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Partnerships with schools to provide rich professional learning experiences for pre-service science teachers: A pilot study examining alternative professional experience models

Gail Chittleborough, Peter Hubber, Russell Tytler

& John Cripps Clark

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Partnerships with schools to provide rich professional learning experiences for pre-service science teachers: A pilot study examining alternative Professional Experience models

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Summary

The professional experience in a school community provides a powerful teaching and learning environment for pre-service teachers. In an attempt to better inform the structure and organisation of the professional experience program for the Bachelor of Science/ Bachelor of Teaching (D351) course, the initial experiences of 17 students were monitored over 8 months as they undertook their first, second and third professional experiences in schools. This data was used to identify the factors that impact on the pre-service teacher’s professional experience. The students were in the third year of the four year course. There were multiple factors that impacted on the pre-service teacher’s professional experience including the professional experience structure, organisational aspects of the course, the pre-service teachers’ identity and growth and the role of partnerships.

The professional experience structure
There was a lack of preparedness among the pre-service teachers for the professional experience, a lack of lesson planning and the workload issues of balancing university coursework with the professional experience requirements. Nearly all students and teachers preferred a block model of practicum, and teachers and students argued for a longer block period in schools, with the preference for students to experience multiple schools - in the third year of their course rather than spending the whole 40 days at one school.

The organisational aspects of the course included having clusters of pre-service teachers at schools in the first practicum – and this had mixed results. There was some merit in the cluster model as evidenced by students speaking of the collegiality that was able to develop among students. The initiative to have students work in pairs in the first practicum also had mixed results. Overall, the buddy system has been shown to have some advantage in the first practicum where students are primarily observing, they are in a new environment and adapting to their new role as teacher. There was some critical comment of the assessment formats suggesting the need for clear criteria for the assessment of pre-service teachers.

The pre-service teachers’ identity and growth was observed to develop over the period of the study as expectations became better understood and pre-service teachers’ confidence and understanding of their professional role as a teacher improved. The pre-service teacher’s previous experience with children did impact on their initial confidence with working with children and understanding of their role as a teacher. Some pre-service teachers were initially ignorant of the need to communicate with the school.
Some pre-service teachers were considered to have adequate scientific knowledge to teach, however others were considered by their supervising teachers not to have sufficient scientific knowledge or pedagogical understanding. It is recommended that the roles of the supervising teacher and coordinating teacher are explained to pre-service teacher. The one-to-one relationship the pre-service teachers have with their Supervising Teacher provides the most influential component of the pre-service teacher’s development. The qualities of the supervising teacher and coordinating teachers included being supportive, providing feedback, modelling leadership, being clear communicators and having realistic expectations of the pre-service teacher. To provide a cohesive professional education the staff at the university and the schools should share common and realistic expectations for the pre-service teacher at their stage of professional development.

**Partnerships** - The results of this study suggest that through partnerships with schools the pre-service teacher’s experience can be made richer and be more connected to their experiences at university. In this case, the stakeholders - coordinating teachers, supervising teachers, university academics and professional experience staff provide different areas of expertise, but all share a common objective – the development of pre-service teachers. By identifying tensions between the demands of the science degree, the teaching degree and the school experience the need for mediation and improved communication between the learning environments- university and at school – are highlighted. Effective partnerships have been shown in this study to exist with coordinating teachers and supervising teachers working alongside university staff mentoring pre-service teachers with the common goal of developing the best teachers for the future.
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Abbreviations

PE Professional Experience
ST Supervising Teacher
Introduction

The role of universities, schools and staff in the training of pre-service teachers is changing as partnerships and links between various institutions are forged (Goodrum & Hackling, 2008). It is undisputed that the “there is a significant relationship between students achievement and the quality of teachers” (Goodrum & Hackling, 2008, p. 1), so by investing in teacher’s professional development students also benefit.

The aim of this research was to identify components of the Professional Experience that provide rich and rewarding experiences for pre-service science teachers. It examined alternative arrangements for Professional Experience among pre-service teachers undertaking the new four year Bachelor of Science / Bachelor of Teaching (D351) course at Deakin University.

This research provides evidence to inform the planning for quality Professional Experience for pre-service science teachers, with regard to:

- the scheduling arrangements of Professional Experience;
- the value of forming partnerships between universities and schools,
- the necessary knowledge and skills for the teaching of science, in particular scientific pedagogical content knowledge.
- the refinement /modification of the new 4 year Bachelor of Science / Bachelor of Teaching (D351) course at Deakin University to enhance pre-service teacher training
- the current professional experience arrangements with respect to the standards for graduating teachers as stipulated by the Victorian Institute of Teachers. (http://www.vit.vic.edu.au/files/documents/1752_Standards-for-Graduating-Teachers-jan-09.pdf)

Background Information

Deakin University developed the Bachelor of Science/Bachelor of Teaching (D351) course in response to the need for innovation in the education of teachers of science. This new course was designed to produce secondary science teachers that are better equipped to engage their students in science, to promote strong links between science and the environment and sustainability, to promote an understanding of scientific pedagogical content knowledge and to reflect a new approach to science in schools. The structure of the Professional Experience program within D351 was designed to have 40 days of Professional Experience in both Year 3 and Year 4 – leaving the pre-service teacher’s time in the first two years of the
course to concentrate on the discipline knowledge of the Sciences. This allowed students to establish a foundational scientific knowledge, and provide greater flexibility for timetabling the Professional Experience in the final two years. The new course began at Deakin University in 2007 and pre-service teachers began the compulsory Professional Experience components in the third year of the course, in 2009. This study focuses on a cohort of 17 pre-service teachers who were in their third year of a four year double degree course, and spent 40 days in schools as part of the Professional Experience in 2009. They had not previously had any Professional Experience in schools as part of their University course. The forty days of Professional Experience in third year is a significant component of their preparation for becoming a teacher in which schools, supervising teachers and university staff work together supporting the professional development of the pre-service science teachers. The arrangements for the Professional Experience need to be flexible and varied, accommodating the diverse needs of pre-service teachers, schools and university.

One of the schools hosting the pre-service teachers, has coincidentally, invited Deakin University to become a partner in a collaborative network of schools and other organisations interested in promoting science and technology education. This initiative is responding to the national crisis of a lack of student engagement with the science by attracting students into science education (Tytler, 2007). The program was initiated by parents at the school, forging partnerships among science professional universities, local high schools and primary schools, in conjunction with a successful application (http://www.localschoolsworkingtogether.deewr.gov.au/) for funding for a science and technology building to the federal Australian government. This project promotes and fosters the subjects of Science and Technology, the professional development of the school science staff and the development of high quality future science teachers. Tytler (2007) identified the need to develop appropriate teaching and learning approaches, teach the curriculum in contemporary settings, and promote science as a career path. As part of this collaborative partnership, in 2009 Deakin University pre-service science teachers, were placed at this school for 40 days over the whole year, providing the opportunity for the pre-service teachers to become valued members of the school community, attending the school each week and actively participating in the school community with opportunities to develop their confidence in teaching science. The professional experience began with a two week block teaching period, then weekly attendance at this school throughout the whole year and another two week block in the middle of the year.

An alternative arrangement existed at the other schools where pre-service teachers attended in two weekly blocks, four times throughout the year, totalling forty days. Some pre-service teachers attended the same school for each placement; others changed from one school to another. This research monitors and compares the various Professional Experience arrangements.
Research Context & Research Questions

The Professional Experiences of 17 pre-service science teachers working in different schools during 2009 was monitored to ascertain the affordances and constraints of students’ particular Professional Experience experiences. There are a number of variables, in their experiences, including:

- the number of schools the pre-service teachers attended,
- the timing of the visits to the schools,
- the schools emphasis on science education,
- the schools responsibility to teacher education and;
- the supervising teachers’ scientific pedagogical content knowledge.

There were primarily two alternative Professional Experience arrangements (see Fig. 1):

*Type One* - where the pre-service teachers undertook four separate intensive block teaching periods (ten school days in each block) over the year. For some pre-service teachers this occurred at the same school for all four “blocks” (Type 1A), while for most, pre-service teachers spent two blocks at one school and two blocks at another school (Type 1B).

*Type Two* – where the pre-service teachers undertook an initial intensive block period of ten teaching days followed by an ongoing one day per week throughout the whole year, with a second intensive block period of ten days in the middle of the year. This occurred at one school only and four of the pre-service teachers were at that school for the whole period (Type 2A) and one student did 30 days at this school and completed the last 10 days at another school (Type 2B).

For the first placement of the year, groups of pre-service teachers were placed at the participating schools, and where possible, two pre-service teachers were assigned to one supervising teacher consistent with a “buddy” system. This was intended to support the pre-service teachers during their first school experience. The purpose of these first placements was for their familiarisation and orientation to the school environment with ample opportunities for observation.

The research study addressed the following research questions:

1. What differences are there in the pre-service teachers’ professional experiences between those undertaking Type One and Type Two Professional Experience (abbreviated PE) arrangements?

2. What differences were experienced by students being undertaking their placements at the same school over the year compared those undertaking their placements at two schools over the year?
3. To what extent does the existence of ongoing relationships or partnerships between schools and Deakin University impact on the pre-service teachers experience and on the experience of the supervising teachers?

4. How do the pre-service teachers’ understandings and appreciation of the teaching of science, in particular scientific pedagogical content knowledge, change over the year? What influences these changes?

5. Which components of the professional development program can be shown to contribute to pre-service teachers achieving the Victorian Institute of Teaching (VIT) Standards for graduating teachers? Both PE arrangements will be examined with respect to the VIT Standards for graduating teachers to help identify those components of the PE that contribute to pre-service science teachers achieving these standards:

- Teachers know how students learn and how to teach them effectively.
- Teachers know the content they teach.
- Teachers know their students.
- Teachers plan and assess for effective learning.
- Teachers create and maintain safe and challenging learning environments.
- Teachers use a range of teaching practices and resources to engage students in effective learning.
- Teachers reflect on, evaluate and improve their professional knowledge and practice.
- Teachers are active members of their profession.

Research Methodology

The research uses a case study approach collecting primarily qualitative data. The participants were staff from participating schools, which included the school Professional Experience coordinators and supervising teachers, the university staff involved in organising placements, science education university lecturers and the pre-service teachers in their third year of the four year D351 course. All participants were invited to participate in the study. The data collection instruments included surveys and semi-structured interviews. The surveys on attitudes were administered to the pre-service teachers were possible. The interviews were conducted individually as well as with groups of participants. Interviews were undertaken with pre-service teachers, supervising teachers, coordinating teachers, and university staff. Data including notes, audio recordings, transcriptions and survey results have been treated confidentially with identifiers removed and pseudonyms used in reporting.
The teaching methods of the 17 pre-service science teachers are presented in Table 1. The Bachelor of Science course at Deakin University offers units that provide the necessary qualification for teaching Science, Biology, Chemistry, Mathematics and Environmental Science in secondary schools as approved by Victorian Institute of Teaching. The research draws on qualitative data collected from a representative volunteer sample group of pre-service teachers, supervising teachers and lecturers and professional experience staff (see Table 4).

The Research Associate, who had no teaching responsibilities with these pre-service teachers, was appointed to monitor the experiences of the pre-service teachers during trimester 1 and 2 in 2009. He met with the pre-service teachers, administered surveys, and interviewed them at various stages of their professional experience. In addition he interviewed the staff at schools and at universities who were involved in the Professional Experience program. Table 2 shows the number of pre-service teachers each of the schools hosted in first trimester (February and May) and second trimester (August and October).

The data sources address the research question by investigating the participants’ expectations, attitudes to teaching, level of preparation, teaching experiences and involvement, evidence of leadership, professional relationships and professional development. Similarly, interviews with the supervising teachers and school staff involved with the pre-service teachers provide some insight into their experiences with the university and the pre-service teachers and their expectations. The data sources are outlined in Table 3.

All data has been de-identified by using a coding system that is not linked to the participants’ identities. Table 4 shows the number of pre service teachers as well as the number of supervising teachers who were interviewed indicating that the data source is representative of the participants of the various Professional Experience arrangements.

<table>
<thead>
<tr>
<th>Major (first method)</th>
<th>Minor (second teaching method)</th>
<th>n=17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Biology</td>
<td>Mathematics</td>
<td>2</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Biology</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Biology</td>
<td>1</td>
</tr>
<tr>
<td>Biology</td>
<td>Environmental Science</td>
<td>1</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Biology</td>
<td>1</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>Environmental Science</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 2 The number of Pre-Service Teachers experiencing each Professional Experience model at various schools in 2009 (n=17)

<table>
<thead>
<tr>
<th>School</th>
<th>Practicum Model Type 1A, 1B, 2A, 2B</th>
<th>Feb and May</th>
<th>August and October</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2A</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>1A, 1B</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>1A</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>1A</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>E</td>
<td>1A, 1B</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>G</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>H</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>J</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>K</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>L</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>M</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>1B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>P</td>
<td>2B</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Letter A, B, C, D etc represents various schools, Practicum Model as described in Figure 1

Type 1A Type one practicum model with pre-service teachers at only one school
Type 1B Type one practicum model with pre-service teachers at two schools
Table 3 List of the Data Sources

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Data sources</th>
<th>Research Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-service science teachers</td>
<td>• Interview</td>
<td>Expectations, attitudes to teaching, level of preparation for their Professional Experience, teaching, experiences and involvement with school staff and other pre-service teachers.</td>
</tr>
<tr>
<td>Supervising teachers and school staff</td>
<td>• Interview</td>
<td>Expectations, their experiences with the university and the pre-service teachers and issues arising, and solutions.</td>
</tr>
<tr>
<td>University professional staff</td>
<td>• Interview</td>
<td>Expectations, their experiences with the schools and the pre-service teachers; issues arising, and solutions.</td>
</tr>
<tr>
<td>University Lecturers</td>
<td>• Field notes</td>
<td>Observations, experiences liaising with schools, supervising teachers and supporting pre-service teachers</td>
</tr>
</tbody>
</table>

Table 4 Data profile: A record of the number of pre-service teachers undertaking each type of Professional Experience and the representation of interviewed participants

<table>
<thead>
<tr>
<th></th>
<th>Type 1A</th>
<th>Type 1 B</th>
<th>Type 2A</th>
<th>Type 2B</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of pre-service teachers</td>
<td>3</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Number of schools</td>
<td>2</td>
<td>12</td>
<td>1</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Interviews of pre-service teachers</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>12 (10 individual and 1 paired)</td>
</tr>
<tr>
<td>Interviews of Supervising Teachers (ST) and Professional Experience Coordinators</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1(7 ST)</td>
<td>5 Interviews</td>
</tr>
</tbody>
</table>

Analysis

The experiences and opinions of the pre-service teachers are compared. The qualitative data mainly in the form of interviews has been transcribed, analysed and used to identify major themes and these are reported and used to address the research questions. The perspective and voice of the pre-service teachers, supervising teachers, coordinating teachers and university staff members are used as evidence of the themes. Validity is established through comprehensive interview data, and the consideration and inclusion of multiple perspectives, providing at times divergent points of views on each theme. The report is primarily of a descriptive nature, reporting the experiences of the stakeholders. Three aspects of the research that impact on the professional experience are considered:
• the design of the practicum within the constraints and limitations of the university.

• the pre-service teachers’ experiences and development;

• the schools’ involvement in the development of pre-service teachers;

Issues arising within these three aspects may contribute to pre-service teachers’ achieving the VIT Standards and his or her employability. The descriptive results are presented in the results section and this data is drawn on to address the research questions in the discussion.

Results

The presentation and analysis of the results which involved interpretation and judgement are presented within the three aspects of the research. This structure helps to locate issues that contribute to the experience of the pre-service teachers:

• the design of the practicum within the constraints and limitations of the university
  o Course Structure for Professional Experience
  o Administrative and organisational aspects of the various models of practicum

• the pre-service teachers’ experiences and satisfactory development
  o The pre-service teachers identity and growth including, subject matter knowledge, prior experience, support, professionalism, student enculturation etc

• the university and schools involvement in the development of pre-service teachers;
  o Institutional structures and relationships between stakeholders: university Professional Experience office, university academics, school coordinators, supervising teachers and pre-service teachers

Course Structure for Professional Experience

The double degree, D351 course structure was different to other teaching courses at Deakin University, because it had only minimal education units in its first year and the professional experience didn’t begin until the start of Year 3 of the course. In the third year the students undertook 40 professional experience days – which was a much larger number than in other courses. For other secondary teaching courses at Deakin University students began education studies in first year for Bachelor of Education /Bachelor of Arts. In reviewing the data the following five issues arose:

1. Lack of preparedness among pre-service teachers
2. Lack of planning and preparation of lessons by students
3. Demanding University and external workload during practicum
4. Scheduling forty days of professional experience in third year is too demanding on time

5. The preferred model of professional experience - block vs one day per week

Each issue is presented below.

**Issue: Lack of preparedness among pre-service teachers**

The structure of the D351 course (see Appendix A) did not provide students with an opportunity to undertake units that focused on teaching before going out to schools. Students had undertaken two education units prior to their first PE. These units, which were shared by the science faculty and included *Being a science learner* (EES100) and *Communicating Science* (EES101) in Year 1. Both units were also undertaken by students not undertaking a teaching course and so were not specifically tailored to the operation of schools.

Nearly all students who were interviewed commented on their lack of understanding of what was expected of them during their first PE. Having their first professional experience in February of Year 3 - before university classes began, meant that many students – felt a lack of support from the university, lack of direction, lack of instruction, lack of preparedness. The students had not taken any curriculum units and so had not been taught about curriculum documents and teaching approaches. This resulted in students relying heavily on their own personal experiences to inform their practice. This was highlighted by the difficulties experienced by students who did not have this experience to draw upon. For example, one student had had no previous experience in an Australian school setting, and another had not been in a school for over 30 years. The only information available was the Professional Experience handbook, which included advice in relation to expectations of the students involved in PE, however, this had not been explained to the pre-service teachers nor had they had any elaboration on the requirements or etiquette expected at schools. The PE handbook did not include specific advice for science teachers. For example, students were not familiar with risk assessment forms or occupational health and safety requirements. This resulted in mixed expectations and inaccurate knowledge of requirements. Examples of representative comments include:

“I felt like we hadn’t done a teaching subject – so I felt- what do we actually do? .... It was a big jump, haven’t done a subject in teaching to teaching a class” (PST.11)

“We knew we had to observe but we weren’t really sure what else we were doing. After a while it just gets really boring. It’s just sitting up the back. It felt like I was a student more than a teacher.”(PST.9)

“I found observations pointless. I have worked with kids in childcare centres and so I feel I already had the skills that may be obtained through observations” (PST.7)

Supervising teachers were critical of the structure also:
“My biggest concern is that these kids were thrown into the school environment without any pedagogical background: they have come without any idea of methodology and the basic requirements of being a classroom teacher.” (ST.1)

The lack of preparedness meant that the pre-service teachers did not know how to get involved or what to observe and were therefore not able to make the most of the opportunity to work closely with a supervising teacher. Teacher educators have long valued lesson observation as an important part of the preparation of pre-service teachers (Allen & Casbergue, 1997; Burant & Kirby, 2002; Rajuan, Beijaard, & Verloop, 2008; Windschitl, Thompson, & Braaten, 2008). Supervising teachers consistently discussed observation as an important skill for pre-service teachers to develop, whereas most pre-service teachers in this study had no clear understanding of the purposes and benefits of observing.

The pre-service teachers had a variety of experiences during their first placement – such as following one student or one class for the day, (often a class they would be teaching) - in various subjects and with various teachers, or planning a lesson and observing their supervising teacher implementing it, or attending staff meetings, playground duty, excursions, after school staff soccer match, and school camps. The pre-service teachers were dependent on guidance from the supervising teacher in terms of experiences to be undertaken– for example: “It depended on the teacher: when I was in Year 7 Maths the teacher would say walk around, talk to the students if you want, that was great. But if the teacher said: “Just sit up the back and watch” that was boring” (PST.9). However, they felt a lack of direction student explained “I didn’t know what I was supposed to be looking for? (PST.13), “there was no actual report I had to hand in”. Most students indicated that they would have preferred more structure to the observations task- For example, the provision of a checklist of experiences to undertake. The period of two weeks for observation was felt to be too long by the students who felt that – one week was enough. Most students were in fact teaching during the second week. The lack of appreciation of the task and skill of observing among the pre-service teachers must be attributed to lack of instruction and direction provided by the university - as a result of the course design. This does not appear to be such an issue in other courses at Deakin, where the observational rounds occur in the first or second year of four year courses and are linked to introductory education units that require the collection of observational data for assignment tasks and include initial experiences in primary schools. All the pre-service teachers talked about observation which occurred in a classroom, without considering a wider perspective. As one coordinating teacher suggested observation tasks need to be stipulated. For example, students observe three teachers with different personalities and compare their relationship with children, the way they scaffold and shape their lessons, and their interactions with other teachers, their professional discussions etc. One Supervising Teacher recalled his instructions to a pre-service teacher and the unsatisfactory and ignorant response: “Go away spend some time thinking about it and come back with what you think you’d change or what you think went well - and I would get a one sentence response and here I am spending an hour: half an hour during the class and 20 minutes after the class scribbling down things for him to think about and the time that he puts in response is five minutes. If
someone was able to help them model what an evaluation is and what a reflection is that could be a useful skill.” (ST.2) This response highlights the need for the students to understand what reflection meant and that further instruction may be warranted to help students develop this skill.

Some of the students at Type 2 School participated in the school camp and considered it an excellent opportunity to get to know the students better. However, the Supervising Teachers were critical of the pre-service teachers’ lack of effort preparation and leadership, and had much higher expectations of them. There were instances where pre-service teachers did not appreciate the need to keep an accurate record of their observations. This Supervising Teacher for example described one pre-service teacher’s attitude to this important skill as one of a lack of need “I haven’t received, two weeks after he finished, the number of lessons that he observed, let alone what he observed in those lessons. I don’t feel that they see that as an important part of the learning process” (ST .3)

Actions Taken

To address the issue of under preparedness of the pre-service teachers – going to schools without any education background - a 3 hour workshop was held for the 2010 cohort of students going out into schools in February 2010. The workshop was held at a secondary school in December 2009 to orientate the incoming students - going on practicum in 2010. The students were instructed about expectations, assessment, their roles and responsibilities and provide with a CD – containing resources for their practicum experience. the resources include a number of curriculum resources, practicum etiquette, behaviour management, handling small groups, questioning techniques, tips on observing teaching tips, lesson plan template and examples, safety issues, risk management forms, Victorian Institute of Teaching (VIT) Standards, Principles of Learning and Teaching (POLT), references as background reading on teaching science and questioning. The feedback from staff and students in 2010 on the first block of professional experience has been positive and seems to have alleviated the problem somewhat.

Further Recommendation:

The education units need to be inclusive of all students’ backgrounds and needs. Pre-service teachers should be prepared for Professional Experience by being given guidelines on what is expected and have an opportunity to develop skills that will be needed- e.g. how to observe, what to look for. Observations should initially run for 3-5 days; and there should be clear goals and outputs; programmed observation, with clear objectives. Observations should occur throughout the whole Professional Experience, not just in the first week of the eighty days of Professional Experience, emphasising the need for teachers to constantly be assessing situations and be alert to changes.

Issue: Lack of planning and preparation of lessons by students

The D351 course structure meant that the students started the first PE round not having been introduced to lesson planning, recording or reflecting. Again the general lack of preparedness for the first
round had ramifications with some pre-service teachers not appreciating the importance or need for completed lesson plans. Later in the year some pre-service teacher were taking lessons for which they had not done adequate planning and preparation, e.g. handing out problems sheets and worksheets without having completed an answer or solution sheet themselves prior to the lesson, and conducting experiments that they had not tried previously. The students were not commonly using a lesson plan template. Comments from supervising teachers varied, however there was consensus that pre-service teachers need to present completed lesson plans prior to the lesson to get feedback.

**Quality of lesson planning**

Lecturer B commented that students’ lesson plans were not always satisfactory, even towards the end of the year, and their reflections, which were to be added to the lesson plans following the teaching of the class, not completed. The supervising teachers reviews the lesson plans. Some STs requested that pre-service teacher be given instruction in these fundamentals before coming to schools. It was recommended by a ST that the pre-service teacher use a standard Lesson Plan template- in an electronic form and in A4 size. Some pre-service teacher had excellent lesson plans. Some prepared lesson plan digitally and sent them by e-mail to their ST for feedback. A successful strategy used by several pre-service teachers was to target three objectives/areas to focus on - for example, classroom management or questioning, closing the lesson in a timely manner, etc. The quality of lesson planning is a common problem for all education courses. Currently there is no need for pre-service teachers at Deakin University to present records of their lesson plans to an academic staff, despite the lesson plans and record of their practicum being a valuable addition to portfolios both in hard copy and electronic form. Portfolios are a valuable record of experiences and accomplishments that reflect an individual’s teaching philosophy and pedagogy. The portfolios are often used in applying for teaching positions. The record of the lesson plan provides a good record of the development through the reflective comments by supervising teacher and the pre-service teacher. The skill of reflecting is closely aligned to observational skills that were dismissed by many pre-service teachers in this study as being superficial.

The time spent planning lessons varied enormously among the pre-service teacher. One pre-service teacher reported spending 1.5 lessons preparing for one lesson; another 20 minutes planning a maths lesson, but science took at least half an hour. While another spent 5-10 hours preparing for a lesson preparing – 2 hours researching the topic, 1 hour writing down what she was going to say, but this time did reduce as she became more experienced. Despite this she also reported that she was pleased with the lessons and that the preparation did pay off. The diversity of results indicates that students did not have a shared understanding of what was required and expected of them in planning a lesson, presenting it to their supervising teacher and keeping records. Providing clear guidelines, the modelling of lesson planning process in classes at university and the use of templates could assist to minimise this variation.
Feedback from Supervising Teachers was commonly in both verbal and written form. All students interviewed described how they reflected on their lessons with the feedback from their Supervising Teachers. Only a few students kept reflective journals; and some wrote reflective comments in lesson plans, while others did not keep written reflections. There was no instruction or requirements to reflect in written form. The written reflections provide evidence of change of practice. Evidence of the impact of reflective practice was shown for example, one pre-service teacher explained how he regularly taught the same lesson to two classes, reflecting on the first lesson and informed by his experience before taking the second lesson, another watched his Supervising Teacher teach a lesson to a class and was able to reflect on this before himself; teaching the same lesson to another class. These strategies provide mechanisms for reflective practice by allowing the pre-service teachers to observe, trial and respond to students responses, answers, engagement, uptake of ideas, pace with which they performed tasks etc. Pre-service teachers can be intentional and adaptive in their approach - modifying and changing teaching approaches according to the needs of the students.

Some students were not aware of the lesson planning templates and resources available through the Deakin Studies Online (DSO) website. Pre service Teacher (PST.9) reported how she “wrote out lesson plans because my supervising teacher told me that that would be a great idea but there were some students who didn’t write out any lesson plans”. An electronic lesson plan template allows students to e-mail ST, get feedback and change it quickly.

**Actions Taken**

In 2010, the lesson plans have been included in tutorials in the curriculum unit. The template has been modified to better suit their needs. Some changes include:

- for science lessons there is a need to include a risk assessment,
- the space for reflections has been expanded,

**Further Recommendation**

Further suggestions for the lesson plan templates include:

- the term Student Teacher replaced with pre-service teacher,
- the layout changed from landscape to portrait - for ease of use - both when writing, printing, handling and pasting in a journal,
- including a summary of the unit of work that the lesson sits within- separate from the lesson plan . The summary page can include the overall VELS outcomes, rationale and background information etc whereas the lesson plan can itemise the specific outcomes expected for the lesson.

Importantly, the lesson plan can be used for reflective comments and suggestions for the next lesson. Currently, at Deakin (Burwood) the Supervising Teacher reports provide good evidence of the pre-
service teacher’s development. The lesson plans could be used by pre-service teachers to record the process and strategies that they are employing to improve their teaching. In response to this issue, in 2010, a suggestion is being considered whereby pre-service teachers maintain a record of their practicum experience—using a template My Practicum Record, that will record details of the school, lessons taught, reports etc. A template was provided on the CD resources for students in 2010. This would require academic staff to oversee the record and then consideration of its value as an assessment item could be considered. A Professional Experience handbook with a Maths/Science teaching focus rather than the current generic form may be advantageous because it would provide examples of Maths/Science lesson plan, rather than the generic example in the current handbook and it would not need to include information for the other courses that is not relevant to the D351 students. A risk assessment is necessary for maths and Science lesson plans. The assessment forms and assessment criteria for each practicum could be included in this handbook.

Consideration to the value of pre-service teachers keeping an ongoing log of their professional experience over the period of their course including the profiles of schools attended, lesson plans, observations, formal and informal learning and this record should be submitted for pass/fail grade in association with the assessment from the Supervising Teacher at the school or an academic at university. This would contribute to their portfolio and could be stored electronically.

**Issue: University and external workload during practicum—**

Time for PE has to be accommodated by the student in their normal schedule. Student commonly have commitments to maintaining university studies as well as regular working/volunteering/sporting commitments. The PE can require students to take leave or reschedule work, sport, volunteer or other commitments. The first professional experience in February had the advantage that there were no university commitments, so the pre-service teachers were able to give 100% for 10 consecutive days. As the year progressed students did report workload issues with assignments and lesson preparation consuming more time than they expected. Students often had group assignments with non-teaching students that required meetings and planning during the practicum period. Student found the professional experience extremely tiring and the time required for lesson planning much greater than many had anticipated. For example: PST.9 reflects

“Doing the lesson plans every night: it was a huge eye-opener. I don’t know how I’m going to do this. But they said it would get easier once you sort of know what you need; you won’t need lesson plans all the time. Just because you’re starting out you need to do it. “

Evidence for the interviews revealed the extensive time commitments that some students have to working and to volunteer positions, e.g., coaching training, etc, leaving very little time for lesson planning and university studies. Time management issues were significant. The Supervising teacher’s were mostly
sympathetic and understanding of the extra and necessary demands on pre-service teacher - with paid work commitments - commonly 15-20 hours per week.

There is evidence from several students that the demands of Type 2 model - with the one day per week, meant the science units were being compromised because of the commitment required in the one day per week. In addition there was no consideration given for the one day per week students for submission dates which had been arranged to best suit the block schedule. *The unit outlines had not allowed for the extra workload that the one-day per-week had demanded.* (PST.3) Another student had suffered unnecessary stress and anguish over the demands of the placements and university studies with comments such as “*this has affected me a lot, I am not over reacting. ... this whole process has put me off being a teacher* “ (PST.2)

Besides the everyday demands of family and outside work, the pre-service teacher at this Type 2 school had the demand of attending and preparing for school one day per week as well as completing necessary university science coursework. Comments from the coordinating teachers indicated that they did not appreciate the demands of the science units the students were undertaking: “*They were taking time off when it came to exams because they couldn’t handle the workload of being here and studying for exams so we got the flick while uni got the number 1*” (CT.1). A Supervising teacher (ST.4) considered the pre-service teacher to be using their science study as an excuse for not completing their school work: “*They use it as an excuse a lot: as in I have an assignment due in tomorrow, I can’t prepare a class tomorrow and that really concerned me because we have all been there and done that; whether you are doing a DipEd or a double degree life goes on*."

When the pre-service teachers go to the schools, they must negotiate time to return to uni to take their normal science classes - this is a continuing dilemma of the double degree structure. In addition to attendance they must complete their assignments - alongside their lesson preparation for teaching commitments. One student commented on selecting online units because they fit in better with working and practicum demands. Initially a practicum was planned during the July University exam period. This caused unnecessary angst among the pre-service teachers. The practicum was moved to a later period so that the pre-service teachers were not disadvantaged.

The design of the Professional Experience with 10 days over 3 weeks allows for Deakin pre-service teacher to maintain their regular attendance at the science units, as part of their Science degree units. When on a block placement the pre-service teacher is able to commit nearly 100% of their time - commonly they plan their time around the science unit commitments. One student made a plea for fewer assignments during the practicum giving consideration of the workload associated with the practicum.

**Recommendation:**

Create opportunities to raise awareness among coordinating and supervising teachers of the demands on pre-service teachers’ time, and similarly having academic units in the school of education
schedule assessment tasks with the practicum schedule in mind. Explore where practicum periods can coincide, even partially, with non trimester time. Also, the science Faculty have a week off during the trimester – this could coincide with the practicum period. The timing of the practicum periods cannot coincide with significant assessment periods like examination.

**Issue: Scheduling forty days of professional experience in third year is too demanding on time**

Scheduling 40 days of Professional Experience in one academic year was challenging and proved to be too difficult. The new program was monitored closely and changes made in response to issues. The motivation to begin the Professional Experience in third year was to leave the first year two years free for students to complete science coursework without interruption. The advantage of the two weeks in February was that the pre-service teacher had no other university commitments and was able to attend continuously for 10 school days; however, the disadvantage was that several students commented that the schools were not ready for them – being a new program and being very early in the school year.

**Actions Taken**

The feedback from schools and pre-service teachers after the first block revealed that the schools felt unsupported supervising students with no educational background knowledge and the pre-service teachers felt under-prepared and lacked direction as to what was expected of them. The February placement was considered an unsuitable time- as teachers were still establishing their classes. This feedback prompted an immediate change to the structure of the Professional Experience for future years with the introduction of a Professional Experience placement placed in every year of the four year double degree course. This new initial Professional Experience of ten half days (one half day per week over the semester) is associated with a first year education unit *Being a Science Learner*, and takes place in primary schools. It ran successfully in second trimester 2009. In addition Professional Experience is now required in second year of the four year double degree course with approximately 15 day block in secondary schools. This will reduce the third year requirements to a more manageable twenty days.

**Issue: The preferred model of professional experience - block vs one day per week**

Nearly all students and teachers preferred a block model of practicum. A teacher at the Type 2A school identified the shortcomings of the one day per week model: "It was hard to get any continuity with the class, with the students and luckily the Student saw that straight away and he tended to come more than once a week and I was happy to let him come in blocks of two, three or four days sometimes. I think he benefited far more from that than once a week." (ST.5). The lack of continuity with Type 2 model for students and pre-service teachers was felt to thwart their development: “it is very hard to get a nice progression and a follow up scenario with that one day a week. I find that the three week blocks or even longer gives the kids a chance to build immediately on what they’ve done in the lesson before” (ST.5). One day per week did not provide time to develop curriculum or learn about policy and procedure. The pre-
service teacher had to work more closely with the ST - following on from their lesson and handing back to them for the next lesson. Much more communication between the Supervising Teacher and the pre-service teacher was needed for this model to function. In addition the extended lesson period – of 4 lessons per day, reduces the flexibility of the day of the week which students can attend to take the assigned classes.

Several students commented that the education units in third year, effective learning environments and the curriculum units did provide valuable foundational knowledge. The students in Type 1 experiencing the block practicum seemed to be less adversely affected than the students experiencing the Type 2 practicum. The Type 1 students had the opportunity to refresh, reflect, gain knowledge from some education units in the first 8 weeks of trimester one before going to the second practicum.

**Length of the Professional Experience**

Many teachers and pre-service teachers did not consider two weeks long enough, with comments such as “by about half way through the second week we had a better idea about what we should be doing” (PST.11). Commonly the pre-service teachers would like a longer block with four weeks (or possibly 15 days over four weeks) repeatedly being mentioned as an ideal period. This was argued to provide sufficient time for pre-service teachers to get to know students and the school and also to complete a full unit of work including assessment by pre-service teachers and supervising teachers alike.

Similarly for the students to really get to know students – it takes time, as one Coordinating Teacher observed to:” get a bit of that differentiated learning in there: catering for all the kids. And that is why the ten days didn’t work because she didn’t have time to work out the different learning styles of all the kids.” (ST.8)

**One school vs many schools**

The students in the Type 1B and Type 2B appreciated the opportunity to attend two different schools during the year, experiencing a different supervising teacher, students, school cultures etc. Nearly all pre-service teachers and Supervising teachers alike considered the opportunity to experience a variety of schools and supervising teachers more important at this stage than becoming an ongoing member of the school community. Personality clashes do occur and having a variety of experiences can help to avoid ongoing problems.

One student was frustrated at the lack of flexibility with professional experience : I had an alpine school I would like to go to but I was told I couldn’t go there . i didn’t like the flat out no” (PST.8). Similarly with another student was unsuccessful in her request for a teaching experience at the zoo. The pre-service teacher’s cannot approach schools or learning centres and are dependent on the Professional experience office to arrange the practicum. The professional experience staffs are restricted by the VIT regulations, and have to find suitably qualified staff to supervise the pre-service teacher at these locations so that their teaching record is complete to ensure future registration as a teacher.
**Action Taken**

In 2010, third year students are undertaking 40 days using the Type 1B model. The Type 2 model is not being used. In 2011, third year students will be required to undertake only 20 days in third year (having completed 6 days in year 1 (2009) and 14 days in year 2 (2010).

**Administrative and organisational aspects of the various models of practicum**

The Professional Experience staff at the university was commended by teachers and students alike for an excellent job in catering for the many requests. They work within the organisational framework and are dependent on academics to change assessments and scheduling.

**Issue: Collaboration or domination with “groups” of pre-service teachers at a same school**

The initiative to have groups of pre-service teachers placed at the participating schools, thereby requiring a smaller number of schools and establishing a collective of pre-service teachers at each school, was trialled in the first trimester. The practicum model was changed in the second trimester 2009 with pre-service teachers placed in a larger number of schools and consequently then the majority of school hosting individual pre-service teachers. Table 2 shows that 17 pre-service teachers were allocated to five schools in the first trimester and 14 schools in second trimester.

Having a group of pre-service teachers at each school was intentional, with the 16 of the students being placed at only four schools in the first block. Many students commented on the advantage of having peers to discuss issues and strategies and team teaching opportunities, with both Deakin students and also students from other institutions. While the arrangement was seen as positive most schools, it was considered negative in another. For example, a supervising teacher commented: “My experience with the student teachers is that they all hung out as a group and they took more information and contact from the group than they did from teachers. So if one of the group gave his opinion it was overriding our opinion as experienced teachers. They hung together as a knot: they didn’t integrate with the teaching body.” (PST. 6).

There were several examples of individuals taking dominant roles within the groups detracting from the original intent and the position of the Supervising Teacher. With groups of students at one school there are potentially more opportunities for University staff to become more closely involved, forging links between the school and university.

There is some merit in the cluster model as evidenced by students speaking of the collegiality that was able to develop among students at the same school. For example “We were hanging around, it was fantastic, and we ended up talking quite a lot. So I actually learnt a lot more from them than I did from the teachers” (PST.13)

**Action Taken**

In 2010, the placement of pre-service teachers did not focus on groups or clusters.
Issue: Potential loss of identity through the buddy system

The buddy system of having two pre-service teachers allocated to one supervising teacher occurred only for the first block practicum. The two pre-service teachers were together for observations, helping in the class and doing some team teaching in the first block. There were mixed results. It was somewhat successful in some instances and unsuccessful in others. Its success depended on each pre-service teacher retaining their identity and independence and also on the management by the supervising teacher.

In one case, the students reported that "at the start it was good (first three days), but later being together was not ideal... We split class time, but we were always together and I thought 'shouldn’t I be doing this myself?’ (PST.11) while another said "I really like being buddied for the first set of rounds- I wasn’t as nervous (PST.8)

In another case the students were accused of not taking the practicum seriously. They were said to be flouting the necessary protocols such as signing in and communicating with staff about their attendance. So a meeting was held with the school coordinator, pre-service teachers and university staff to clarify to the students the expected behaviour and their responsibilities. These particular students had two supervising teachers which may have made communication more complex.

Action Taken

Continuing the approach adopted in 2009, the pre-service teachers in D351 in 2010 were placed with a buddy where schools could accommodate it. There were 8 pairs of students placed as pairs, that being 16 out of the 23 students in the 2010. The buddy system has been shown to have some advantage in the first practicum where students are primarily observing, they are in a new environment and adapting to their new role as teacher. Similarly, in the Bachelor of Primary Education, the buddy system was introduced in the second year of the degree course in 2009 successfully, when students are in their initial professional experience placements and is continuing to be used in 2010.

Issue: Clear criteria for the assessment of pre-service teachers assessment

The record and the reports on pre-service teachers’ professional experiences are a necessary requirement for teacher registration. For the first block placement, there was no requirement for students to teach. It was primarily an observational and orientation round and the assessment form indicates this. Many students, however, did take the initiative and opportunity to teach, which is commendable; but these students should not be assessed on this initiative at this stage. For example one student reported teaching 8 or 9 classes in the first ten days, whereas another said - “I knew that I didn’t have to do any teaching” (PST.15) and focussed on observing only for the first two week block. To provide flexibility and to allow feedback to the student, the reporting form has since been modified so the students are assessed on the observations and orientation only, but provision is included for comments on teaching where it occurred. There was some ambiguity among students as to how they were being assessed. The details of the
assessment criteria are in the handbook; however there seemed little opportunity for explanation or clarification. Assessment forms have not previously been readily available to pre-service teachers. A more transparent system could include having a copy of the assessment forms available for viewing online or in the professional experience handbook. One student was classified “at risk”, but did not appreciate the severity of this classification. He failed to reply to an e-mail from the professional experience office. This meant that he did not receive mentoring and went on to fail the next placement.

While attendance at school commitments outside the classroom meetings, playground duty is suggested, it is not mandated. Many students attended meetings, camps, volunteered extra days etc and reported the value of these activities. However at the Type 2 schools, the staff commented on the pre-service teacher’s lack of attendance: “they don’t participate in the school environment, they don’t go to staff meetings, they don’t sit with teachers, they don’t find out” (ST.6). Attendance at school meetings and events contributes towards attitude, initiative and enthusiasm and an accurate record of such attendances in a journal or on the report would be recommended.

Some teachers were satisfied with the assessment forms, but other felt they were lacking in recording a student’s attendance at meetings and yard duty: “On their assessment sheet there is no place to report on that. I felt that because there is nothing to say that they pass or fail that component they feel that they can get away with it. On both of their reports I found a place to squash it in where you are asked to grade them on their rapport with staff; and I said: “By attending meetings and doing yard duty etc. they may have had a chance to develop rapport with staff but as they were never in attendance this was never able to happen”. (ST.3)

Action Taken

The report on the first stage of school experience EEY304A was revised so that students were not assessed on criteria outside the assessable criteria for that practicum at that stage, as a result of this feedback to the university professional experience staff. This will mean that students can teach lessons in their first placement but they will not be assessed on this at that stage. This allows and encourages pre-service teachers to show initiative and be involved without being penalised for working beyond what is expected of them at that initial stage.

Recommendation:

All university assessments should be aligned to the school experiences, prior to practicum and post practicum - allowing synergies for example:

- analysis of lesson plans that have been prepared and conducted during practicum,
- preparing a profile of the school- policies, statistics, specific needs, etc ,
- interviewing staff, laboratory attendant - to delve deeper into roles and procedures in school work environment,
• identify the policies and procedures in science department- such as curriculum planning, themes, school initiatives, professional development programs etc,

• report back on activities in school e.g. staff meetings, playground duty, camp, excursions, parent-teacher meetings

All report forms be included in the handbook so pre-service teachers are made aware of the expected outcomes upon which they will be assessed for the practicum period. The consequences of an “at risk”, “unsatisfactory” and, “fail” grade should be explained to students along with the Academic Progress Discipline Committee (APDC) involvement, with opportunities for clarification.

Pre-Service Teachers’ Identity and Growth

Most pre-service teachers found the professional experience rewarding but challenging. They were commonly fragile and lacked confidence. One student commented that “I learnt so much more doing the practicum, I picked up more in 20 days than I did in 2 ½ years at university” (ST.7). Many commented about being nervous, scared, uncertain and doubting themselves, but they all recognised their confidence growing over the year. They were mostly nurtured by their supervising teachers. The most rewarding part was hearing their enjoyment and love of teaching that was developing: for example “The best thing was seeing kids actually get it – when you are not just talking to dead air, getting practice teaching” (PST.8).

Lecturers observed dramatic growth and change in pre-service teachers over the year as they transitioned the role from student to teacher. Comments ranged from – feeling like students – back in school, to being treated as a teacher - by other teachers and by students. One student recounted one of her first experiences: “there was this one teacher who introduced me and said: “This is Ms Smith (pseudonym) and she’s from the government and she’s going to walk around and see what you are doing. And she’s going to report back to the principal.” And the kids were great. At the end of the class she said: ‘I hope you didn’t mind that I did that but I noticed that when I did my rounds when the teacher says this is a student teacher the kids don’t take you seriously’ and the class was great.” (PST.9)

Preconceptions were challenged as pre-service teachers became aware of the demands of teaching; for example one student explained how she only wanted to teach VCE Mathematics and had not been expecting to teach Years 7-10. Another student described her first week of face to face teaching as overwhelming, daunting and stressful, “I found it overwhelming - trying to teach specific content and work out what they need to know” (PST.9). While another reflected on the constant issue of behaviour management- “I started to feel that they were being a bit disrespectful”. (PST.13)

A student’s belief in their own agency, efficacy and competence has been linked to the expected features of job satisfaction and sense of accomplishment and also the more importantly, student engagement, motivation and performance (Malmberg & Hagger, 2009). In this study there was no direct assessment of pre-service teachers’ classroom performances. Detailed assessments were made by their
supervising teachers. Individual assessments by supervising teachers were generally more favourable than interview reports.

Pre-service teachers who were experienced with working with “groups” of children, such as after school care, teaching and coaching roles, were familiar with the teacher role, and seemed more confident in the initial rounds than students without this experience. Some pre-service teachers with this experience, felt the observation period was less significant, while other appreciated that they had a new role – as a science/maths teacher, and that the secondary students were different to the primary aged children: “You need to relate more to high school kids, can’t just tell them, you need to show why you are doing it” (PST.8). There was evidence of the impact of experience in other units – e.g. as part of ESS101 Communicating Science one student had visited a primary school 6 times working on a water saving scheme. And another had been to a primary school as part of SBS350 Community Science Project.

**Issue: Act like a teacher: Meeting professional expectations**

Some supervising teachers commented about a lack of communication with pre-service teachers about their attendance, some failed to sign in; others did not inform the school when they were absent. Some pre-service teachers were not aware of the expectations and requirements of them during the practicum. Many expected to be able to “make up days” that were missed, and considered that the 10 days over 3 weeks meant they could choose when they attend rather than establishing and negotiating the schedule with their supervising teacher from Day 1, in consideration of school timetable, classes and commitments at university. There are some examples of pre-service teachers not taking the initiative to communicate with supervising teachers, not providing their contact details, not establishing the weekly attendance schedule or planning lessons they will be taking well in advance. The lack of direction resulted in missed learning opportunities in for the pre-service teachers despite being immersed in a rich learning environment.

The pre-service teachers at the Type 2A School offended some teachers with a casual attitude. Entering other classes unannounced caused supervising teachers much anguish as described during an interview: “They didn’t ask the permission of the teacher beforehand, they just waltzed into the classroom. Which meant that, us as supervising teachers copped the flack from out fellow teachers who felt they couldn’t say to the student teachers: “No this is not suitable for you to come in”. Which means next year when I have a student teacher, if I have a student teacher, I seriously have to consider the impact it is having on my relationship on the other staff members around the school.” (ST.6). The pre-service teacher’s lack of sensitivity and awareness, and the poor communication reported at this school is concerning, but not all schools reported these difficulties.

The ICT skill level of the pre-service teachers varied across the cohort. One ST suggested that the lesson plans should be completed electronically. However not all students have computers at home, and not
many do not have laptops. One ST commented on the lack of computer skills among the pre-service teachers and the need for all teachers to be “computer aware”.

**Recommendation**

Pre-service teachers should be made aware that the supervising teachers and coordinating teachers are supporting and nurturing them as part of their professional responsibility, and that they receive little or no rewards. Therefore, acknowledging their effort is necessary.

**Issue: Know your Science /Maths: having adequate knowledge to teach**

This cohort of students is undertaking the Science degree at Deakin University concurrently with their teaching degree. Teaching science requires expertise across a wide variety of science subjects and it is assumed that any science degree will provide this expertise, whereas in some cases the science degree can be limited to particular areas of science. Consequently all teachers at times have to learn the science that they have to teach. One pre-service teacher commented that “I have my science degree and I have 8 maths units and 4 science units and I don’t feel prepared to teach. There are gaps in my education that worry me“(PST.14). This student displayed a lack of confidence and inability to see the relevance and applicability of the science degree. Another student commented that the science subjects were valuable but have nothing to do with teaching (PST.7).

There was variability in the ability of pre-service teacher to cope in new teaching situations. When one pre-service teacher (PST.15) wasn’t confident in a topic, he investigated and explored the content he was not familiar with. The Supervising Teacher (ST.7) commented that he was confident his pre-service teacher had the capacity to cope with unfamiliar topics. Overall most pre-service teachers felt confident, but Supervising Teacher comments are to the contrary. Supervising Teacher’s at the Type 2 school, where students were attending one day per week, expressed concern at the pre-service teacher inadequate level of content and pedagogical knowledge. All the teachers from this school commented on this issue. For example a supervising teacher commented: The big problem with these kids was their content knowledge. That was very disappointing. When we have someone playing around with our VCE students we cannot afford them to have board notes and explaining concepts and getting it wrong that is not acceptable “(ST.1)

Students with majors in Environmental Science were considered poorly prepared for teaching the other sciences: The knowledge that these guys had was certainly at junior level: some of the Year 7s left them for dead as far as their science background, the chemistry background. Environmental science might be a cover all for science; we are used to students not being able to deal with the Physics aspect but when they dip out on the Chemistry and the Biology as well it’s not good. It just means that we have to put in more time; in addition our main aim which is teaching them classroom skills: how to deal with disruptive kids, how to deal with good kids, how to prepare material which will satisfy all the way across the curriculum; it just wipes that out. You have to start from scratch, just survival lesson “(ST.6).
The responses from supervising teachers at other schools were not as alarming and seemed to be dependent on the particular pre-service teacher with which they were working, for example “I needed to do a bit of work with her Chem, there are a few holes. And after she has gone I’ve had to go over a few things but that is part and parcel.” (ST 8 discussing PST.9). When the pre-service teacher’s content knowledge was lacking, one supervising teacher commented that she felt limited as to which topics she could confidently assign to the pre-service teacher teach indicating they were not adequately qualified.

**Action Taken**

There is a focus on pedagogical content knowledge in the Curriculum units for all science and maths education units. There are also recent changes to the compulsory units in the Bachelor of Science degree course that will ensure that all students will have completed five – foundational units that should ensure a better background knowledge in Science.

**Issue: Conceptual thinking is required**

The lack of pedagogical knowledge was also evident in the students at Type 2 school, where students continued the placement, one day per week after the initial 10 day block: “I don’t think they had sufficient background to take in what was required. That slowed down their progress compared to other institution where they have had a solid year of background on classroom procedures, lesson structures and materials which would fire the kids up. It was very much a hold their hand scenario.” (ST.1) This comment highlights the reasonable expectation by supervising teachers that universities will prepare the pre-service teachers before they are permitted into schools, and that pre-service teachers will be creative, innovative, take risks and move away from a textbook.

**Institutional structures and relationships**

Professional relationships are key to the success of pre-service teacher professional development. There is however, evidence that the students are often inexperienced and lack an appreciation of the fundamental attributes necessary to forge healthy relationships including punctuality, clear communication, planning, openness, expectations and the roles of all stakeholders. The number of links in the communication chain can mean that the original message is not communicated as clearly or as accurately as originally intended.
The pre-service teacher is receiving information from academics at university, supervising and coordinating teachers and staff in the professional experience office (Figure 2). Punctuality, enthusiasm, initiative, willingness, responsive, and well-organised are words used by Supervising Teachers to describe desirable characteristics in a pre-service teacher. Advice from the Supervising Teacher included:

- communicate with Supervising Teacher,
- be at the school well before the beginning of the day.
- be ready for lessons;
- you need to think of yourself as a teacher.

**Issue: Understanding the role of the coordinating teacher**

The coordinator manages communication between the school to the university - managing the requests from the universities - matching available supervising teachers to the request for various discipline areas and practicum period. The coordinators manage request in accordance with the schools policies for example, one school had a finite number of pre-service teachers permitted at the school at any one time; some schools have memorandums of understanding with particular universities which will receive preferential consideration; and teachers may impose stipulations such as not wanting pre-service teachers working with VCE students, or not wanting pre-service teacher for extended lengths of time.

The coordinators commonly ask for expressions of interest from all teachers at the beginning of the school year, however at one school, the coordinator asks particular teachers individually. All the coordinators spoke of the difficulty in meeting the requests both in number and in discipline areas. Not all the
teachers in the school are available to be supervising teachers, some are not willing, others are not suitable (as reviewed by the coordinator), and not all supervising teachers are able to provide the necessary time because of small teaching loads, discipline constraints, administrative responsibilities, and part-time teaching etc.

Coordinators manage the pre-service teacher’s placement, liaising with the university and the supervising teachers. The coordinator tracks the progress of each pre-service teacher while they are at the school. He or she intervenes when necessary - providing advice to teachers, requesting visits from university academic staff, making recommendations for alternative placements etc. The coordinators collate reports and send them back to the university.

In this study the coordinating teachers at various schools were very aware of issues that had arisen with pre-service teacher, the Supervising Teacher and students. In all cases the coordinating teacher had shown excellent leadership in managing, at times, difficult situations. One example where a pre-service teacher had had a negative first experience, the Coordinating Teacher re-assigned her to a particular Supervising Teacher because he “was a gentleman, who can calmly stroke children verbally and emotionally”; thereby consciously matching supervising teachers and pre-service teachers according to their needs. The expertise of coordinating teachers became evident from interview data. One coordinating teacher explained that pre-service teachers had to appreciate that we (referring to the teaching profession) are in the relationships business and be aware of the importance of their relationships with their supervising teachers, students and other staff.

**Recommendation**

The role of the supervising teacher and coordinating teacher is explained to pre-service teacher. The pre-service teacher prepares a short profile of themselves (half page) that is forwarded to the Coordinating Teachers and Supervising Teacher - to provide background information that is relevant to their working with children in teaching science such as the major /minor area of study and extent of completion of the course, experience with children such as coaching, umpiring, tutoring, and working commitments (if relevant), and areas they want to focus on during the forthcoming practicum.

**Issue: Understanding the Role of the supervising teacher**

Many Supervising Teachers mentioned the enjoyment they had in helping pre-service teachers, where they gained new knowledge as well as taught the pre-service teacher. Most regarded it as part of their professional responsibility - their commitment to next generation, just as they had experienced. The supervising teachers have a variety of perceptions of the role of the pre-service teachers - including:

- an apprentice model of learning;
- learning practical school based skills over theoretical university concepts;
• developing new curricula, and showing new ways of teaching.

The Supervising Teacher commonly saw their role as:

• providing insight into strategies, and practice, but not to "spoon feed them(ST.6)");
• giving constructive feedback and advice.
• giving positive reinforcement
• identifying potential, and
• reporting to the relative experience of the student teacher.

The role of the supervising teacher was described by one Supervising Teacher as: "we’re there to point them in the direction and then they get on with it. If you want us to provide you with one or two things along the way we will; but it is not the idea that we have to give you the information, give you the skills, tell you. You have to spend time with the lab technician working through the prac" (ST.6)

In some instances the roles were not clearly delineated with the Supervising Teacher’s frustrated by the lack of initiative and innovation shown by some pre-service teachers, with comments such as "but there comes a point where we say: “No, you’re supposed to be developing your own material, you have a different slant on it to the slant that we have; we are giving you the opportunity, here is a classroom run with it, do something that we wouldn’t do, pick up an idea that we wouldn’t have thought of, run with that”.(ST.6)

Supervising Teachers, who are supportive, provide feedback, good leadership, are clear communicators and have realistic expectations of the pre-service teacher provide the most influential component of the pre-service teacher’s development. An authentic learning situation, and receiving individual instruction and feedback from the Supervising Teacher provides the best learning experience and this is corroborated by the pre-service teacher’s who all confirm that the practicum is the best learning experience.

There are several examples of the pre-service teacher’s having less than ideal relationships with their Supervising Teacher for example one pre-service teacher commenting that she was "so stressed, working on how I was going to please my mentor”.(PST 2). There are a variety of reasons for this - and many are due to individual differences. Some common reasons include:

• a lack of communication,
• pre-service teacher having inadequate subject knowledge and so the Supervising Teacher not having confidence in the pre-service teacher being able to teach effectively
• pre-service teacher having inadequate pedagogical knowledge and the Supervising Teacher not having confidence in the pre-service teacher
• pre-service teacher not acting on feedback,
• Supervising Teacher having unrealistic expectations

The coordinating teacher liaises with the Supervising Teachers, passing on the University Professional Experience handbook that outlines the expectations and requirements of the university.

**Recommendation**

To minimise any misinformation, it is recommended that Supervising Teacher be given details of the previous experience of the pre-service teacher, a copy of their short profile, the expected outcomes and the assessment template.

**Issue: Establishing and Maintaining Professional Relationships**

Among the interviews there are examples of excellent, good and poor relationships between the pre-service teacher and their Supervising teachers. There were some examples of a clear disjunction between a pre-service teacher’s identity and the assessment by their supervising teacher with for example a pre-service teacher becoming over confident in his abilities to teach and in another case, a pre-service teacher retreating, and losing all confidence. Three of the pre-service teacher in this study reported very difficult experiences - confronting, feeling inadequate, unsupported and emotionally and mentally draining. These individuals may have come forward earlier with concerns if they had had greater induction into the role of the various individuals at school and at university.

In this study there was evidence of miscommunication between the Type 2 School and the university as to the selection of pre-service teachers, the prior teaching experience of the pre-service teachers and the role of the pre-service teachers. The Coordinator Teacher (CT.1) explained:

“*When we initially approached Deakin we were very interested in final year students who were going to make a significant contribution to our curriculum development as well as us giving them a significant contribution to their teaching practice. They were supposed to advertise to students who were interested in this project and chose to come to this school. The arrangements were made so late they didn’t have the ability to do that. The initial group they gave me, I said we don’t have Environmental Science as methods. There weren’t supposed to be Environmental Science students here. It was a very special teaching situation that had been set up but no selection procedures that we had requested had taken place. These students were not given sufficient background into what they were coming into. We don’t believe they were aware of that or aware of their responsibilities.*”

Many of the issues that arose with the pre-service teacher in the Type 2A school was a result of this initial miscommunication, as the pre-service teacher - with no practicum experience, having had no education background were expected to make significant contributions to the teaching program. The pre-service teachers are extremely vulnerable especially when they are new to the teaching role and are learning about the profession.
Recommendation

The staff at the university and the schools shares common and realistic expectations for the pre-service teacher at their stage of professional development.
Discussion

The discussion will address each of the four research questions in turn and then examine how the research aligns with the seven principles of highly effective professional learning.

1. What differences are there in the pre-service teachers’ professional experiences between those undertaking the four block Professional Experience (Type 1) and those doing the two block and one day per week (Type 2) practicum?

The data shows that the students undertaking the Type 2 experienced teaching sooner than students in the alternative block model. The weekly teaching commitments were additional to their normal university load and some students struggled to cope well with the demands of both teaching and studying simultaneously for the whole year. This is evident in the results of more students from the Type 2 model, having difficulties with their practicum than from the Type 1 model. There was no allowance made for assessments for the Type 2 group of students, despite having this additional load. They did however have additional free time during week 9-11 of the trimester when the other students were teaching in their block. There were high expectations among the Supervising Teacher and the Coordinating Teacher of the pre-service teachers despite them having no previous teaching experience. Both groups experienced the initial ten day block and universally it was noted that the students were not well prepared for the initial practicum.

All the students at the Type 2 school volunteered and attended additional days - at the school and attending camp. The assumption with the Type 2 model was that the pre-service teachers would have greater opportunity to experience the change across the whole school year, and become and active member of the school, by for example being involved in extracurricular activities. The constraints to this were the demands on the pre-service teachers’ time. They juggled university study, outside work and one day teaching each week.

Some students at Type 2 experienced stressful relationships with their supervising teachers. There were limitations with visiting a school one day per week in establishing continuity with students and the curriculum. Regular communication with the supervising teachers was needed to be able to pick up from where the class was up to and teach.

2. What differences were experienced by students being undertaking their placements at the same school over the year compared those undertaking their placements at two schools over the year?

The significant factor impacting on this factor is the inexperience of the students, and the need for them to experience a variety of school and teachers. Supervising teachers voiced concerns about limiting the pre-service teachers experience to one school, because they missed opportunities to experience a variety of
students, and teaching and learning environments. Institutions were pre-service teachers had poor relationships with their supervising teachers then the opportunity to start at a new school was welcome.

3. **To what extent does the existence of ongoing relationships or partnerships between schools and Deakin University impact on the pre-service teachers experience and on the experience of the supervising teachers?**

The professional experience in a school community provides a powerful teaching and learning environment for pre-service teachers and the university courses provide essential foundational knowledge for becoming teachers. There is often little or no integration or knowledge of the two learning environments despite having the common goal of developing the pedagogical skills of the pre-service teachers. The existence of relationships and partnerships are valuable for placing pre-service teachers and meeting the organisational and administrative requirements. Several coordinating teachers reported giving preference to Deakin pre-service teachers because of the existing partnership or relationship between the university and the school. This commitment usually meant that the school coordinator was familiar with Deakin staff, policy, expectations, standards and reporting, and that they gave preference to Deakin pre-service teacher. One school in this study routinely takes Deakin students and manages the pre-service teacher placements for other schools in its geographic area (cluster). Another school involved in this study has a formal commitment to promoting Science and Technology Education and is in a partnership with Deakin University. This is however, a new initiative and has not yet impacted on the pre-service teachers professional experience

Relationships and partnerships are founded on the participants having common objectives. It is important that in this case, the stakeholders- coordinating teachers, supervising teachers, university academics and professional experience staff who are all experienced educators, but come with different areas of expertise, all share a common objective – the development of pre-service teachers. The pre-service teachers have contact with all the stakeholders, but the stakeholders do not necessarily have to have a great deal of contact, if any, with each other (Figure 3).
The professional experience is a most significant component of a teacher’s education. The authentic learning opportunity and individual attention of a supervising teacher to every detail of your lesson is expensive in time and dollars and should be valued. Coordinating and Supervising teachers, who are aligned with the goals of the university and familiar with the programs that education lecturers provide, improve the experience for the pre-service teacher. One coordinating teacher argued that “the theory should come with hands-on experience inferring that at university it can fall on barren ground” (CT.2), commenting on the need for authentic learning opportunities.

The results of this study suggest that through partnerships the pre-service teacher’s experience can be made richer and be more connected to their experiences at university. Tensions between the demands of the science degree, the teaching degree and the school experience argue for mediation and improved communication between the two learning environments - at university and at school.

4. How do the pre-service teachers’ understandings and appreciation of the teaching of science/maths, in particular scientific pedagogical content knowledge, change over the year? What influences these changes?

The pre-service teachers’ content knowledge in science/math’s impacts on this question:

- The number of specialist areas that a science degrees can include has increased; there are more specialist areas- and these not always provide the learner with the more general science education covered in school science
• The science / maths content learnt at university is not taught at school, however the scientific way of thinking, and the epistemology of the discipline is applicable at all levels of education and it is considered important for science/maths teachers to be able to apply this way of thinking to new content areas.

• The Science field covered in school can be very large and the pre-service teacher cannot be expected to know all the content; however there is an expectation that they have the skills to be able to research and learn new content.

• Pedagogical content knowledge – the specific strategies and approaches that are optimum for particular content areas – is the focus of the curriculum units and develops as pre-service teachers gain experience teaching scientific content.

In this study, there were individual differences as to the level of content knowledge. There were strong comments by some Supervising Teacher as to the adequacy of the scientific knowledge of the pre-service teachers however, other pre-service teacher were considered to have adequate knowledge. The concerns were genuine and impact severely on the pre-service teacher ability to teach. This inadequacy needs to be identified and addressed and opportunities provided for these particular pre-service teachers to learn the content of the curriculum. It is necessary for the pre-service teacher to be confident in the content knowledge so that they can focus on the pedagogical aspects of how to teach the content.

Without a solid background in curriculum studies the students were ill-prepared as has been discussed. The most significant influence on the pre-service teacher over the year was the impact of their relationship with the Supervising Teacher. It is through the professional experience at schools that they are supported, trained, given instruction, learning content and pedagogy in situ. Experiences teaching a variety of topics meant that pre-service teachers trialed various pedagogical approaches. The University curriculum units, in which the pre-service teachers, cover a variety of pedagogical approaches and content areas and prepare units of work add to this experience. As familiarity with curriculum documents, the DEECD resources, textbooks etc, grows, the pre-service teachers’ level of confidence and practice at applying pedagogical principles to content areas generally improved.

5. Which components of the professional development program can be shown to contribute to pre-service teachers achieving the Victorian Institute of Teaching (VIT) Standards for graduating teachers?

All components of the professional development program can be shown to contribute to pre-service teachers achieving the Victorian Institute of Teaching (VIT) Standards for graduating teachers. In particular the following are described:

• Teachers know how students learn and how to teach them effectively.

The pre-service teachers observe and monitor students understanding during the practicum.
• Teachers know the content they teach.  
All pre-service teachers are completing a Bachelor of Science, however if they didn’t know the content to be taught, they had to learn it.

• Teachers know their students.  
Pre-service teachers actively tried to get to know students, observing learning names etc

• Teachers plan and assess for effective learning.  
The pre-service teachers had to use diagnostic, formative and summative assessment forms in their lessons.

• Teachers create and maintain safe and challenging learning environments.  
The pre-service teachers designed and undertook lessons that endured safe and challenging learning environments

• Teachers use a range of teaching practices and resources to engage students in effective learning.  
Teachers are introduced to a variety of teaching approaches and begin to discriminate as to the effective strategies for particular students and particular content

• Teachers reflect on, evaluate and improve their professional knowledge and practice.  
The lesson plans include reflective comment, and while the Supervising teacher provides feedback and critical commentary there is evidence that many pre-service teachers could improve and expand their reflective practice..

• Teachers are active members of their profession.  
The pre-service teachers participate fully in the school life- attending meetings, professional development programs etc while they are present.

**Conclusion**

The pre-service teacher is at the centre of this study. There are some issues related to the constraints that the undergraduate and double degree produce; others relate to the restrictions of working within the constraints of both school and university ;and yet others are more widely applicable to all pre-service education including mentoring, relationships, communications and enculturation issues. The professional experience arranged by Deakin University and provided by staff and schools is of a very high standard. All stakeholders are working towards a common goal of providing every opportunity for the pre-service teachers to develop as excellent teachers. The data from the study has shown that the block program of study is preferred, and that the pre-service teachers should have the opportunity to experience a variety of schools during their development. The role of the Coordinating Teachers was shown to be significant not only in liaising with university, but also in managing and providing leadership within the school for supervising teachers and for the pre-service teachers. The Coordinating Teachers dealt with many issues before they became barriers or problems. The Supervising Teacher as the primary contact with the pre-
service teacher plays a vital role in nurturing, supporting and leading the pre-service teacher through the
difficulties of managing and organising an effective learning environment.

Many of the issues concerning the scheduling and lack of preparedness have been dealt with
through changes to the programming of the professional experience in future years. The results reinforce the
importance of setting up a progressive staged development of the professional experience program over the
maximum time available (4 years), and recognise the limitations of the double degree commitments.

Professional relationships that form at school and university have been shown to be instrumental
for the success of the professional experience with communication key to their success. Knowledge of
school etiquette and professional behaviour has also been shown to be integral to a positive professional
experience.

The partnerships and relationships that have developed between university and schools promote a
strong and shared vision for the pre-service teachers’ professional experiences. The partnerships provide
opportunities for links between theory and practice to be made more effectively.

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Victorian Institute of Teaching: Standards for Graduating Teachers Source:  

APPENDIX A

Bachelor of Science/Bachelor of Teaching
Ref http://www.deakin.edu.au/current-students/courses/course.php?course=D351&version=1

For students commencing 2007 and 2008:

Level 1 Trimester 1
EEE101 Communicating Science (B, G)
One Science minor unit
One Science elective unit
One Science major unit

Trimester 2
EEE100 Being a Science Learner (B)
One Science minor unit
One Science elective unit
One Science major unit

Level 2 Trimester 1
SBS251 Research Methods and Data Analysis (B, G, W)
One Science minor unit
Two Science major units

Trimester 2
SBS350 Community Science Project (B)
One Science minor unit
Two Science major units

Level 3 Trimester 1
EEE201 Creating Effective Learning Environments (B)
Secondary Curriculum Method study 1 A*
Secondary Curriculum Method study 2 A*
One Science major unit
EEY304 Secondary School Experience 3C (B)

Trimester 2
EEE202 Curriculum Assessment and Reporting (B)
Secondary Curriculum Method study 1 B*
Secondary Curriculum Method study 2 B*
One Science major unit
EEY305 Secondary School Experience 3D (B)

* Units selected from the School of Education.

Level 4 Trimester 1
EEE401 Professional Relationships (B, G, W)
ESE499 Independent Project (ONLINE)
ESS439 Issues in Science and Environmental Education (B, X)
EXC425 Literacy and Numeracy Across the Curriculum (B)
EEY401 Secondary School Experience 4A (B)

Trimester 2
EEE402 Transition to Beginning Teaching (B, G, W)
EXC440 Teaching for Diversity (B)
ESS415 Resources in the Contemporary Science Curriculum (B, G, X)
EEH530 Promoting Student Wellbeing (B, G)
EEY402 Secondary School Experience 4B (B)
EEY403 Secondary School Experience 4C (B)