Emerging teachers' conceptions about their current use of ICT in vocational education

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This article presents emerging results from an ongoing phenomenographic study that examines teachers' conceptions of ICT-enhanced teaching and learning in vocational education. Twenty three teachers from three Technical and Further Education (TAFE) institutions participated in semi-structured in-depth interviews about the role of ICT in their teaching and profession. The emerging findings reveal that vocational education teachers consider ICT use for teaching vocational courses in five different ways. Specifically, they saw the use of ICT for teaching: 1) as a response to external expectations; 2) as a means to access information and resources; 3) as a delivery tool; 4) as media to support active learning; and 5) as an environment for preparing students for their chosen profession. While some of these findings are in line with those of similar phenomenographic studies in higher and tertiary education, conceptions a) and e) tend to be more distinct in vocational education settings.

Keywords: ICT-enhanced teaching, vocational education, teacher conceptions, TAFE.

Introduction and background

How do teachers' conceive the role of Information and Communication Technologies (ICT) in professional and vocational education? How do they use these technologies to support their teaching and students' learning? With the growing concerns about the quality of ICT-enhanced learning and teaching in tertiary education, there has been an increasing interest in how teachers conceive the role of ICT in their teaching and students' learning (Ellis, Hughes, Weyers, & Riding, 2009; González, 2010; Roberts, 2003). Looking to the past, some studies have found that what teachers say about teaching and what they do in classrooms are not necessary the same (Kane, Sandretto, & Heath, 2002), nevertheless other studies have shown that the conceptions that teachers hold about learning technology tend to be strongly associated with how they approach the design of ICT-enhanced courses and how they go about using ICT in their teaching practice (Ellis et al. 2009; Gonzalez, 2009). In short, what teachers believe about the use of ICT in their teaching does matter to the kinds of learning environments and experiences they will eventually design for students.

Research studies in this area has investigated various forms of ICT-enhanced learning in higher education included web-based learning, online learning, eLearning and blended learning. In this line, the first study conducted by Roberts (2003) in a Scottish university, revealed three teachers' conceptions of teaching using the Web: 1) as a source of subject information; 2) for individual and independent self-paced learning; and 3) for group analysis/interaction, decision-making and dialogue. These findings have been extended in a more recent study conducted by González (2009) in an Australian university. He identified three slightly different conceptions of Web use for teaching online: a) for individual access to learning materials and information, and for individual assessment; b) for learning-related communication; and c) as a medium for networked learning. Gonzalez (2009) argued that what he identified as "networked learning" with a distinct focus on knowledge building had not been identified in similar study undertaken by Roberts (2003). Previous studies investigating teachers' conceptions of ICT-enhanced teaching generally found similar conceptions falling into two broad

categories: more "fragmented" or "less complete" which focus on ICT as a tool to enhance access and delivery; and more "cohesive" or "complete " which focus on ICT as a way to facilitate students' engagement with learning (Ellis et al, 2009, Gonzalez, 2009). While studies generally share some broad common characteristics of teachers' conceptions of ICT in teaching new studies often bring to light new distinct insights into this phenomenon. Overall, researchers argue that teachers' conceptions of ICT cannot be understood in isolation from context and they therefore stress the need to take into account institutional influences, curriculum, subject, students' profiles and other contextual elements (González, 2009; Lindblom-Ylänne, Trigwell, Nevgi, & Ashwin, 2006; Trigwell & Prosser, 1996). Almost all studies on teachers conceptions of ICT in tertiary education have been conducted in university settings (González, 2010; Prosser, Trigwell, & Taylor, 1994), and very little is known about how teachers perceive ICT in vocational teaching and learning environments. Only very recently, a questionnaire based phenomenographic study conducted by Bliuc et al. (2012) investigated teachers' conceptions of blended learning in vocational education. It identified five conceptions: 1) blended learning to empower students for lifelong learning; 2) blended learning for students' needs and learning goals; 3) blended learning to improve students' access to learning and meet their practical needs; 4) blended learning as an aggregation of face-to-face, online and other types of technologically driven delivery; and 5) blended learning as the use of technological teaching tools. These findings reveal potentially rather different views of ICT-enhanced teaching in vocational education, such as empowering students for lifelong learning or providing students with "gap training" that addresses their individual needs. However, no in-depth interview-based study has been conducted to investigate these teachers' beliefs about the use of ICT in vocational education. In order to fill this void, in this study the researchers aim to investigate teachers' conceptions of ICT-enhanced teaching in vocational education. Our research question is: What does ICT-enhanced teaching mean to TAFE teachers?

Methodology and study design

This study used a phenomenographic research methodology (Marton, 1981; Marton, Watkins, & Tang, 1997). Phenomenography aims to identify qualitatively different ways in which people understand or experience particular phenomenon, such as teaching, blended learning or teaching online. In this study, the focus was TAFE teachers' conceptions of the use of ICT in vocational education. A semi-structured phenomenographic interviewing technique was used to collect data. The aim of the interviews was to explore TAFE teachers' awareness about using ICT in their teaching. The interviews started with broad "what" type of questions, such as: "What does ICT in teaching mean to you?" Followed by further probing to establish an in-depth understanding of how participants perceived and experienced the use of ICT in their teaching. The interviews ended with a request to see some examples of their ICT-enhanced teaching resources. All interviews lasted between forty to sixty minutes. In total, 23 participants from three TAFE institutions in NSW, a main Australian vocational provider, were interviewed. In order to achieve a considerable variation in teachers' experiences, participants were selected from different specializations (engineering, arts, business, accounting, etc.), employment levels, age groups, gender, and years of ICT use for teaching. The results presented in this paper are based on the initial analysis of ten transcripts (Table 1).

Table 1: Participants demographic information

Teacher ID	*Institution ID*	*Gender*	*Discipline*	*Employment level*	*Teaching with ICT mode*	*Experience of teaching with ICT*
P01	T3	Male	ICT	Full time	Blended	16 - 20 years
P02	T2	Female	ICT	Full time	Blended	16 - 20 years
P03	T3	Male	ICT	Full time	Face-to-face, blended	21 or more years
P04	T3	Female	Accounting	Full time	Face-to-face, blended, online	11 - 15 years
P05	T1	Male	Mechanical Engg.	Part time	Face-to-face	11 - 15 years
P06	T1	Female	Accounting	Full time	Face-to-face	0 - 5 years
P07	T1	Male	Finance	Full time	Blended	11 - 15 years
P08	T2	Female	Community service	Full time	Face-to-face	6 - 10 years
P09	T2	Male	Business studies	Full time	Face-to-face	0 - 5 years
P10	T2	Male	Event management	Part time	Face-to-face	0 - 5 years

Data analysis and findings

Data analysis followed the procedure suggested by Sjöström & Dahlgren (2002) which was originally developed and employed for analysing pheomenographic interviews in professional education, namely, nursing research.

Initially, all interviews were transcribed, and the transcripts were read several times in order to become familiar with their content. After, a more in-depth reading was done to identify those participants' responses that were related to particular research questions. During the next reading, the central elements of the participants' answers were identified and labelled. Then, similar answers were classified into preliminary groups. These groups were reviewed several times checking whether or not responses with similar meaning appeared under more than one heading. This analysis resulted in an initial list of the categories of descriptions. Before presenting the outcomes, the ten transcripts were reread to confirm that the preliminary categories accurately and comprehensively represented the experiences of the teachers interviewed. Five qualitatively different categories of conceptions have emerged through this process.

Category A: ICT is used to meet external expectations

This conception represents the TAFE teachers' view of ICT use in teaching as meeting external expectations. These expectations include several distinct aspects. First, teachers experience both organizational pressure and departmental requirements to use ICT, for example, when advised to do so by a head teacher. Second, teachers' decisions to use ICT sometimes derive from their own interpretation of what is expected from them as teachers. For example, some participants noted that technology had reached many teachers already and they did not want to lag behind in this "digital revolution". Third, teachers are aware of students' interests in ICT and their expectations that teachers would be "technologically literate". Overall, in this conception, the central purpose for using ICT is less related to the intrinsic teaching or learning goals, but to the external expectations and demands to adopt ICT-enhanced teaching. The participants did not see much difference between teaching without ICT and with ICT.

> "When you get up there and you're just putting up PowerPoint slides or something along those lines, there's no difference in the technology between that and putting up overhead slides and writing things on the board. There's nothing new, it's just a different way of doing the same thing" (P03-T3).

Category B: ICT is used to gain access to information and resources

In this conception, ICT is a method and tool for obtaining information for teaching. Teachers consider technology as a resource bank. They access information needed for their teaching by researching the Internet. They use ICT to update their knowledge, add new content to their courses and prepare their notes for students. ICT is considered an instrument for accessing resources and preparing for teaching, rather than a tool which is used directly in the teaching and learning process.

> "I can connect to the net and download various websites or play short video clips if I so choose. So I guess my view is, these are simply electronic tools" (P09-T2).

Category C: ICT is used as a delivery tool

In this conception, teachers consider ICT as a delivery tool for their teaching. This category includes several distinct methods of ICT use. First, ICT can be used to support face-to-face instruction. For example, teachers saw ICT as a tool for sharing notes and other resources with students and submitting assignments. Second, ICT can be used as an integrated course delivery platform. For example, TAFE teachers use Moodle for supporting their teaching. Third, ICT is seen as a tool to enhance classroom presentations, for example teachers could use PowerPoint presentations and interactive whiteboards, and make demonstrations using simulation software. Some teachers also saw ICT as an alternative delivery system, for example, some TAFE teachers occasionally presented their subject's content online. Overall, in this conception, ICT is a means to support and enhance teachers' instructional activities and effective course delivery:

> "Before (using ICT), I print out the financial reports of each public company and try to explain them but it was hard to follow. But if they see that on the screen, it's more broadened. They can see everything and they can see where I'm at, where I'm going. So it's much understanding for students as well and much easier for me as well" (P06-T1).

Category D: ICT is used as media for active learning

In this category, the primary intention of using ICT is to create active learning opportunities. ICT is considered an interactive media for engaging students in learning in a myriad of ways, such as group discussion, brainstorming, various project-based tasks, and analysis different software based tasks. This conception not only emphasises the technology and teaching, but also the active learning. Therefore, the focus of teaching shifts from the provision of information and delivery to the encouragement of students to get involved in their learning and the facilitation of the learning process. The main intention here is to create an environment where students are involved in a more independent, self-paced and active learning and construction of their understanding.

> "I like to get the students to go out and explore and find information for themselves, so having computer technology available in the classroom, or available at home enables them to find the

information or find a lot of information, and then my job is to help them filter that information and assess that information, put it all together, bring it together in a classroom environment and use that to teach each other" (P01-T3).

Category E: ICT is an environment for preparing students for future profession
In this conception, technologies are primarily considered as a medium through which students could develop knowledge and skills for a future career. One of the roles of ICT use in teaching is to make sure that students are prepared to participate in the constantly changing workplace of the future. ICT is seen as a means to assist students in accessing up-to-date information, connecting them with the professional world of the future. Here, similarly to Category D, the teachers are primarily facilitators of students' learning. Their focus is on creating teaching and learning environments where students can develop their understanding and skills for their future profession. This conception differs from Category D, as it emphasizes not only active students' roles, but networking, collaboration and interaction with a particular focus on professional competences needed for a future career in industry.

"So it's also part for us to make sure that our students are ready for the technology when they go out in the workforce. We need to prepare them for that as well. So I think it's just a different strategy, a different teaching strategy really making sure that you are addressing the needs that they have" (P08-T2).

Discussion and conclusions

Some results from this analysis support previous research findings of teachers' conceptions of various kinds of ICT-enhanced teaching and learning, such as blended learning, e-learning, web learning and online learning (Ellis, et al., 2009; González, 2009, 2010; Roberts, 2003). For example, Category B (ICT is used to gain access to information) is in line with the previous finding of Roberts (2003) where some teachers conceived the web as a source of information. Category C (ICT is used as a delivery tool) is similar to the findings by Ellis et al. (2009) where some teachers conceived of learning technologies as tools for information delivery. Similarly, comparable conceptions to Category D (ICT is used for active learning) have been found in studies by Ellis et al. (2009) and González (2010). This study, however, reveals two different conceptions of current ICT use by vocational teachers. Category A (ICT is used to meet external expectations) has not been found in previous phenomenographic studies. Category E (ICT helps students preparing for future profession) shares some similarities with the conceptions of learning technology as "ways of building knowledge" (Ellis et al., 2009; González, 2010) found in higher education. However, university teachers' conceptions primarily focused on students' academic development and construction of deep authentic understanding. In contrast, vocational teachers' conceptions of ICT use have a strong focus on practical knowledge and skills relevant to future workplace. Overall, the above findings provide initial knowledge about how vocational teachers understand ICT use in their teaching. These findings, in line with some previous studies of vocational education (Lucas, Spencer, & Claxton, 2012), show that improving practical knowledge and skills through the use of blended learning and ICT for the prospective profession is one of distinct concerns of vocational pedagogy and an important area for future research on ICT in vocational education.

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