing upon the
expertise of the classroom teachers, the preservice teachers, and the college consultant, was highly successful, both in demonstrating new educational methods to experienced classroom teachers and in providing valuable field experience in these methods to preservice teachers. Another collaborative consultation project was a school-university partnership program between the University of Northern Iowa and Moline (Iowa) Public School District. Steele and Meredith (1993) write that the project called for a long-term collaborative effort in order to develop a complex and sophisticated level of university involvement with a single school district, which would allow for observation of successes and failures and provide opportunities for refinement of training efforts based on feedback. The project combined the prescriptive and catalytic models of organizational intervention, as teacher educators served as consultants to bring new information and strategies to the school teaching and administrative staff and as facilitators for staff-directed instructional, organizational, and curricular change. The project specifically sought to train faculty members in implementation of a language learning program based on a whole language philosophy.

One method of training principals and teachers to lead substantive change initiatives lies in partnership activities between schools and local university. Hackman and Schmitt (1995) describe the Collaborative School Improvement Program (C-SIP) which is a successful school-university partnership that focuses upon collaborative relationships between Eastern Michigan University and area schools to promote school improvement activities through building-level shared decision making. The C-SIP model offers a clearly delineated problem-solving approach that effectively combines theory, research, and practice. The individual school, the local school district, the intermediate school district, and Eastern Michigan University each assume important roles in ensuring the successful implementation of local projects. Faculty are recognized as equal shareholders in the change process, and administrative support is a prerequisite to a school’s acceptance as a project school. Eastern Michigan University provides financial and technical assistance to each project site, and a faculty member is assigned as a facilitator in assisting with change efforts.
An interesting school-university partnership in a rural context is the partnership between the College of Education of Ohio University and public schools in southeastern Ohio. Hillkirk and Others (1996) describe how the partnerships share at least six common threads: (1) a beginning in informal conversation; (2) a share set of goals; (3) an early focus on preservice teacher preparation; (4) a gradual expansion towards collaboration on professional development, proposal writing, and other common endeavors; (5) openness to creative and flexible rewards and incentives; (6) minimal up-front investment. The efforts include: the Teacher Education for Civic Responsibility (TECR) Program, now called the Creating Active and Reflective Educators (CARE) Program; a program that includes professional development for classroom teachers; proposal development; the Appalachian Distance Learning Project, a fiber optic network that links three third-grade classrooms with the College of Education; and teaching of college course work by classroom teachers and district administrators. This effort also includes year-long professional development workshops and preservice field experience. The partnership experiences have shown that: little initial financial support is required; beginning informally and small is best; and recognizing the diversity between university and public school cultures is necessary. Existing partnerships are being strengthened to enhance partnerships that center around student teaching and teacher induction, and teacher research is being supported in problems arising from teaching practice.

School-university partnerships' support for beginning teachers and social justice was another collaborative effort that educators researched for urban education development. Cantor (1998) summarizes a case study that examined the school-university relationship between UCLA’s newly-restructured teacher education program and a nearby school district. The program was designed to develop beginning teachers to become change agents within urban education. The study explored what happens after four beginning teachers learned critical, social reconstructivist theory and began to deal with the cognitive dissonance that often occurs when they have to react to policies and practices, and make sense of their real-life setting. Their stories indicate that it was better for them to begin their careers in school-university partnerships, which offered more support for theory and practice to intersect.
The Plains Elementary School and Ohio University Partnership Project began in 1991 as a collaborative effort between a public school and university to restructure the professional development of preservice teachers, elementary school staff, and College of Education faculty. Viechnicki and Others (1997) describe how each year a cohort group of approximately 25 Ohio University junior-level students spends an academic year at an elementary school at which the school's faculty and college teacher educators provide theoretical frameworks and instruction in teaching strategies that are implemented by preservice teachers in the classroom. Action research is used in the partnership to gather information about student and program performance through two strands in the Plains Project. In one strand, teachers working with the students seek ways to solve classroom problems, and in the other, a university professor attempts to link a curriculum foundations course with work in which preservice teachers are engaged. The project allows both classroom and preservice teachers to place the notion of action research into a realistic perspective and feel a sense of empowerment.

There is growing evidence that establishing school-university partnerships for the purpose of restructuring schools has impacts on teacher education, the elementary and secondary curriculum, and the knowledge base that undergirds the profession. Loving and Others (1997) summarize that the National Education Association (NEA) created the Teacher Education Initiative (TEI) to achieve comprehensive reform in education with a major focus on program curriculum evaluation and delivery aspects associated with the professional development of teachers in Professional Development Schools (PDS) where schools and universities cooperate for educational improvement. The overall partnership has had positive effects on all partner institutions. Although the partnerships for teacher education required great time commitments from all partners, the benefits to students outweighed the negatives.

A number of the school-university partnerships in Australia were initiated and ongoing developed through the Innovative Links Project. Yeatman and Sachs (1995) describe how the project was established as an operational project in 1994. It was then that schools were invited to express interest in participating in the project, a Roundtable nucleus or interim Roundtable steering committee was established to
select participating schools, schools were selected, and proceeded to come on board the Roundtable, and then proceeded to define more closely the program of research and action they wanted to follow. When the project has been developed and progressed. The project had entered its second year of funding, the National Executive was beginning to consider issues for the strategic development of the project into its third year funding (Yeatman and Sachs, 1995).

Yeatman and Sachs (1995) conclude that the Innovative Links approach is new and significant for the following reasons: teacher professional development has been designed and developed on a whole school basis in ways which break down traditional classroom isolation and network teachers into ongoing school-based learning communities and professional conversation; it has developed as a formal and explicit relationship the principle of partnership between practicing teachers and teacher educators in ways which are designed to foster the professional development of both of these partners; this is a formal partnership between participating schools and universities on a scale that is of system-wide impact and significance. It has considerable promise that goes beyond the specific nature of this project. At the beginning of the project 12 universities were referred to, involving 18 teacher educators across 5 states. The project was growth rapidly as they remark:

"As of the Innovative Links Project’s official progress report to Department of Employment, Education and Training (1995), the scale of the project had grown to include:

- universities (16 campuses) in all states and the Northern Territory -this being approximately one third of all Australian universities
- almost 100 schools
- 80 academic associates."

(Yeatman and Sachs, 1995, p.20).

At this point it was estimated that approximately 2000 professional development project since its beginning, involving around 1,700 teachers.
The original National Teaching and Learning Consortium proposal for the funding of the Innovative Links Project conceptualised partnerships between universities and school communities as a key component in establishing site-based teacher professional development initiatives. In the original proposal, the project was to be constructed upon the principle of partnerships of key players with interests in the improvement of the organisation of work practices and the development of teacher competence for the enhancement of student learning. These key partners include: (1) school communities concerned with restructuring and improving the organisational structures and practices on the basis of research, reflection and strategic action; (2) members of the academic community, particularly teacher educators, interested in exploring innovative partnerships with schools, experimenting with new forms of teacher education and professional development, and fostering teacher and school-based research; (3) representatives of teacher unions and employing bodies (Yeatman and Sachs, 1995).

Many schools in Victoria, Australia are developing approaches to identifying personnel management and curriculum leadership skills. For example teachers and principals in the northern suburbs of Melbourne and academic staff of Latrobe University developed the Dynamic Curriculum Leadership in Self-managing Schools course. The course has developed from a desire to explore and share skills needed in emerging self-management contexts for leading teacher positions (SCTP, 1996).

A trend which is becoming popular in parts of Australia is the concept of the “professional development school (PDS)”. Groups of student teachers and a university liaison person work in the school and provide the stimulus for teaching staff to develop reflective practice through a variety of mentor arrangements. The mentoring supervision role is itself a learning opportunity for the mentor. The requirements of the task lead to communicating one’s own skills to others, exploring new classroom learning settings, reflecting on one’s own practice and being challenged by different ways of doing things by the trainees. The Monash University Gippsland Campus School-based Primary Teacher Education Program is one such PDS task (SCTP, 1996). With the support of a liaison lecturer and teacher supervisor as mentors, groups of seven or eight final year trainee teachers spent two days a week in each of
four primary schools in South Gippsland, Victoria, immersed in the full school program as part of their course. The effect on the trainees is very important and the mentors also learnt from the experience. In 1995, Mount Waverley Secondary College was approached by Deakin University to pilot a new program in the teaching of business studies methodology to a group of trainee teachers. The program was designed to allow them to see the relevance of the methods and for a relationship to develop between Deakin University and the college (SCTP, 1996).

The curriculum and standards framework (CSF) is a statement distributed to all schools in Victoria outlining student learning outcomes through a number of stages in the primary and secondary education. There are two aspects of professional development. The first is to assist teachers to become acquainted with the CSF and associated Course Advice-a set of curriculum materials and resources to support teaching and learning areas. The second is to develop strategies for implementation in the classroom. Many activities have been initiated to make teachers familiar with the CSF through coordinated presentations and workshops across the state by agencies such as the Victorian Board of Studies, the Department of Education, subject associations and other professional bodies. For example, Gourmet Professional Development is a program developed in South Gippsland, Victoria by teachers, principals and lecturers from Monash University, Gippsland Campus (SCTP, 1996). The program is a series of courses, each of which make up one subject credit towards the Graduate Certificate of Education (Professional Development Studies). Two examples of the courses are the educational use of electronic technology across the curriculum and developmental approaches to junior primary education. Another program is School Initiated Teaching and Learning Strategies which was operated at Beaumaris Primary School. This program focused on teaching and learning and initiated, in collaboration between teachers and university staff, a series of modules with the framework of a Certificate of Effective Teaching. This certificate is recognised by Deakin University for formal credit and supported by the Victorian Department of Education as one of pilot programs investigating models of professional development that link schools and universities.
2.3 Factors Lead to a Successful School-university Partnership

For a variety of reasons the relation between schools and universities has been characterized as a fickle romance (Wiske, 1989). Instead of the differences between schools and universities in reward systems, schedules, roles and rules, being a problem, many working partnerships have been created. The most successful projects have been those in which both parties planned and prepared themselves well before starting the partnership. The adequate resources were allocated to develop and maintain the activities, and mutual respect between partners was consciously and systematically nurtured. Successful school-university collaborations provide a means of overcoming the credibility gap between the castle of the school and the castle of the academy. Partnerships enable new kinds of professional learning to occur between teachers and academics and also help in the creation of new, more powerful kinds of knowledge to inform teaching and schooling, as the rub between theory and practice (Darling and McLaughlin, 1995), produces more theoretically grounded, broadly informed practice. If partnerships between schools and universities are to be successful and to become an integral part of the professional life of teachers and academics, then both parties must have opportunities to try out and hone new practices.

Among the specific suggestions derived from successful collaborators are as follows:

- The university must be committed to the collaborative ideal and provide financial support if necessary, including stipends or load credit for faculty members (Hillman, 1987).
- If teachers are to be involved as equal partners, they must be involved for as much time as the other actors (Wiske, 1989).
- Exchanges should be reciprocal; each partner should gain something (Wiske, 1989).
- Education should be mutual; each party must develop an appreciation of the other’s contribution (Wiske, 1989).
- Project goals should be jointly conceived and agreed upon (Knapczyk, 1991; Allum, 1991).
• Teachers should be actively involved, not just passive recipients (Knapczyk, 1991; Allum, 1991).
• Leadership should rotate among partners as appropriate to their skills (Balajthy, 1991).
• Outcome should be mutually owned (Balajthy, 1991).
• The partnership should encourage teachers and academics to be co-learners. They should be not in the position in such a way that one is the expert and the other is the client (Yeatman and Sachs, 1995).
• The partnership should establish a culture of possibility so that new ideas can be tested, evaluated and refined (Yeatman and Sachs, 1995).
• The partnership should be set up to build bridges between schools and universities so that both organisations are learning to create innovative practices with the intention of institutionalising them (Yeatman and Sachs, 1995).
• The structures and practices of the partnership should provide opportunities for teachers and academics to debate and negotiate their roles and responsibilities (Yeatman and Sachs, 1995).

Responding to these suggestions helps to establish, refine and improve institutional practice. As Lieberman (1995) points that some people and some organisations, by learning from their mistakes, use what they learn to create new structures and new levels of participation, in some cases determining what immediate steps to take and how people can be mobilised to support them.

2.4 Lessons Learned From the Literature

The reviews of schools-universities projects show that efforts to promote the professional development school (PDS) concept might initiate the restructuring process for teacher education and collaborate with a local school through the establishment of a PDS. The three major PDS components are teacher education, inquiry and research, and professional development. The four stages of PDS development that to be taken by partners are exploration, orientation, implementation
and operation. In addition, the finances, evaluation, and administrative support are prerequisite to a school's acceptance as a school project.

One method of training principals and teachers to lead substantive change initiatives lies in partnership activities between schools and the local university. The paradigm of symbiotic mutualism and simultaneous renewal offers the most promise for effective school reform (Balajthy, 1991). Although the development of a partnership culture is complicated, the rapid evolution of school-university partnerships in recent years demonstrates that schools and universities can work together cooperatively. The ideal collaboration between schools and universities which is based on a mutually collaborative arrangement has great potential to effect significant educational improvements.

The different workplace cultures and accompanying professional values and behavior of university and public school partnership colleagues effect the problems and successes of school-university collaborations. University faculty should realise that offering a traditional university course to professional development school teachers is antithetical to shared decision-making. The foundation for effective professional development schools is an establishment of common cultural understandings and a willingness to work together. The partnership must value inquiry as a priority and allocate time and resources for the activity to occur.

One of the major roles of the Faculty of Education Khon Kaen University is that in response to teacher development in the rural schools, this link project would occur in a rural setting. The literature surveys suggest some solutions for improving staff development, through the school-university partnership, in rural settings are: (1) linking rural schools and outside experts through audiographic computer systems that simultaneously transmit voice and graphic images; (2) encouraging staff ownership of training so that the schools and the university share responsibility for planning and delivering training sessions; (3) improving on-the-job performance by training teachers to apply the concepts immediately to real-life classroom situations; and (4) fostering stronger collaboration among rural teachers through cooperative learning projects. Distance education and telecommunication technologies can give teachers in
rural communities opportunities to upgrade their skills when more conventional forms of training are not available to them. This approach also allows flexibility in developing training activities that are well-suited to the needs of rural communities through the school-university partnerships project.
CHAPTER 3
TEACHERS' PERCEPTIONS OF THE ACADEMIC LINK PROJECT

In this chapter the researcher's intention is to present the school teachers' perceptions of the academic link project, and to indicate some of the issues they are thinking about school-university partnership. The researcher uses data collected from interviews with teachers and the questionnaires sent to school principals and teachers.

A good question arises at this point: is there a possibility to establish public schools and Khon Kaen University partnerships? According to this question, in the design of study the researcher is trying to find out in threefold of teachers' perceptions: the formats of academic link project, the formats of activities of the link project, and the content areas of the activities of the link project. In addition, a picture of how the academic link project fits into the goal of school reform is also discussed.

Frequency distributions were compiled for survey questions and qualitative analysis of open ended questions (see Appendix A) and interviewing (see Appendix B) are included in the results and discussion sections of this report. Of the 600 surveys mailed, 530 were completed and returned. This represented a response rate of 88.33% and a sample of 175 school principals and 355 teachers from six provinces, Khon Kaen (17.9%), Udornthani (17.7%), Nongkai (17.0%), Loei (16.6%), Sakonnakorn (16.4%), and Nhongbualampoo (14.3%). All respondents' perceptions seem to agree very positively to the concept of school-university partnership project.

3.1 Teachers' Perceptions On The Formats Of Academic Link Project Between Schools And Universities For Professional Development

In order to examine teachers' perceptions on the academic link project, the survey asked them to identify ten preferred formats of academic link project. Perceptions of respondents (see Table 3.1) indicated that the project goals and strategic plans should be jointly conceived and agreed upon by the partners (94.0 %) was the most important factor for the success of the link project.
Table 3.1 Teachers’ perceptions on the formats of academic link project between schools and universities for professional development

<table>
<thead>
<tr>
<th>Format of academic link project</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>1. The project goals and strategic plans should be jointly conceived and agree upon by the partners.</td>
<td>94.0</td>
</tr>
<tr>
<td>2. The partnership should encourage experience exchanges and the partners are co-learners.</td>
<td>79.8</td>
</tr>
<tr>
<td>3. Teachers and university faculty should participate in the project upon their individual interests and needs in professional development.</td>
<td>77.2</td>
</tr>
<tr>
<td>4. The project outcome is mutually owned.</td>
<td>76.8</td>
</tr>
<tr>
<td>5. Teachers and university faculty are mutual partners, with each partner developing and appreciating the other’s contribution.</td>
<td>74.0</td>
</tr>
<tr>
<td>6. Leadership of the project activities should rotate among partners as appropriate to their skills and experiences.</td>
<td>66.8</td>
</tr>
<tr>
<td>7. All participants should have equal roles and responsibilities in the project.</td>
<td>63.8</td>
</tr>
<tr>
<td>8. Teachers and university faculty should be involved in the project as equal partners.</td>
<td>60.4</td>
</tr>
<tr>
<td>9. Teachers and university faculty should be involved in the project as much time as the other do.</td>
<td>60.4</td>
</tr>
<tr>
<td>10. Each partner must be committed to the collaborative ideal and provide financial support if necessary.</td>
<td>60.2</td>
</tr>
</tbody>
</table>

While the partnership should encourages experience exchanges and the partners are co-learners (79.8%), teachers and university faculty should participate in the project upon their individual interests and needs in professional development (77.2%), the project outcome is mutually owned (76.8%), and teachers and university faculty are mutual partners, with each partner developing and appreciating the other’s contribution (74.0%). These were the factors that the participants agreed should be recognized in establishing process of the link project.
However, about sixty percent of respondents indicated leadership of the project activities should rotate among partners as appropriate to their skills and experiences (66.8%), all participants should have equal roles and responsibilities in the project (63.8%), teachers and university faculty should be involved in the project as equal partners (60.4%), teachers and university faculty should be involved in the project as much time as the other do (60.4%), and each partner must be committed to the collaborative ideal and provide financial support if necessary (60.2%). These last factors were the least important factors for the success of the link project.

**Some teachers’ views**

Gathering information through interviewing with school teachers let them express their views on the schools-universities partnership in details. The teacher interviews were made in Thai then they have been translated into English for report preparation. Some teachers viewed the partnership as a rather negative process but their perceptions are valuable information for dealing with the partnership. From three quotes:

I agree with the school and university partnership. But it is so difficulty to collaborate with people and come out with something you are proud of because so many compromises have to be made. (Male/Age 45)

In my experiences, I think working with people who come from different culture, I mean university faculty, is so hard to understand what they need for and it takes so much time to understand. As a school teacher I have too much work to do with my students so it is hard to work in collaboration with university faculty. However, if we are ready to learn to understand each other, it would be useful for establishing collaborative projects to support school reform and development. (Male/Age 36)
In another view, a teacher thinks about school-university partnership in a rather negative way because of her experience in participation at academic activities. As in her words:

I don’t want my ideas lost in a collaborative group. In several seminars I attended, I try to share and contribute my experiences in my classroom to the discussion groups but very few people accepted my ideas. I think...because I always think in different way from the others and view things from a different side to the way the others do. So I think it waste my time to work in collaboration with people. (Female/Age 39)

A teacher who concentrates on doing research at the university, describes the pressure for individual achievement through research in universities that are intense in competing for the best graduate students, the most high-profile schools, private and public funds, and the high public regard. The push for institutional prestige that comes from individual faculty recognition in research and publication is tag of research university life. As in his words:

From my experiences while I was doing my master in education, I think many university faculty have been socialized into researching and teaching alone rather than collaboratively. From their own work in graduate courses and teaching associateships, through dissertation research on what are usually highly specialized topics, into a university environment that rewards solitary publication over teaching and community outreach...faculty have been initiated into a system in which team teaching and collaborative research within disciplines are very few. It seems published research has become the professor’s requirement product. It is justification for faculty’s support and nothing to be shared. I think school and university partnership is a good and a new idea for teachers but I have never seen activities encourage it to occur. I am really waiting
to see it and willing to participate in the project if it is possible.  
(Male/Age 42)

Some teachers view a partnership as a process that should support individual interest. This valuable idea suggests the school-university partnership establishment. As one teacher contributes in the interview that:

It seems difficult to establish school and university partnerships for many people because teachers and faculty have their own interests. Someone may be interested in educational technology and the others may be interested in other different specific educational topics. For example I am interested in action research which is new for me but I don’t know how many people are interested in this topic. However, I think school and university partnership might be an idea to enhance the opportunity which responds to teachers’ interests. (Female/Age 37)

Some teachers said in the interviews that the level of interest in teacher education and teacher professional development are important factors that support or are obstacles to collaborative education reform efforts. As one of them expressed:

The level of interest, of both the faculty and teachers, in teacher education and professional development could be a support or an obstacle to collaborative education reform efforts. Some faculty in research universities show very little enthusiasm for working in teacher education in ways other than the teaching of their own courses. Many teachers ignore their professional development. They only work to fulfill their teachers’ roles. Instead of enhancing their visions in education reform and professional development they concentrate only on their class activities, ...working with their students without sharing their experiences with other people. (Female/Age 41)
3.2 Formats Of The Academic Link Project Activities that Teachers Need

The second question of the survey was comprised of seven preferred formats of the academic link project (see Appendix A). The respondents were asked to rank these formats according to their needs. The results are summarized in rank order as follows:

1. organize educational conferences;
2. organize educational seminars;
3. offer professional development via telecommunication technology (printed materials, Video tapes, telephone, fax machines, CD-ROMs, and Internet);
4. offer short and medium training courses at Faculty of Education, KKU;
5. issue an educational journal for publishing the participants’ academic papers;
6. offer academic study tours at the educational institutions and other attractive places; and
7. establish the collaborative research team among participants to develop the teaching and learning strategies and educational administrations.

Some teachers’ needs

It is evident that a program of continual and sustained professional development must be made available to teachers (Darling and McLaughlin, 1995), and that traditional top-down approaches to professional development must be abandoned in favor of equal partnership (Lieberman, 1995). Teachers’ needs in professional development programs are different from the past. They suggest bottom-up and top-down collaboration is vital to the experience. The school-university partnership must take its major role in the new formats of pre-service and in-service training program. As in one teacher’s words:

Professional development programs, through the educational conferences and seminars or a short course training program, must be different from the past in which experts lectured on new education approaches or exposed passive teachers to new ideas and practices because teachers learn best when they are
involved as active participants in the professional development experience. (Male/Age 45)

Teachers believe that universities are academic leaders and major educational resources for them. They need helps in both human and technological resources from universities. Thus establishing a school-university partnership would be benefit for teachers to extent their experiences to new ideas and an advancement of educational technology. In addition, it would support the school reform to reach its goal. As in one quote from a teacher:

If we promote more meaningful and vital relationships between faculty and teachers, we will step up to the stage to reconfigure teacher education and drive school reform. I believe that university is philosophically capable of providing the kind of training that practicing teachers and administrators need, and university should be out of the business of teacher education. I hope, from the partnership, to see more productive and active activities in the next educational conferences and seminars...also in the future, short course training. (Female/Age 38)

The more university faculty have become estranged from teachers and distant from schools, the collaborations will be more difficult and confrontational. In the view of the gap between university faculty and practicing teachers, teachers believe the close relationship as equal partners will be helpful to deal with this problem. They suggest that information technology and communication technology should be used for narrowing the gap between faculty and teachers. This technology is not only used for communication but also could be used for delivering materials of a professional development program. The following quote below exemplifies how information technology and communication could be used in a professional development program.

I attended a short training course in Internet Applications in Education last semester. After I practice using email and a Web browser, I think these are very useful for making a close
relation between faculty and teachers. Why don’t we use this technology for our understanding? I believe it could help us to narrow our gap. Furthermore, I strongly suggest that we should use this technology for our professional development. With its advancement and ease of use, why don’t universities offer some professional development program via this technology? I believe it is possible because I have seen on the World Wide Web (WWW), many universities offer bachelor and master programs via their webpages. If it is possible to establish an academic link project, would you please consider using this technology as a medium of transferring the project activities? (Male/Age 28)

Some teachers complained that when talking about professional development they always think about the lack of money, time, and teacher support. They suggest that the computer technology and communication technology could be used for diminishing these barriers. They believe that these technologies could be used for delivering the contents of professional development programs, for example, transferring the learning package via CD-ROM, WWW, Video tapes, Audio tape, and Fax machine. As one teacher states that:

I agree that professional development is necessary for teacher profession but we can’t participate in such programs because we all are confronting with the lack of money, time, and support. As you know that teachers have to work all day and sometime we have to finish our work at home, so we have problems with participating in the traditional professional development program offered by many education institutions. I think teachers who are interested in professional development would like to have opportunities to study by themselves in their own learning styles and when they want to learn. This is the idea of distant learning, or informal learning if you like to call it, the course materials could be transferred via many types of
media... such as printed materials by post mail, audio tape, video tape, fax machine, CD-ROM, and using the Internet. I think these formats of professional development program will enhance the opportunity to teachers to develop themselves. (Male/Age 30)

Nonformal learning is often defined by activities outside the formal learning setting such as field trips and museum visits, characterized by voluntary as opposed to mandatory participation. Sometimes nonformal learning is identified as learners holding the objectives for learning with the means controlled by the educator or organization (Bramble and Martin, 1995). Some teachers discuss that there are many interesting methods to extend teachers’ experiences which differed from boring conventional conferences and seminars. As one teacher suggests:

I think workshops, lectures, classes, and educational conferences and seminars are some of the common formal learning programs which are using in many professional development programs. These formats of activities are not learner centered and attractive. Although study tours, informational signage, educational exhibitions, interactive displays, and demonstrations which are often considered nonformal learning constructed by the education staff, they are rarely used as formats of professional development program. I think we have to rethink about our professional development reform. (Male/Age 48)

3.3 Types Of The Academic Link Project Activities that Teachers Need For Their Professional Development

The respondents were asked to rank nine content area of professional development activities according to their need. The results indicate they need the activities, in ranking order, to enhance their knowledge, experiences and skills in:

1. pedagogy of teaching and learning;
2. educational technology;
3. educational research;
4. action research;
5. educational administration strategies;
6. local curriculum development;
7. computer and information technology application in education;
8. educational materials and text productions; and
9. writing academic papers.

The most preferred content areas of professional development are pedagogy of teaching and learning and educational technology, along with educational and action research. These results seem to indicate that teachers value professional development that is current, practical and relevant to immediate classroom and curriculum needs. It is interesting to note the low rating of educational materials and text productions and writing academic papers could be an indication of teachers’ recognition of unnecessary skills to deal with because they have to use the curriculum textbooks assigned by Ministry of Education in their courses.

**What content areas do teachers really need?**

Some teachers’ voices indicate that after teaching for about ten years they feel their teaching strategies are boring. So they need to learn and practice more teaching and learning strategies. This not only makes them feel fresh in teaching but also lets them keep up to the education and technology changes. As two following quotes indicate:

In my experience with teaching role for twelve years it was boring using the same several teaching activities in my class. I think I need to improve my teaching skill especially application of new ideas and technology in the classroom. (Female/Age 37)

Professional development courses must be useful to classroom performance and improve delivery to students. There has been a profusion of inservices in the past that have simply had no
relevance to teachers or the students they teach. I would like to train more in teaching with new strategies and education innovations. (Male/Age 42)

It is surprising that the school reform policy forces teachers to improve their work. They feel that the school reform policy is a major factor that drives them recognize the importance of professional development. Some teachers plan to participate in short training courses offering by universities. As a teacher explains:

As you have learnt that the school reform policy launched by the Ministry of education forces us to move for improvement. May I read one of its strategies: emphasizing performance efficiency of authentic learning outcome in evaluating teachers of their promotion, development of teaching/learning activities. Can I stay with my old teaching styles? No! I have to keep up with the changes... Let’s see another strategy: providing training and skills development opportunities to every teacher continuously and comprehensively with the view to keeping them abreast with social and technological changes. A teacher should undergo some form of training at least once every two years... participation in conferences, seminars and every form of self-development must be regarded as teachers' duties, to be assessed as part of their performance. This fearful strategy makes me think about my future work. Participation in conferences, seminars is my duty. You can imagine how much work is added to my teaching life and how much time I have to spend on it. So I think all content areas on the list are necessary for us, I mean for all teachers in the school reform period. (Male/Age 42)
3.4 In What Ways May The Partnership Establish The Foundations For A Systematic Partnership Between Practicing Teachers And University Faculty That Support The School Reform?

This question was discussed in the interviews with teachers to gather a wealth of baseline information on processes and structures of locally designed partnership to effect school reform. Most teachers eagerly and critically express their ideas about this task because they are on the way of school reform. Their ideas are summarized under the following headings.

More research is needed

Several teachers suggest quite the same idea that there is very little literature on establishing a school-university partnership in Khon Kaen. We have no information about how partnerships could be used for school reform process. They suggest more research work could be done to find out and distribute information on this task. As several teachers explained:

My personal belief is that the collaboration itself can be the subject of research. It will yield both quantitative and qualitative baseline information on processes of designed partnerships to effect school reform, the roles played by different partners, the teacher and curriculum development, teacher effectiveness and the learning experiences of students. The collaborative research team included university researchers and school researchers should be formed to deal with this task. (Male/Age 48)

If faculty are rewarded first and foremost for basic research, and if faculty ignore their role in school reform, then we are not likely to see faculty rush toward the preservice and inservice teacher education program. Universities should recognize the need to vitalize partnership with schools. University
administrators may view their role as crucial in driving school reform, and faculty will follow university leaders who develop incentives to achieve university goals. Thus, collaborative research team initiation is possible, and will help to achieve the school reform goals. (Female/Age 41)

Collaboration is an important key of school reform

Some teachers comment that collaboration is a key factor for school reform. The collaboration among agencies concerned in the school reform process would lead to its success. Not only the Ministry of Education and school administrators but also faculty in the higher education institutions have to take their responsibilities in the process. There are many school reform activities for which collaboration is a necessity, for example, providing training and skills development opportunities to teachers continuously and comprehensively as well as development of educational administrators. As some participants comment:

Collaboration among school teachers, university faculty, and educational administrators who are working with school reform is no longer just an ideal to be pursued. Now it has become a necessity. Many professional development programs are needed in the school reform process that focus on teachers and educational administrators development. University is a major human resource for educational development, particularly Faculties of Education, that could provide appropriate training programs to meet the school reform goals. The problem is how to initiate the collaboration among university faculty, school teachers and administrators to develop the appropriate training and skills development programs for teachers and educational administrators. We, teachers and administrators need more opportunities to enhance our knowledge and experiences to work with school reform. (Male/Age 30)
In the past, our schools was administered and operated using hierarchical, bureaucratic decision-making structure and processes. In contrast, the principles of teamwork and collaboration are currently being used extensively in our school reform movement. The advocates of school reform propose the use of participatory management, allowing each individual school and its personnel and students' parents to assume primary responsibility for shaping their school's mission, goals, and procedures. The school council includes representative of all constituent groups, parents, teachers, administrators, and support personnel. I think, university faculty should be included in the school council as the academic human resources. Hence, the collaboration or partnership between schools and university should be established to meet our school reform goals. (Female/Age 38)

I think a successful school reform should have a clear understanding of its goals, unified commitment, and competent members who have both technical and personal skills to work in collaboration with others. The appropriate training programs are needed for teachers and administrators to develop their skills. Thus the school-university partnership can provide these training programs through its activities from the result of partners' negotiation. (Male/Age 48)
CHAPTER 4
SUMMARY AND SUGGESTIONS

According to information derived from the study the researcher would like to propose a conceptual model of school and university partnership for further implementation in education development. In addition the suggestions from the study are discussed in this chapter.

4.1 Factors of the effective School and University Partnership

The results of this study suggest that five major factors of the effective school and university partnership are: formats of the link project, formats of the project activities, types of project activities, individual partners' needs and interests, and implementation of information and communication technologies in the project. The relationship of these factors is shown in Figure 1.

![Diagram of conceptual model of effective school-university partnership]

**Figure 1** The conceptual model of the effective school-university partnership
Formats of the link project

In relation to the first question, this report concludes that the formats of the link project of the school-university partnership should become a collaborative and as equal partners’ project. The conclusions concerning the formats of the school-university partnership include:

- the project goals and strategic plan should be jointly conceived and agree upon by the partners;
- the project should encourage experience exchanges and the partners are co-learners;
- school teachers and university faculty should participate in the project according to their needs and interests in professional development;
- the outcome of the project is mutually owned;
- leadership of the project activities should rotate among partners;
- all participants should have equal roles and responsibilities in the project;
- teachers and faculty should be involved in the project as equal and mutual partners;
- teachers and faculty should be involved in the project for as much time as the other group spend on the project;
- each partner must be committed to the collaborative idea and provide financial support if necessary.

Formats of the project activities

In relation to the second question, this report concludes that the formats of the link project activities should focus on professional development for all participants. The key elements of the formats of the project activities can be summarized as follows:

- organize educational conferences, seminars and training courses;
- offer professional development via telecommunication technology and academic study tours;
- issue an educational journal for publishing the participants’ academic papers;
• establish the collaborative research team among participants to develop the teaching and learning strategies and educational administrations through research.

**Types of the project activities**

In responding to the third question teachers indicate that the project activities should broaden and deepen their understanding, knowledge and skills to be effective teachers in the information technology age. The school-university partnership should adopt a broad perspective on skills development, taking into account (in rank order):

1. pedagogy of teaching and learning;
2. educational technology;
3. educational research;
4. action research;
5. educational administration strategies;
6. local curriculum development;
7. computer and information technology application in education;
8. educational materials and text productions; and
9. writing academic papers.

**Individual participants’ needs and interests**

Traditionally, staff development projects have focused on defects. The assumption was that teachers had something wrong with them that inservice training would correct (Krupp, 1986). Research on adult learning and development mandates a switch to a growth orientation. The fact that individuals' needs and interest are supported by the studies of the internal hierarchy of needs (Maslow, 1971), and of career changes for personal growth (Uris & Tarrant, 1983). The school-university partnership aims to develop participants’ knowledge and skills. Its activity formats should respond to individuals' needs and interest. The results of this study suggest that the project should emphasize these characteristics with a variety of strategies:

• the project should focus on individual needs, interests, and growth;
use both personal and professional knowledge about participants in planning;

use evaluation information to reassess individual needs and interests;

help participants tie their individual needs to school goals;

encourage participants to write a proposal for their own staff development to meet an immediate need;

assuring that participants attain their goals requires a system for linking individuals with available resources.

Implementation of information and communication technologies

Related to the teachers' perception is the claim about using information and telecommunication technologies to narrow the gap between teachers and faculty who participate in the school-university partnership. The researcher agrees that these technologies should be integrated with clearly identified staff development needs. However, teachers' perceptions suggest that information and communication technologies should be used in the project for:

- narrowing the gap between teachers and faculty;
- delivering materials of professional development program;
- transferring the activities of the project;
- diminishing the lack of money, time, and support for professional development.

4.2 Suggestions from the Study

In general the results of this study suggest a substantial range of teachers' perceptions on school-university partnership. It has been noted that there are five factors of effective school-university partnership. In addition the study also provides valuable suggestions for establishing the school-university partnership. These include:

- thinking about how to work collaboratively with people who come from different work culture;
• universities are academic leaders and educational resources for teachers and communities;

• understanding among participants is an important factor of partnership establishment;

• the project activities should support individual needs and interests in teacher education and teacher professional development;

• the partnership should encourage the productive and active activities in the conferences, seminars, and training courses;

• awareness of appropriate integration of information and communication technologies in the partnership activities;

• computer and communication technologies should be used for diminishing the lack of money, time, and teacher support for professional development by using CD-ROM, WWW, Video tape, Audio tape, and Fax machine as media for transferring the training and learning materials;

• nonformal learning should be used in professional development program—study tours, information signage, educational exhibitions, interactive displays, and demonstrations.

In conclusion, what this study tells the researcher is that technical support, innovative approaches to training, the involvement of all participants from school and university as equal partners, and clear links with professional development are important elements of the successful establishment of a school-university partnership. It is also tell the researcher that collaborative work and development of understanding among participants are probably also a necessary part of the complexity of the partnership.
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Appendix A

TEACHERS' PERCEPTIONS OF THE ACADEMIC LINK PROJECT BETWEEN SCHOOLS AND UNIVERSITIES FOR TEACHERS PROFESSIONAL DEVELOPMENT QUESTIONNAIRE
TEACHERS' PERCEPTIONS OF THE ACADEMIC LINK PROJECT BETWEEN SCHOOLS AND UNIVERSITIES FOR TEACHERS PROFESSIONAL DEVELOPMENT QUESTIONNAIRE
(Translated from Thai)

Instructions

1. This questionnaire is to be answered by school principals and teachers in secondary schools.

2. The information obtained in this questionnaire will be used for research purposes only. All information will be kept confidential. Please feel free to state your opinions and provide as much information as you can. Your cooperation is greatly appreciated.

3. The Academic Link Project used in this questionnaire means any activity that focus on professional development for teachers.

Section 1: Background information

Please check [ ] in [ ] and fill in the blank.


2. Age: ....... years.


4. Province
   [K] Khon Kaen
   [U] Udonthani
   [N] Nongkai
   [L] Loei
   [S] Sakolnakorn
   [N] Nongbualamphoo
Section 2: Perceptions on the formats of academic link project between schools and universities for professional development

Please mark (✓) the items that you believe are the characteristics of the academic link project should be.

- The project goals and strategic plans should be jointly conceived and agree upon by the partners.
- All participants should have equal roles and responsibilities in the project.
- Teachers and university faculty should be involved in the project as much time as the other do.
- Teachers and university faculty should participate in the project upon their individual interests and needs in professional development.
- The partnership should encourage experience exchanges and the partners are co-learners.
- Teachers and university faculty are mutual partners, with each partner developing and appreciating the other’s contribution.
- Teachers and university faculty should be involved in the project as equal partners.
- Leadership of the project activities should rotate among partners as appropriate to their skills and experiences.
- Each partner must be committed to the collaborative ideal and provide financial support if necessary.
- The project outcome is mutually owned.

Please use space provided below to make any comments on the formats of the academic link project between schools and universities.

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Section 3: Formats of the Academic Link Project Activities that Teachers' Needs

This section is comprised of seven preferred activity formats of the academic link project. Please rank these activities according to your needs by putting the number from 1 (the most preferred) to 7 (the least preferred) in front of the items.

....... Organize educational conferences.
....... Organize educational seminars.
....... Offer professional development via telecommunication technology (printed materials, Video tapes, telephone, fax machines, CD-ROMs, and Internet).
....... Offer short and medium training courses at Faculty of Education, KKU.
....... Issue an educational journal for publishing the participants' academic papers.
....... Offer academic study tours at the educational institutions and other attractive places.
....... Establish the collaborative research team among participants to develop the teaching and learning strategies and educational administrations.

Please use space provided below to make any comments on the activities of the academic link project between schools and universities.

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Section 4: The Content Areas Of The Professional Development Activities According To Teachers' Needs

This section is comprised of nine preferred content areas of the academic link project. Please rank these content areas according to your needs by putting the number from 1 (the most preferred) to 9 (the least preferred) in front of the items.

1. pedagogy of teaching and learning
2. educational technology
3. educational research
4. action research
5. educational administration strategies
6. local curriculum development
7. computer and information technology application in education
8. educational materials and text productions
9. writing academic papers

Please use space provided below to make any comments on the content areas of the academic link project between schools and universities.
Appendix B

Questions used in the Interviews
A set of questions prepared for interviews.

1. In what ways may the partnership establish the foundations for a systematic partnership between practicing teachers and university faculty that support the school reform?

2. What content areas of the academic project do you really need?

3. What activities of the academic link project do you really need?