Transforming Learning Using ICT- A Time to Move Away From Integration Models

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Abstract: *A key focus in Australian schools and higher education settings has been on the use of e-Learning tools and information and communication technology (ICT) integration using authentic assessment. The implementation of these approaches challenges us to use ICT as a tool for change. Much of what is referred to as integration is more accurately described by Finger, Russell, Jamieson-Proctor and Russell (2007), as transformation. However, there is a critical difference between ICT transformation that demonstrates change and its reasons, and ICT integration. Each comes from differing paradigms with varying outcomes and directions.*

This paper critically examines practices and strategies for ICT use in the classroom and explores the differences between the two paradigms, namely the integrative and transformative models from a higher education perspective. This paper challenges the 'integrative' model of technology use that encourages the acquisition of skills in contrast to the 'transformational' model where ICT is used to enhance the curriculum content.

Introduction

As the move towards ICT integration appears to continue to grow unabated, the more important it becomes to examine the effectiveness of the technologically integrated learning process and whether or not transformation to the learning environment has occurred. In any educational environment it is not a matter of simply using the technology, but evaluating how ICT is being used to foster learning, for what purpose ICT is being integrated into the learning environment and assessing whether or not ICT is being utilised to enrich and essentially transform teaching and learning.

A review of current trends and policies reveals that the contemporary practice for ICT inclusion in educational policy, for both schools and higher education, is that of integration. The term integration in relation to ICT in education appears ubiquitously in the literature. Fluck (2003) defines the term integration as the degree to which "ICT vanishes into the background of the classroom learning activity" (p. 28). Lloyd (2006) suggests that the term ICT integration connotates a wide variety of learning environments; from a single personal computer in the classroom to a situation where the teaching is done by the computer through online applications. For Fluck and Lloyd the integration of ICT is not a focus on the technology but more about the pedagogical means through which the technology is employed in the classroom, a description which could be argued is not holistically represented by the term ICT integration.

There have been significant developments in the effective implementation of ICT in Australian schools. In 2005 the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) released the *National Goal for Schooling and Information and Communication Technology (ICT)*. These goals identified the importance of learning with computers, as opposed to learning about computers through "integrating technologies, engaging students in ways not possible, creating new learning and teaching possibilities, enhancing achievement and extending interactions with local and global communities" (MCEETYA, 2005, p. 2). Such approaches to the use of ICT present a key fallacy and the notion of ICT integration is an inaccurate description. Much of what is referred to as integration can more accurately be described as transformation (Finger et al., 2007).

There is a critical difference between ICT transformation, as shown by Finger et al. (2007) that describes change and its reasons, and ICT integration. Both come from differing paradigms with different outcomes and directions.

'Transformation' is more likely to imply change, particularly with reference to teacher leadership and evidence of reflective practice (Newhouse, Clarkson, & Trinidad, 2005). Integration on the other hand can have the blending and co-ordinating function where the view is that ICT integration is seen to "seamlessly combine parts or elements into a complex but harmonious whole" (Lloyd, 2006, p. 5). In order for educators to assess such pedagogical effectiveness there is a need to understand the constructivist framework that currently dominates and underpins the transformational learning process.

ICT and Constructivism

ICT in education has always been heavily influenced by constructivism (Roblyer, 2003). Constructivism in the ICT classroom is having students interact positively with others and to self facilitate the procurement of their own knowledge. Current ICT practice is a shift away from instructivism, whereby students participate in the direct instruction of technical knowledge with the primary focus of acquiring specific application based skills, towards a constructivist approach where the purpose is in utilising student knowledge and skills in a more meaningful way (Coupal, 2004). Such meaningful learning is a process brought about due to the nature of familiarity a student has with ICT and the participation in experiences such as those supported through the "active, constructive, collaborative, intentional, complex, contextual, conversational, and reflective" characteristics of the constructivist learning experience (Jonassen, 1999). The result is that a student is able to play a far more vigorous role in their learning; from being a traditional passive recipient to being a more active learner, where the learner is able to establish clear ideas and appropriate personal goals that drive the student to search, create, adapt and overcome obstacles in order to meet these goals (Margules, 1996).

Factors that impact on transformative learning have been shown to be underpinned by the school environment and the teachers' knowledge, beliefs and actions (Reimann and Goodyear, 2004). What is of significant importance in this transformative framework is not on the ICT, but more so in how the ICT is used in the classroom (Finger et al., 2007). The transformative framework is characterised by the inclusion of authentic, real-world learning experiences through the following pedagogies: problem-oriented and case-oriented, inquiry-oriented, design, modelling and construction- oriented, knowledge-building and immersive learning pedagogies. Dias and Atkinson (2001) support this framework by stating that the transformational integration of technology has very little to do with technology itself and everything to do with teaching.

Teachers have been identified as having a crucial role in the adoption and implementation of ICT into the curriculum to transform learning. If the potential of ICT is to be realised into education then, as in any other profession, teachers must play a number of roles: they are not only a classroom practitioner but also a manager, a planner, assessor and a learner. This notion is further supported by the MCEETYA (2005) Report *Learning in an Online World* that makes the recommendation to all Australian teachers to integrate ICT in learning and teaching by focussing on learning improvement, classroom and school transformation, addressing the multiple, interactive dimensions of ICT use, listening to and empowering students, providing tools to evaluate levels of integration of ICT in learning, improving personal learning plan efficiency and developing collaborative networks.

Transformational Practice at the Australian Catholic University

Tertiary institutions are embracing the integration of technology in current teaching and learning practices, where technology use is being fused within the traditional tertiary education culture in order to provide more meaningful learning experiences for students. Against this background the Australian Catholic University (ACU), NSW developed an "Online Teaching and Learning Strategic Plan 2007 – 2009" for technology use within the ACU, School of Education NSW teaching and learning environment. The online teaching and learning plan identified the importance of student-centred learning where the focus is on a shift of emphasis in responsibility from teacher to student (Australian Catholic University, 2007). In order to implement and realise these plans the ACU, School of Education NSW has adopted key strategies in teaching and learning with ICT integration. The School of Education promotes general characteristics of effective learning, such as having clear learning goals and a wide repertoire of learning strategies, using available resources effectively, and understanding the learning process that emphasise planning, monitoring, evaluating and adaptive learning processes (de la Harpe, Kulski, & Radloff, 1999, p.110). In

support of these the School of Education has embraced the principles that describe characteristics of a high quality learning design in higher education from a learning perspective (Agostinho, Oliver, Harper, Hedberg, & Wills, 2002).

Consistent with School of Education principles Boud and Prosser (Australian Universities Teaching Committee, 2001) argue that in order for the potential of high quality learning to be realised learning design needs to address the following four principles:

- Engage learners by considering learners' prior knowledge and their desires and building on their expectations.
- Acknowledge the learning context by considering how the implementation of the learning design (be it a one class session, over the period of a few weeks, or the entire subject) is positioned within the broader program of study for the learner.
- Challenge learners, by seeking the active participation of learners, encouraging learners to be self-critical and supporting learners' ampliative skills.
- Provide practice by encouraging learners to articulate and demonstrate to themselves and their peers what they are learning.

these principles demonstrate a paradigm where ICT is used to augment and transform learning.

Within the current context of higher education these principles are consistent with views of the use of effective transformational learning strategies and principles that encourage sound learning design, a broad range of resources and pathways through the Learning Management System (LMS), and high levels of learner interaction (Bullen & Janes, 2007, Khan, 2006, Weert & Tatnall, 2005). These principles are holistic in that they incorporate both learning outcomes and learning processes and are based on the premise that learning arises from what students experience from an implementation of a learning design. To be effective in professional teacher preparation programs students need to develop their own models of professional growth in order to have frameworks to guide their career planning (Bransford, 2000).

The School of Education NSW has a clear approach in its courses to these principles, however, the change in professional practice to achieve these outcomes required building upon existing practices for using ICT and encouraging students to begin to build frameworks and portfolios of their professional learning. Therefore, the change in focus of the pre-service professional programs, offered by the School of Education NSW, has been on the use of e-Learning tools, ICT integration, assessment, student perceptions and evaluation. This is consistent with Somekh's (2007) view that a student's performance is associated with motivation and engagement, the penetration of ICT, policy and the evaluation of the impact of ICT implementation.

Project Overview

In 2005 the School of Education NSW developed an ICT based scope and sequence to ensure that ICT content was distributed across the mandatory undergraduate education based units, but more importantly to ensure that the traditional teaching and learning environment was transformed. As a result 3 ICT modules were developed, with varying degrees of content and skill; from the acquisition of basic skills in module 1, through to web authoring in module 2 and the development of e-portfolios in module 3. The integration of ICT into the education based units involved the distribution of time in pedagogical practice, and assessment to both the education and ICT components.

Online evaluations were administered to both students and staff on the present educational integrative practice with mixed results. The majority of students expressed their inability to contextualise and transfer ICT into the classroom with many still viewing ICT as an additional entity. A high proportion of staff also supported this view with many indicating that present integrative practice, and assessment, did not promote critical reflection and the transference of ICT from the tertiary learning environment to the school environment due to the skills focussed approach conducted.

It was acknowledged that in order truly transform the present practice that ICT integration would need to be renamed and reconstructed to fit into the evolving learning environment. In 2007 an ICT Strategic Committee was developed to reconceptualise, remodel and transform the educational learning environment as represented in the conceptual framework (Figure 1).

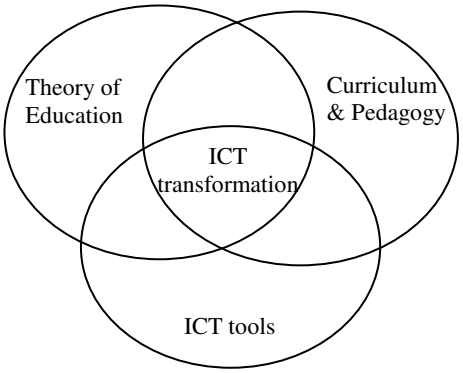

Figure 1: Conceptual Framework

In order to bridge the gap between ICT integration and transformation, two innovative practises were developed and planned these were the Virtual School and the Learning Activity Management System (LAMS). These were each utilised in the context of a Teaching and Learning Consortium (TLC) to promote and foster student reflective practice.

The Virtual School is a learning object which is web-based and accessed through the LAMS which simulates experiences and interactions in real school situations. Students are presented with case studies, or scenarios, that commence in the first semester of the undergraduate program using the Virtual School and are followed through to subsequent semesters using LAMS and the communication tools within the LAMS. Student teachers are presented with examples of classroom and contextual situations which requires them to respond in a realistic manner. For the student teacher this highlights the real relationships between themselves, their students and the school, i.e. situating learning in authentic contexts. The reality of the Virtual School facilitates in students a deeper thinking and the opportunity to critically reflect on situations that have been transformed from abstract descriptions to conceptual reality.

The TLC is a field-based approach to professional teacher preparation where students complete two units of their second year of university in a mixed mode comprising 50% on campus and the remaining 50% in a school setting. The key focus of student centred learning is the independent project that each school group of students designs, implements and evaluates. While students collect and develop their own profiles as undergraduates through the use of portfolios, the teaching staff within the TLC believed that the processes and methods used do not allow a clear and transparent monitoring of the student's development though their course. The use of ICT to create ePortfolios was proposed to assist students develop a more purposeful and consistent approach to recording their professional reflections and collecting a body of evidence while undertaking their TLC experience. This approach is consistent with transformation approaches to ICT use and demonstrates how it can support high quality learning as demonstrated by the model for ICT transformation (Figure 2).

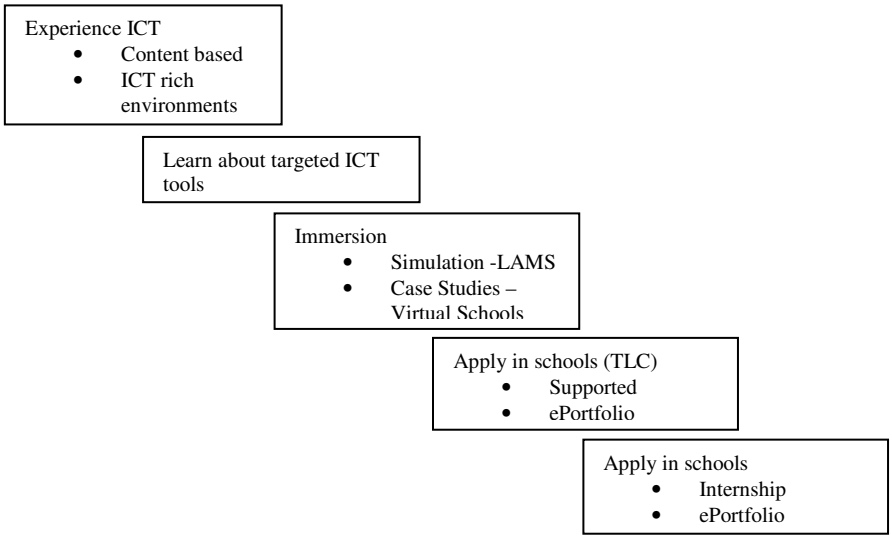

Figure 2: Model for ICT transformation

Project Evaluation

A variety of evaluative instruments were administered, including a capability and attitude questionnaire, an ICT knowledge and skills survey, a reflection proforma along with conducting interviews with the 287 students and teaching teams of the unit (see Table 1 for the data sources and variables assessed).

Variables	**Data Sources**		
	Source 1	**Source 2**	**Source 3**
Students' Experience	Capabilities questionnaire	ICT survey: knowledge and skills	Focus groups
Students' Attitudes	Attitude scale	Focus groups	
Lecturers' Experience	Reflection diaries	Interviews	

Table 1. Methodology

287 questionnaires were completed, 134 from students specialising in primary education and 147 students specialising in secondary education. The students have given very positive ratings to the integrative practices conducted. 82% rated their confidence in effectively communicating their ideas through information technology and 80% of students also acknowledged that the use of the Internet aided in the acquisition of knowledge and skills in this unit. With respect to the effectiveness of the transformative practices implemented into the unit students concurred that the ICT components of the unit were integrated with the content presented in the lectures and tutorials and that the unit contributed toward their information technology skill acquisition (see Table 2).

	Rating (%)			
Item	Strongly agree	Agree	Disagree	Strongly disagree
Q9. The ICT components of this unit were fully integrated with the principles and ideas that were presented in the lectures, tutorials and online materials	45.7	43.7	10.6	0
Q10. I believe that this unit has contributed toward my skills in the use of information technology	43.6	54.6	1.8	0
Q11. The ICT related outcomes were made clear to me early in the semester	32.3	43	24.7	0
Q12. I was able to use ICT knowledge and skills in completing the assessment for this unit	38.7	46.5	14.8	0
Q13. I am satisfied with the level of support that I received in this unit in relation to its ICT component	22	48	22	8

Table 2: Questionnaire results on ICT integration and learning

The fact that the results here are very positive reflects the successful nature of the ICT transformative practices implemented in the unit. The fact that the pedagogical focus was not on the direct acquisition of ICT skills but on a more cohesive approach, that included greater direction through leadership and the ICT Strategic Committee, technologically integrated practices such as the Virtual School and LAMS and the fostering and promotion of student reflective practice through the development of ePortfolios, provides evidence that we are meeting our intentions with a more constructivist approach. The constructivist approach applied cannot be accurately described as merely ICT integration but reflects a uniquely transformed teaching and learning environment.

The Future

This combination of approaches with the use of the Virtual School, LAMS and TLC, in addition to e-learning tools in the LMS has been an excellent strategy for the use of ICT. It is perceived to be high on relevance and thus promoting engagement amongst students in the early units of their studies. It has stimulated students to think deeply about children in context and about developmental theory. It is evident that the integration of ICT has occurred

within these units, however, the changes undergone through the restructuring of the educational units, content, assessment and most importantly pedagogy can only be described as transformational.

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