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Integrating ICT in Pre-service Teacher Education – reframing teacher education.
(Work in Progress)

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A recent study by Taylor (2004) examined teachers' existing understanding of Information and Communications Technology and the way it changes as they learn to teach. Using this current study and others (Simpson, Payne, Munro, & Hughes, 1999; Vrasidas & McIsaac, 2001) the aim of this project is to conduct research into pre-service teacher education and the integration of ICT learning in education courses.

The study aims to conduct initial research and trial of innovative teaching methodology as a basis for further study into how to better integrate ICT learning into curriculum method classes in pre-service education. An identified aim of curriculum standard frameworks in Victoria is the integration of ICT learning across the curriculum. This study intend to examine how prospective secondary teachers in the key learning areas of SOSE, English, Science, Mathematics and Technology are using ICT in their methodology classes that prepare teachers for their specialized teaching. Preliminary discussion with method lectures has revealed an uneven use and knowledge of ICT across the key learning areas. This study intends to examine the reasons why this may be the case, raise issues about ICT in relation to key learning areas and propose recommendations to redesign initial teacher training.

The significance of the study

- Addresses issues related to initial teacher education. New teachers are expected to integrate ICT into their teaching once in schools, however, their teaching courses show that this knowledge is unevenly tackled in teacher education courses;
- Forms a basis for further advocacy for greater funding for teaching courses in order to equip new teachers with the necessary ICT skills prior to their initial placement;
- Promotes integration of ICT with best pedagogical practice teacher education courses so that new teachers are able to bring new knowledge into schools and create an impact from the onset;
- Encourages universities to be more creative with teacher education courses and advocates greater funding for innovation in teacher education courses; and
- Establishes a foundation for ongoing research into ICT in relation to key learning areas by conducting a comparative study of pre-service courses at Victorian Universities.
Current Models for ICT usage

Welliver’s Instructional Transformation Model\(^1\) has teachers progressing through five hierarchical states in order to integrate ICT effectively.

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<tr>
<td>1. Familiarisation</td>
<td>Teachers become aware of technology and its potential uses.</td>
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<td>2. Utilization</td>
<td>Teachers use technology, but minor problems will cause teachers to discontinue its use.</td>
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<td>3. Integration</td>
<td>Technology becomes essential for the educational process and teachers are constantly thinking of ways to use technology in their classrooms</td>
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<td>4. Reorientation</td>
<td>Teachers begin to re-think the educational goals of the classroom with the use of technology</td>
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<td>5. Revolution</td>
<td>The evolving classroom becomes completely integrated with technology in all subject areas. Technology becomes an invisible tool that is seamlessly woven into the teaching and learning process.</td>
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Every educator looks at integrating technology and its challenges from a different perspective. They tend to focus solely on how it affects them in terms of their workload, impact on students, their current skills/knowledge, time management, motivation and vision. The barriers to efficient technology integration can be overcome through effective leadership, training and a commitment to enhancing teaching and learning using technology.\(^2\)

It has been argued that with proper technology training, teachers;
- Create relationships between active learning and active teaching
- Develop an appreciation and an understanding of the potential of technology
- Learn to be authors of multimedia software
- Develop leadership skills and become role models for successful integration
- Understand the power of technology integration
- Design integrated curriculum activities
- Learn the benefits of technology in the classroom
- Develop ownership of the technology through authentic experiences
- Learn to motivate students with technology
- Achieve success by becoming informed and reflective decision makers
- Become advocates for technology integration


What is meant by proper training?

This perhaps, could be better termed as integration training. Not only do teachers need to learn the skills but in addition, they need to learn what is possible in their subject area. Pre-Service Education Teachers need to learn how ICT can be integrated within a particular KLA and what this means for them. It is not suggested that integration training provide all the answers, but would empower teachers and
enable them to develop their confidence and vision for full integration and in addition, pass this onto their students and hopefully facilitate an innovative learning environment.

**Is training the perfect band-aid?**

It is doubtful that training alone would heal all the ills in relation to the integration of ICT in Pre-service Teacher Education. It can be argued that the structure of Dip Ed courses also has a role to play in impeding integration. It has been found that those teachers who casually chat about their subjects and content on a regular basis appear to be the ahead of integration race and this is especially so at La Trobe University. However, ICT still isn’t seamlessly woven into the teaching and learning process. There seems to be much debate over each teacher’s role in the delivery of ICT education in terms of skills and software.

It can be suggested that a new paradigm for teaching has to be developed to serve the needs of teaching and learning in the pre-service education environment. The study intends to apply Welliver’s Instructional Transformation Model as a basis for trialing an innovative redesign of units in a Diploma of Education course. The redesign will focus on ways of integrating ICT into method classes for key learning areas of SOSE, English, Science, Technology and Mathematics.

The current structure at Latrobe University is to have separate method classes for SOSE, English, Science, Technology and Mathematics. The ICT component is a unique unit in the course where prospective teachers learn the fundamentals of ICT usage. There is more advanced ICT learning that is available as an optional subject. The research intends to address the issues with ICT that arise from a segregated approach and trail an integrated approach to ICT across the key learning areas.

**Methodology for Project**

1. Discovery research will conduct a detailed literature review of ICT and teacher education;
2. Case study of Latrobe University Diploma of Education program;
3. Identification of issues related to ICT and teacher education’
4. Conduct pilot project to adapt Welliver’s Instructional Transformation Model; and
5. Evaluation of pilot project with recommendations for a new model that integrates ICT.

**Preliminary Results**

Questionnaires distributed to 140 students currently undertaking a Post graduate Diploma of Education Course. This accounted for 70% of the Dip Ed Cohorts and we received a 30% response rate. The respondents were split into 2 groups:

- 28 Primary Dip Ed students
- 16 Secondary Dip Ed students

Questionnaires contained both open-ended and a small number of closed questions and in addition we included a ranking scale that left out the numbers. Students were asked to rank themselves according to certain criteria and in an attempt to steer them
away from ranking towards the middle of a pre-set scale, we omitted numbers and on analysis used a transparency to help give us a picture of the students’ rank. If this were to be repeated we would aim to increase the response rate by asking to students to complete questionnaires within a given time limit, for example, by returning them at the end of a session.

Students were asked; whether they used ICT with your students on your first teaching round? The aim of this question was to ascertain the extent to which ICT was integrated into their teaching by the first teaching round.

![Graph showing usage of ICT by primary and secondary students. Green bars indicate yes, red bars indicate no.]

**Figure 1**

At first glance, it would appear that primary students seemed to have a greater propensity for the use of ICT within 1st teaching round. However, this must be approached with caution due to the small sample size.

What is interesting though, from the qualitative data collected is what they actually did. For both groups this usage tended to air on the simplistic side; using word processing, Powerpoint and the Web for general researching seeming to be the common patterns of use. It is also interesting to note, there appeared to be no distinction in some students’ responses between their own use of ICT (personal ICT Skills) and how they used it in the classroom with students.

Students were also asked to comment on barriers/obstacles and tended to be for both groups mainly problems in accessing the technology or slow or inadequate web access. In addition to this, primaries often cited lack of encouragement or support from supervising teacher, supporting the findings of Jones (2002)

Arising from concerns about some responses regarding the inability to differentiate their own use of ICT (personal ICT Skills) and how they used it in the classroom with students it was necessary to attempt to correlate questions 3 and 4 on the questionnaire:

Q3 How skilled were you in using ICT effectively during your first teaching round?
Q4 During your first teaching round, how much knowledge did you have of the possibilities for using ICT and what could be achieved with its use?

**Comparison of personal skill and knowledge of possibilities…**

![Graphs showing comparison of personal skill and knowledge of possibilities.](image)

\[t=2.398\]
\[p<.05\]

**Figure 2**

Primary students overall, reported that they were moderately skilled in using ICT during the first teaching round. In terms of possibilities for use of ICT within teaching, they rated their knowledge at a slightly lower level. However, for secondary students there was a similar trend, but the difference between skill and knowledge of possibilities was not as evident.

When comparing Primary and Secondary students there appears little difference between their perceptions of knowledge of the possibilities.

Indications appear to point to the students’ being at the FAMILIARIZATION stage of Welliver’s model. Teachers become aware of technology and its potential uses. With some moving into the next stage – UTILIZATION where teachers use technology, but minor problems will cause teachers to discontinue its use.

This concurs with the study by Taylor (2004) where she examined the relationship between personal ICT skills and development of understanding how to teach geography using ICT. The study found that some students had high personal skill level but were only thinking about using ICT in teaching and learning at a fairly basic level. In addition, there were some who had below average skill level and yet were beginning to think at a more advanced level in terms of ICT and pedagogy.

Anedotal and assignment evidence for this study seems to also concur with the latter finding of the Taylor study, particularly with regard to students own perceptions of their skill level. In that this often doesn’t equate with the use ICT in the best pedagogical manner.

We felt it necessary to compare students’ views on the ease in which they thought ICT could be integrated into key learning areas and how much they felt they had learned.
in each associated method area. In order to assess where students appeared to gain most of their knowledge about the possibilities of teaching and learning with ICT, we firstly asked to students to rank how difficult they thought it was/could be to integrate ICT into their teaching for each KLA.

Note: The Technology KLA (which incorporates Learning Technologies/ICT) has been purposely omitted from this study. The purpose of this, being to assess where students gained knowledge of how & when ICT integration could best happen in each KLA and we didn’t want to confuse this with ICT skills. It was also felt that students have been mostly learning about ICT out of context.

**Comparison of views on integration within each key learning area with amount learned in about it in each KLA**

![Graph showing ease of integration and amount learned across different KLA](image)

**Primary Dip Ed**

Figure 3
Q6 – How difficult do you think it is to integrate ICT in each KLA

Q7 – During the course, how much do you feel you learned about the integration of ICT in each KLA

**Primary Students Responses**

Apart from Visual and Performing Arts (VPA) and Health and Physical Education (HPE), students overall tended to indicate reasonable ease with respect to integration of ICT across the KLAs. However, the extent to which students felt they had learned about integrating ICT in teaching within the KLAs was rated at a lower level. Suggesting they did not learn as much as perhaps they thought they should. This supports the findings of Simpson et al (1999) “…trainee teachers felt their tutors had failed to deal as extensively or effectively as they would have wished with key factors associated with the pedagogical use and management of this powerful resource.”

It is interesting to note also, that there seemed to be some relationship between students’ perception of ease of integration and how much they felt they learned in that KLA. The qualitative data collected, helps us to suggest some reasons for this; modeling of ICT integration by lecturers; and also students reported that inclusion of ICT as an assessment requirement in that KLA helped develop their understanding. This concurs with Taylor (2002) in which she identifies three experiences that help students develop their understanding of teaching using ICT:

1. University Teaching
2. Assignments
3. Experience of teaching using ICT

However, this could potentially pose a problem in that, simply requiring the use of ICT for an assessment task does not necessarily mean students have learned about the use of ICT within their own teaching. It leads us to question whether students are able to distinguish between personal ICT skills and the pedagogy of teaching and learning with ICT.
Secondary Students Responses
Compared to Primary Dip Ed students, there didn’t seem to be as great a difference between mean scores for students’ perceptions of ease of integration and how much they felt they had learned about teaching and learning with ICT in each KLA studied.

This could be due to the small sample size. There is also the possibility that because they study only 2 method areas they are able concentrate more on the pedagogical issues of teaching and learning with ICT rather than focusing on personal ICT skills. However the data shows that this hasn’t necessarily increased their propensity for use of ICT within their teaching.

Implications
New model for Integrating ICT in Pre-service Teacher Education?
- Simpson et al (1999) suggest all lecturers should help their students learn about:
  - How ICT supports learning
  - How to integrate ICT into the curriculum
  - How to differentiate tasks using ICT
  - Management of ICT resources in the classroom

- How is this best achieved?
  - Some suggestions so far:
    - New model for integration
    - Context-based learning
    - Team learning

Issues to be considered
How can we help students differentiate between personal ICT skills and the pedagogical issues of teaching and learning with ICT?

How can we overcome obstacles such as lecturer reluctance to be involved with trialing a new model for integrating ICT throughout pre-service education?

Decontextualisation of PD away from normal practice eg ICT, discipline, teaching practicum…a way to combine all three as the norm for pre-service teacher training.

How do we establish meaningful links beyond the current practice?

Can we create the cooperative learning environment for each discipline? Eg for SOSE inquiry method as learning strategy may need particular ICT management/teaching techniques.

Shift of concern away from lack of access to technology but to lack of modelling of technology usage by teachers in schools;

pre-service teacher is restricted in legal sense from taking responsibility of classes on teaching round, therefore they have to contend with authority of supervisor. Jones (2002)
References:

Jones A.J. (2002) Integration of ICT in an Initial Teacher Training Course: Participants’ Views


