

ICT for ICT's sake: Secondary teachers' views on technology as a tool for teaching and learning

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This paper reports on a study that sought to explore the pedagogical reasoning behind the use of ICT in secondary teachers' classes. In particular, it explored the question of whether their use of ICT was driven by pedagogical ideals for meaningful learning or whether they were using technology for other purposes. Eighteen teachers from two Australian regional secondary schools were asked how they currently use and integrate ICT into their regular curriculum practices and their reasons for so doing. This paper specifically takes an evaluative look at the pedagogical reasons behind teachers' attitudes, views and reasons for using ICT as a learning vehicle. The study revealed that ICT was largely being used for ICT's sake rather than for any convincing or meaningful pedagogical purpose.

REVIEW OF THE LITERATURE AND THEORETICAL FRAMEWORK

Since ICT (Information and Communication Technology) has been introduced into the classroom, it has been claimed that it has a positive impact on student learning. In the research literature, ICT has frequently been reported as a tool that provides opportunities that transform learning (Selinger, 1998); build knowledge and thinking skills in learners (McFarlane, 1997), and alters the traditional balance between teacher and learner. Zhao et al. (2002) reported that teachers' use of ICT therefore hinged on understanding the affordances and constraints of the technology being used with a greater emphasis on the technical skills (as well as support from the human infrastructure) rather than the pedagogical aspects.

The individual teacher is the important starting point in understanding change within the use of ICT in schools (Donnelly, McGarr & O'Reilly, 2011). Adding to this, Garcia-Valcarcel (2010) pointed out that ICT has not become fully accepted into the classroom and remains as an under-utilized resource in the teaching process even though, in many schools, the resources are reasonably readily available. She suggested that teachers needed a range of professional support however she did not adequately describe how ICT contributes to the learning process. While teachers can show commitment to ICT, they do not seem to recognize the value of it beyond the extent that it can be used to motivate students (Wikan and Molster, 2011). Wikan and Molster claimed that teachers' use of ICT often reflects the outside expectations placed on teachers to use ICT (for ICT's sake), rather than how it might contribute to student understanding. In fact, much ICT research centres on the use or uptake of the resources rather than focusing on the pedagogical use of ICT as a learning tool, or indeed, how it supplements existing mainstream teaching approaches.

Some researchers (Girvan & Savage, 2010) have explored which pedagogical approaches are more appropriate for use with ICT. This approach could have similar outcomes to aligning student learning styles to teaching approaches. The research into ICT use has parallels to earlier learning styles research and comparatively little research into appropriate pedagogical frameworks. Savin-Baden (2008) agrees that much ICT use lacks adequate pedagogical frameworks. This apparent lack of pedagogical frameworks is reflected in Webb and Cox's (2004) review of ICT-related pedagogy that suggests its adoption depends on teachers' values and beliefs and that this is influenced by the teachers' pedagogical content knowledge (PCK). Chen (2010) stated that pre-service teachers' self-efficacy of teaching with technology strongly influenced their use of ICT which in turn was mediated by their perceived value of ICT use.

Schibeci et al. (2011) reported on a study that investigated learning opportunities presented by ICT and the effect on teachers' pedagogy. They reported that once teachers have adequate experience and confidence in three areas, namely, "Approaches to Teaching and Curriculum Development", "ICT Use and Competency", and "Classroom Dynamics", teachers have the ability to deliver effective lessons. While these researchers recognized context as an important factor in teacher professional development and that teachers needed to retain control over their professional development, it is still a step-wise process which is analogous to conceptual change theory but does not recognize the fluidity of classroom learning as outlined by second generation, cognitive change scientists (Klein, 2006; Schwartz & Heiser, 2006; Wickmann, 2006) who view learning as an 'expressive' situated nature of cognition.

Recently, there has been an interest in Technological Pedagogical Content Knowledge (TPACK) (Harris & Hofer, 2011). They found that teachers' use and selection of learning activities and technologies changed by becoming more student centered on intellectual pedagogies rather than engagement pedagogies and more selective in the use of technology. Mouza (2011) investigate how professional development influenced teachers use of technology, content and pedagogy. She claimed that professional development increased their ability to connect technology with pedagogy and content but was not clear why pedagogical choices were made about their use of technology in the teaching process.

Research has described aspects of teaching that relate to effective learning and student outcomes (Hattie, 2009). Effective teaching needs to involve the teachers' background, beliefs and attitudes and also the students, classroom and the school. Teachers' beliefs about the nature of teaching and learning tend to range between transmissive and constructivist

beliefs (Rogers, 2003). The transmissive view sees the teacher as the holder of knowledge and controls the learning process while the constructivist view implies that students play an active role in the learning with a resultant emphasis that stresses the development of thinking and reasoning processes (Staub & Stern, 2002). While different views about where to put the emphasis in classrooms will not affect the validity of the very general principles asserted, they will affect the balance of activities and strategies recommended for the exemplary classroom. The teachers' view of the learning process *should* deliberately affect how they utilize ICT in their teaching and learning practices.

In Victoria, Australia, the use of technology in teaching and learning is strongly encouraged for years 7-10 (VCAA, 2012). How teachers evaluate the effectiveness of the use of technology in promoting teaching and learning is a largely unanswered question. William (2011) stated that for learning to occur, there is a need for greater focus on the learning process and context. There is a comparative silence about what is a theory of learning within ICT and how teachers' beliefs and values impact on how they view learning and use ICT in their practice. In addition, how to assess the impact of ICT on the learning process is also an unanswered question. So, it is important to examine how teachers perceive that they will assess this effect.

RESEARCH DESIGN AND DATA ANALYSES

In this research, 18 teachers from two regional schools in Victoria, Australia, participated in the study. In framing an appropriate research design for this study, it was considered that an ethnographic methodology, situated within a qualitative paradigm, was the best approach. While a pre-interview survey captured a list of the technologies the participants claimed to use, the majority of the data around the reasons for their use was largely collected from

individual teacher-researcher interviews. The research literature has demonstrated that in an interview situation teachers usually provide narrative accounts when answering research questions (Clandinin & Connelly, 2000; Conle, 2003). These narratives offer rich and deep insight behind their practice than some other forms of data collection and thus enriches the data being collected.

In undertaking the research, initially all participants were presented with an individual pre-interview survey. This survey introduced the study and its purpose and defined technologies that might constitute ICT. The survey asked teachers to reflect on the particular and various forms of ICT that they had used in their classroom practice in the last six months and to list them in a table. This table then formed the basis for further exploration of the teachers' reasoning and pedagogical views behind the use of the particular ICT tool in the subsequent interview.

From the survey responses, a list of all the forms of ICT the participants' claimed that they had used in the last six months was compiled and grouped into major categories (Table 1). To further provide more detail to the analyses of the data, the forms of ICT claimed by each individual participant, their subject areas, years of teaching experience, and gender were examined.

In the individual, open-interviews, participants were asked to consider how they saw ICT assisting in the process of teaching and learning. Why did they use the particular forms of ICT they claimed they used in their practice? What were the benefits/advantages or disadvantages that ICT have to offer? What were the reasons behind its use? Were these

linked to student learning? For pedagogical reasons? What teaching approaches did it support?

These interviews were then transcribed and carefully analyzed. Responses across all the participants were categorized and tabled under the main research questions (as above), and, as an emerging theme or category became apparent, this was also appended to this developing table. This procedure yielded a large data set from which similar, interesting and varied views were able to be drawn out and summarized.

RESULTS AND DISCUSSION

From the data collected through the survey, Table 1, reveals that the access, use and uptake of ICT from the 18 participants across the two regional schools was extensive and wide-ranging with over 40 various forms of ICT being claimed. There appears to be *generally* no significant difference between the forms of ICT being used across subject areas (except in the case of content-specific computer programs), between teachers with different years of teaching experiences, between the age of the teachers and the uptake of the technology, or between the two schools. However, there were apparent individual differences, most markedly evident between two participants teaching the same subject at the same school. Shane, an English teacher, listed few ICT forms while Grace, also an English teacher at the same school, offered a very extensive list. While the data suggests a lack of correlation generally, the forms of ICT claimed to be used has been shown to be very individualistic. It becomes important then to find out the individual teacher's reasons, motivations and preferences behind their use.

Table 1: ICT forms claimed to be used by participants

Major category	Minor category	ICT forms claimed to be used by participants
Programs/soft-ware	Microsoft Office programs	<ul style="list-style-type: none"> • PowerPoint • Word • Excel • Access • Publisher
	Educational	<ul style="list-style-type: none"> • Classtools.net (creates free educational games, quizzes, activities for online hosting) • Spelldrome (an interactive program for enhancing students' spelling and literacy skills) • Interactive games (general) • Interactive math programs (general) • Maths300 (online resource for lesson ideas for teachers) • Mathletics (an interactive program for enhancing students' mathematical skills)
	Graphics editing	<ul style="list-style-type: none"> • Photoshop (Adobe) (A graphics editing program) • Illustrator (Adobe) (A vector graphics editing program) • Paint (Microsoft). (A drawing program used to create simple drawings). • Google SketchUp (a 3D modelling program) • GIF animator (online or downloadable program for creating animated GIF images). • Flash (Adobe) (A multimedia platform for creating animations for using on computers and other electronic devices)
	Video/audio editing	<ul style="list-style-type: none"> • Windows MovieMaker (Microsoft) (a video creating/editing software) • Premier Elements (Adobe) (a video creating/editing software) • Final Cut Pro (Apple) (a video creating/editing software) • Audacity (a program for recording/editing audio) • Photo Story (Microsoft) (Allows users to create a visual story from digital photos). • Animoto (A web application that produces a video from photos, video and music). • Podcasts (a series of audio/video files subscribed to and downloaded from the internet) • Cartoon Story Maker (A software program for creating 2D screen based cartoon stories to illustrate conversations and dialogues)
	Web-authoring	<ul style="list-style-type: none"> • Dreamweaver (Adobe). (Web authoring and editing software).
	Present-ation software	<ul style="list-style-type: none"> • Prezi (a cloud-based presentation software)
Intranet	Other	<ul style="list-style-type: none"> • OneNote (Microsoft) (A program for free-form information gathering and sharing) • Geographic mapping programs(general) • Hot Potatoes (a freeware program for creating interactive multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises for the internet)
	Intranet	<ul style="list-style-type: none"> • Moodle (software for producing internet-based courses and websites) • Clickview (a video delivery platform that provides pre-recorded educational television programs to teachers' computers or data projectors)
	Websites	<ul style="list-style-type: none"> • Websites (general) • E-learning interactive websites (general) • Google • YouTube • Social networking websites: <ul style="list-style-type: none"> ◦ Facebook ◦ Myspace • Wikipedia
	Online applications	<ul style="list-style-type: none"> • Email • Hyperlinks (hyperlinks to general websites) • Blogs (personal journals published on the internet) • Wikis (simple webpages that groups can edit together) • Interactive games (general) • Online testing applications
	Other communication applications	<ul style="list-style-type: none"> • SMS (Short Message Service, also known as "texting" is a text messaging service from communication devices, such as phone, web and mobile devices)
ICT Infrastructure and/or hardware		<ul style="list-style-type: none"> • Interactive whiteboard • Classroom computers • Student laptops • Data projector • iPods • Digital Camera • DVDs • Videos and video clips • Webcams • Hand-held voice recorders

The data set that emerged from the participants' individual interviews provided answers to these questions. Participants' responses had been grouped according to the research questions asked in the interview and any emerging themes. Presented here is a summation of these data with indicative responses provided where appropriate.

The participants who heavily utilized technology in their classroom (Grace, Sarah, Margaret and Belinda) generally felt that it allowed their teaching to be tailored for various paces, levels, ease of access to information and spontaneous learning opportunities.

For some of the participants (Kay, Shane, Mary, Helen), although they used technology in their practice, they were more attracted to traditional learning approaches and were concerned that some skills (such as hand writing) would be lost to the detriment of the students. These participants claimed that ICT was often used for ICT's sake rather than for quality learning, and should not be seen as a replacement for "doing the teaching".

Specific reasons for using particular forms of ICT were wide ranging and were unanimously viewed by all participants, to be the benefits or advantages of using the particular forms of ICT claimed. Reasons included that ICT:

- fostered student-centred learning;
- aided student organisation;
- enabled innovative teaching;
- was taught only for ICT's sake - "*I'd be perfectly honest and say that we are expected to put some ICT into our courses*" (Mary);
- fostered student engagement:
 - through visual stimulus;

- because of its interactivity;
- because it dressed up educational software as a game;
- because it was a novel “*gadget*” (*Mary*);
- was a fast research tool;
- allowed easy manipulation of content;
- could demonstrate complex models (i.e., in conceptualising the atom in 3D in science);
- offered experiences which are otherwise impossible or unavailable;
- relevant to ICT in everyday life and the reality of its uptake in society:
 - that it is today’s students’ preference for learning – “*Clearly it’s the way they prefer to learn*” (*Grace*);
- fostered a sense of student community with the wider community in regional schools through online networking and collaboration.

Many of the participants (n=16) felt that their reasons for using (apart from using ICT for ICT’s sake) were pedagogically sound. This was clear from their explanations about how and why they used a particular technology. Surprisingly, very few participants (Belinda and Faye) made consistent, clear pedagogical links between their ICT use and their teaching, their students’ learning and the content being taught. For example, Faye believed that her use of ICT developed higher-order thinking skills in her students:

“Part of my job is actually about ... trying to change how we think and change the level of thinking and use more higher-order thinking for our students or get them doing more higher order thinking using ICT. ... It’s a big change of philosophy”
(Faye).

Belinda was wary of being more than just a facilitator in her classroom. Although she felt she was a facilitator of learning, she was not just a facilitator for the technology being used. She saw her clear role to direct and facilitate the learning but not to allow the technology to do the learning for them. She stated:

"My view is that you shouldn't use ICT as the teacher. That the teacher is central. ... And so you realise when you're using ICT that your teaching still has to be explicit. ... You still have to provide all of the steps and you still have to provide that one on one instruction. You can't just go well, you watch this slide show or presentation that I've saved on the computer – it tells you what to do then you do it. You know, you can't just have the technology teach for you, you still need the teacher in the room" (Belinda).

All others struggled to make a convincing argument that for some or all of their reasons, that any actual link existed at all. For example:

"We don't have to spoon feed them anymore. I think it [the internet] teaches kids to be more resourceful and find out information and that skill can be carried across to anything in life" (Kay).

This comment shows that this teacher's belief is that the technology can do the teaching for them. So, if this is the limit of Kay's involvement in her students' learning then pedagogically it is flawed. It is no longer a pedagogical technique but a way of removing herself from the pedagogical process all together. In fact, Kay later stated that her view of ICT being embedded in schools was because *"I just think we live with a group of kids that are constantly plugged into some form or another of you know, media. So that to really tap into what engages them, that it is really useful"* (Kay).

For Grace, Kevin and also Kay, their reasoning behind some of their ICT use was that it was simply “engaging” for students. While this could be linked as a motivating factor for pedagogically sound ICT activities, they could give no further rationale beyond the fact.

When asked to describe some of the difficulties/disadvantages or frustrations around using particular forms of ICT, the following responses were provided:

- infrastructure was under resourced;
- technical support not available through the school day;
- monitoring student off-task behaviour was problematic;
- encourages lazy behaviour / automates thinking / students rushing;
- issues in authenticating student work as their own: “*Some kids I think let the computer do the thinking for them ... An easy out*” (Mary);
- cannot replace all forms of learning (i.e., practicals in science);
- students believing everything on the internet as absolute truth.

For most of the participants (n=16), the last of the five points above were commonly eluded to in the interview. This may seem a surprising finding because while these participants mostly were unable to articulate sound pedagogical reasoning behind their use of technology, they were able to readily point out its deficiencies. This effect may be related to the teachers’ negative attitudes on ICT use in teaching and learning itself. If these teachers are not using ICT for valid pedagogical reasons, then their use of ICT may be as a means of “doing the teaching” for them. In this way, the technology actually betrays them – it leads to a lack of student engagement, encourages off-task behaviour and does indeed create an “easy out” for students. So, it is therefore not surprising that these teachers would be more aware of the disadvantages of the technology being used as they would be more commonly exposed to these challenges.

All participants agreed that good learning habits in students *could* be promoted through ICT use but all but one participant (Faye) could provide sound examples or explanations. Faye,

throughout her responses, indicated a few good learning habits which can be encouraged through ICT, such as it “*creates some fantastic organisational habits*” (*Faye*) for students, and most importantly, it gives the student ownership, independence and a sense of autonomy in their own learning:

“One of the things that it [ICT] can really do is work out who is responsible for their learning. And I think that’s a big changing in thinking and philosophy. ... They [students] can turn around and realise this is actually [their] job. Not somebody else’s job to make [them] do this. This is [their] job to take responsibility. ... It becomes more independent and it becomes their role. So then the teachers are there ... as a guide, as a facilitator rather than as a driver” (*Faye*).

A couple of participants (Kevin, Alka, Stuart) offered a caveat though that “*good learning habits are supported by whatever tools you are using to learn something with*” (*Kevin*) not just necessarily ICT forms. All participants also claimed that technology offered support in individualising the curriculum because it allowed students to travel at their own pace or be completing different activities in the same classroom at the same time as other students. All of the participants claimed that they used “*student engagement levels*” when asked “What do teachers look for to show that ICT is having an impact on student learning?” Aside from this ad-hoc method, there was seemingly no other ideas offered. Both Faye and Belinda, however, were able to present adequate explanations that included how they used ICT in valid assessment of their students’ learning.

CONCLUSION

Findings from the study revealed that teachers have varying views on how ICT should be used in the classroom. In the study, all teachers used a variety of ICT forms and that the two schools expected them to use technology in their teaching. Most participants claimed that its use formed or was part of an effective strategy or approach for teaching and learning. In reality, the responses from the participants revealed that nearly all of them (n=16) could not

provide convincing pedagogical arguments behind its use. Only two participants could consistently offer sound pedagogical reasoning for their choice and implementation of ICT in their practice.

The way teachers used ICT therefore seemed to be impacted by how they viewed the teaching and learning process. For the teachers who heavily used ICT forms in their daily lessons, they believed that ICT offered a more amenable and engaging tool that facilitated learning. These teachers felt that ICT allowed their teaching to be tailored for various paces, ease of access to information, and spontaneous learning opportunities, among others.

Other teachers had a different approach, recognizing that other non-ICT forms of teaching were important. Although, these teachers felt that ICT had its place in the curriculum, they were concerned that students were also being left-behind if traditional teaching/learning approaches were abandoned. These teachers in particular looked at the quality of the ICT being used and the ability to adequately assess students' learning through ICT. Other teachers viewed ICT as replacing or "doing the teaching" and that their role was simply being a director of learning. Perhaps, the most significant finding in this study was the linking between teachers' negative attitudes to ICT and teaching and learning – those who could not articulate sound pedagogical reasoning behind their use of ICT were also the ones most likely to offer disadvantages and deficiencies around its use. In many ways, this is akin to intended failure, where poor pedagogy leads to poor use of ICT which leads to poor student engagement, which leads to teacher frustration and so on.

Although the use of technology is an accepted part of school culture in Victoria, and is encouraged through curriculum documents, it seems the focus for teachers is still on

functional opportunities afforded through efficient computation (such as accessing fast data from the internet) rather than the impact of developing robust student understanding. That is, its use does not reflect a strong pedagogical framework.

Dominating the research literature on ICT in education, is the focus on the technologies themselves – on their use, their uptake within classrooms, what they can offer in regard to learning outcomes, technical competencies, and so forth. While this is worthwhile, there appears to be a relative vagueness when it comes to linking ICT with the teaching and learning process. This study is one attempt at addressing this important link.

As we learn more about the complexities involved in teaching and learning, and understand that the teachers' involvement is crucial in that process, it is imperative that we begin to explore teachers' views of ICT, their beliefs and values, how they use it in their practice, their reasons for so doing and how they might link this purposefully (or otherwise) to the teaching and learning process. This study brings the teacher into the spotlight and acknowledges their essential role to the process, and might contribute to the development of a pedagogy for ICT education, in what will inevitably be regularly embedded as part of the normative learning processes in the future of schooling.

AUTHORS' BIOS

Adam Bertram is a lecturer in the Faculty of Education, Monash University. He worked for eight years as a secondary teacher. His PhD explored how teachers' pedagogical content knowledge (PCK) could be developed and recognised. This led Adam to become interested in teacher education and teacher development research. For his work on PCK, he has been invited to present and conduct workshops with teachers nationally and internationally. One of

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