Pre-Service Perspectives on E-Teaching: Assessing E-Teaching Using the EPEC Hierarchy of Conditions for E-Learning / Teaching Competence

Culture, technologie et instruction en littératie chez les adolescents : points de vue d'élèves adolescents urbains

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Abstract

This article reports on the findings of phase two of a larger study, which examines pre-service teacher experiences engaging with a synchronous (live-time) platform as a part of their training. While phase one focused on pre-service experiences *e-learning* with this synchronous platform (Woodcock, Sisco, & Eady, 2015), phase two focuses on their experiences *e-teaching* with the platform. During phase two, fifty-three students who participated in a blended learning (including both face-to-face and online lectures) course were assessed in a teaching simulation through an online presentation, and participated in questionnaires and interviews about their experiences as e-learners using the platform. The EPEC (ease of use, psychologically safe environment, e-learning/e-teaching efficacy, and e-learning competence) hierarchy of conditions for e-learning competency (Woodcock, Sisco, & Eady, 2015), developed during phase one based on an analysis of pre-service teachers' experience as e-learners in this same study, was used as a framework to assess teacher perspectives as e-teachers using this technology. Qualitative interview and survey data were collected about students' experiences using the platform, and analyzed via thematic content analysis. Quantitative survey data were also collected and analyzed via basic statistical analysis. The findings showed that students generally favoured the online e-teaching synchronous platform over in-person presentations, and the quality of online presentations was considered at least as good as in person.

Résumé

Les adolescents modernes ont, de façon généralisée, intégré les nouvelles technologies à leurs vies, et la technologie est devenue une composante importante de la culture populaire chez les adolescents. Les éducateurs ont signalé la promesse que représente l'exploitation de la technologie pour améliorer les compétences des élèves en langue et en littératie ainsi que leur succès scolaire global. Il n'existe toutefois aucun consensus sur l'effet qu'a la technologie sur les

adolescents, et peu d'études qui intègrent les points de vue d'élèves urbains et linguistiquement variés quant à la faisabilité d'appliquer de nouvelles technologies dans l'enseignement et l'apprentissage de la littératie dans les salles de classe intactes. Cet article rapporte les points de vue des adolescents urbains sur l'usage de la technologie au sein de la culture adolescente, pour l'apprentissage en général et l'instruction relative à la littératie en particulier. Des entrevues en groupes de discussion ont été réalisées auprès d'élèves urbains linguistiquement variés en 6e, 7e et 8e année dans un quartier au revenu relativement faible d'une région du Nord-est américain. Les conclusions principales de l'étude ont été 1) que les adolescents urbains utilisaient les médias sociaux et les appareils technologiques principalement et presque exclusivement pour socialiser avec leurs pairs, 2) qu'ils étaient intéressés par l'utilisation de la technologie pour améliorer leurs compétences en littératie, mais ne semblaient pas intégrer la technologie dans leur apprentissage de façon volontaire ou indépendante et 3) que les élèves de 8e année utilisaient la technologie et formulaient des suggestions d'application de la technologie à l'apprentissage de la littératie de façon nettement plus sophistiquée que les élèves de 6e et de 7e année. Ces conclusions mènent à des suggestions pour le développement d'une instruction efficace en littératie à l'aide des nouvelles technologies.

Introduction

E-teaching Illiteracy

In an increasingly digital world, e-teaching literacy (the ability to teach online) is crucial to remaining relevant and effective in postsecondary education (Hew & Cheung, 2013; Pillay & Reynold, 2014; Starcic, 2010; Vargas & Tian, 2013; Woldab, 2014). Greater focus on quality teaching, cost reduction, and an enduring pedagogical change in education toward building 21st century skills (e.g., e-literacy, collaboration, innovation, critical thinking, inquiring, problem-solving, and decision-making, etc…) have stimulated considerable growth in post-secondary e-learning (Garrison, 2011; Jimoyiannis & Komis, 2007; Koc & Bakir, 2010; Lambert & Gong, 2010; Lock, 2010; O'Meara, 2011). Research has already shown that incorporating technology into training programs and courses can transform teachers' approaches to cultivate such skill sets (Koc & Bakir, 2010). As a result, teachers are becoming accountable for building e-teaching skills into their repertoires (Jones 2010; Pillay & Reynold 2014; Starcic 2010; Woodcock, 2010).

However, pre-service teachers are struggling to keep pace with the pedagogical shift to e-learning (Chai, Koh, Tsai, & Tan, 2011; Jones 2010; Pillay & Reynold 2014; Thompson, Miller, & Franz 2013; Woldab, 2014). While pre-service training in e-teaching is becoming more common, it remains outpaced by e-learning's uptake (Pillay & Reynold 2014; Thompson, Miller, & Franz, 2013; Woldab, 2014). Moreover, existing programs are lacking in their ability to foster the special skills required for e-teachers to perform their dual roles as content deliverers and student-tutor communication facilitators (Bjekic, Krneta, & Milosevic 2010).

Literature suggests that teachers often demonstrate a resistance to change from the preconceptions of education formed in their own experience as learners within the system (Jones, 2010; Korthagen, 2010; Starcic, 2010; Woldab, 2014). However, a previous study by the authors found that when given the opportunity, pre-service teachers were open to teaching and learning in an online environment. While the previous study assessed pre-service teacher perceptions of

the online platform as "e-learners", this study considers their perceptions as "e-teachers", seeking to answer the question, "How do teachers feel about teaching with technology?"

To answer this question, the authors have built upon prior work and adapted the EPEC (ease of use, psychologically safe environment, e-learning/e-teaching efficacy, and e-learning competence) hierarchy of conditions for e-learning competence (Woodcock, Sisco, & Eady, 2015) for an e-teaching context (see Figure 1). Furthermore, the authors have also drawn on the EPEC framework and developed an evaluation of e-teaching experience (see Tables 2-4, Appendix A) for assessing an e-teaching simulation for pre-service teachers. EPEC consists of the following conditions: Ease of use, psychologically safe environment, e-learning/e-teaching efficacy, and e-learning competence.

Theoretical Support

The EPEC hierarchy of conditions for e-learning competence provides a guide to pre-service (and in-service) teachers in transforming into effective e-teachers through a series of sequential preconditions. This model was developed during phase one of this study, based on an analysis of a data set focused on *e-learning* competence (rather than *e-teaching* competence, which is the focus of phase two of this study featured in this article). While the model was arrived at through analysis consistent with grounded theory, it clearly corresponds with three theoretical frameworks drawn, in part, from a review of relevant literature.

Social cognitive theory, the e-learning acceptance model (ELAM), and transactional distance theory are a triumvirate of theoretical models, based on three governing interrelated factors drawn from social and educational psychology. Figure 1 illustrates how the three models relate with one another. Specifically, environmental factors include facilitating conditions and structure; personal factors include expectations and autonomy; and behavioural factors include social influence and dialogue.
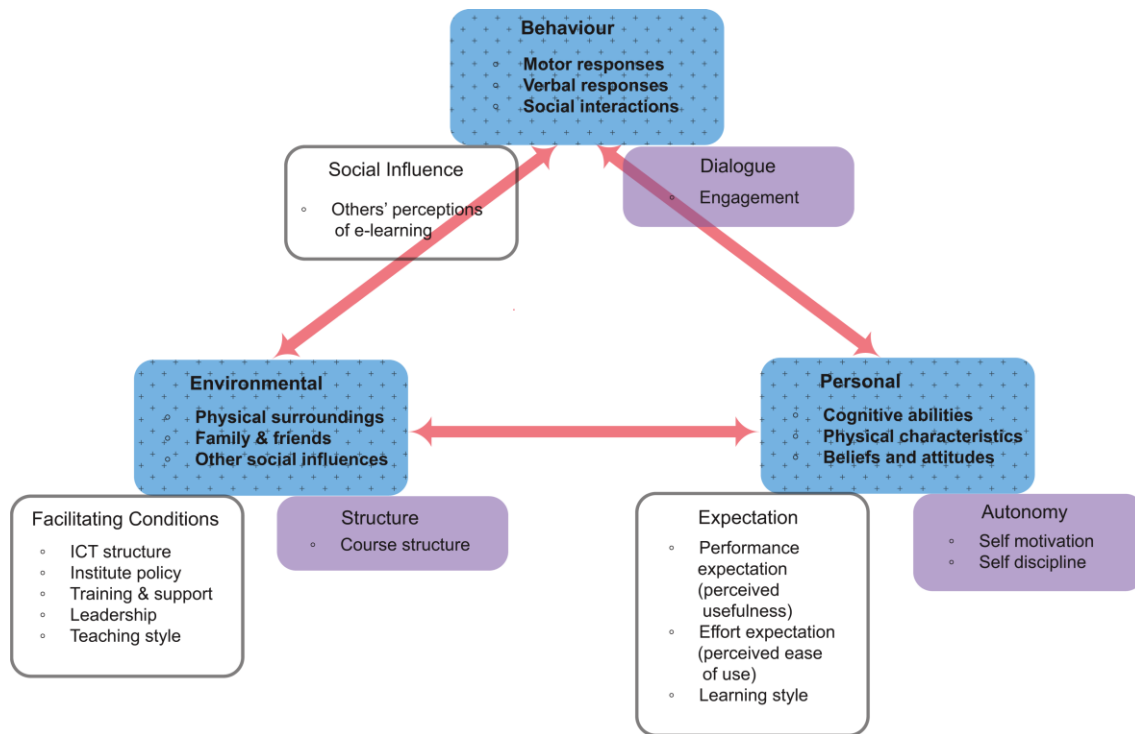
Figure 1. Sisco-Woodcock-Eady social cognitive, e-learning acceptance and transactional distance theoretical framework.

Social Cognitive Theory (SCT)

According to SCT, human behaviour can be described as an outcome of interactions between personal, behavioural, and environmental factors (Bandura, 1977; 1986; 1989; Fertman & Allensworth, 2010; Zikic & Saks, 2009). Humans are able to learn through direct experience, observations, and interactions (Bandura, 1989). SCT gives prominence to cognitive influences on behaviour, rather than emphasising the influence of the environment. Since human behaviour involves cognition, it follows generally that human beings have the ability to make rational decisions in order to actively adopt new behaviours (Gochman, 1997). Furthermore, this means that individuals not only copy what they see in their environments, but also are likely to make effective judgments because they are likely to base their reasoning on relatively complete information, including the consequences of different choices (Bandura, 1989).

Bandura (1997, p. 6) defined reciprocal determinism as interactions of the environment, personal factors, and behavior (Figure 1). SCT acknowledges that the interactions between the three factors, including their strength, depends on the behavior and situation (Bandura, 1989). Cognition plays an essential role in an individual's capability to modify his or her own behaviours (Bandura, 1999). At the same time, an individual's behaviour can affect the environment. In terms of environmental and personal factors, Bandura (1986) asserted that the social environment might influence expectations, beliefs, emotional patterns, and intellectual processes. In addition, the environment may evoke diverse reactions in people (Lerner, 1982).

Moreover, behaviour may change the environment, which may subsequently adjust behaviour, thus, people are both producers and products of their environments (Bandura, 1989).

Personal factors comprise an individual's beliefs, thoughts, feelings, self-perceptions, goals, and intentions (Bandura, 1986), all of which shape behaviour (Bandura, 1989; 1999). The perceptions that individuals have of a particular behaviour can affect how they will behave and behaviours can vary by situation. Personal factors include beliefs of personal efficacy, comprehension of goals, logical thinking, and effective self-reactions to different situations (Bandura, 1999). In the person to environment interaction, Bandura suggested that, "[p]eople evoke different reactions from their social environment by their physical characteristics, such as their age, size, race, sex and physical attractiveness" (1999, p. 8). They also are likely to evoke different reactions from their environment depending on their social roles and status. Personal and environmental influences do not function as independent determinants. In fact they determine each other. People have the ability to affect their environments and modify them. The modifications in turn, may affect them personally (Bandura, 1999; Corsini, Wedding, & Dumont 2008).

Personal factors may influence behaviour when individuals learn by observing others and have high self-efficacy for performing a particular behaviour. People with high self-efficacy for a task are more likely to engage in that task than would otherwise be the case (Bandura, 1997). Although SCT incorporates the notion of human rationality, rational thinking requires reasoning skills which vary in different people and circumstances (Morris & Schunn, 2005), and which are not always well developed or used effectively (Bandura, 1999). People are not necessarily rational.

There are two broadly different kinds of environments that are likely to affect, and be affected by, individuals. The physical environment refers to the external, tangible surroundings in which individuals live (Davison & Lawson 2006; Motl, Dishman, Saunders, Dowda, & Pate 2006). The second kind of environment is the social environment. The social environment is likely to include the culture in which a person lives, and people with whom and institutions with which a person interacts (Barnett & Casper, 2001).

People's environments can directly affect their beliefs, expectations, and cognitive competencies. The environments of individuals are likely to play a role in determining their behaviours. Social and physical experiences of environments can modify and develop a set of beliefs, expectations, and cognitive competencies (Fertman & Allensworth, 2010). Environmental factors may involve the socio-cultural context within which behaviour is shaped through continuous observation and learning, and reactions to environmental stimuli. The environment can influence personal factors in the form of social persuasion and modelling, and tuition alters cognition (Bandura, 1999).

Behavioural factors may be modified by the environment and personal factors (Bandura, 1999; 1986; 1989; Fertman & Allensworth, 2010), and behaviour can modify the environment. Behaviour can affect personal factors, cognitive processes, emotional reactions, and self-beliefs. Through different selection of situations, individuals affect the nature of their experienced environment. People tend to choose activities that are not beyond their current capabilities and their achieved competencies (Bandura, 1989). Through their actions, people create as well as

select environments; behaviour determines which of the many potential environmental influences will be considered and what kind of action people take.

The classic interactions of the three factors can be found in the classroom. When a lesson is presented in the class, students may pay attention to what the teacher is saying (environment influences cognition, a personal factor). Students who do not understand may raise their hands to ask questions (cognition influences behaviour). The teacher may try to simplify the point (behaviour influences environment). The teacher may give students an assignment (environment influences cognition, which influences behaviour). While the students are working on the assignment, they may believe they are performing well (behaviour influences cognition).

The E-learning Acceptance Model (ELAM)

The E-Learning Acceptance Model (ELAM) was created by Umrani-Khan & Iyer in 2009 (Umrani-Khan & Iyer, 2009). ELAM consists of three interrelated factors that align with Bandura's social cognitive framework. As Figure 1 illustrates, social influence aligns with behaviour, although specifically focused on others' perceptions of e-teaching and e-learning (Umrani-Khan & Iyer, 2009). Facilitating conditions aligns with environmental, although specifically focused on the virtual environment and conditions (i.e., ICT infrastructure, training and support, teaching style, etc…) (Umrani-Khan & Iyer, 2009). Expectation is perhaps ELAM's greatest contribution to the development of the EPEC model. Expectation aligns with personal, but introduces two specific concepts drawn from the unified theory of acceptance and use of technology (UTAUT) adapted for an e-learning/e-teaching context, both of which have proven useful in understanding the preconditions of e-learning and e-teacher competency (Umrani-Khan & Iyer, 2009). These include, 1) effort expectancy (or perceived ease of use), and 2) performance expectancy (or perceived usefulness) (Umrani-Khan & Iyer, 2009, p. 478). Therefore, ELAM supports EPEC by augmenting SCT for an e-learning/e-teaching context, and particularly through the addition of effort expectancy and performance expectancy.

ELAM has gained both credibility and popularity in the distance education field. Teo (2010, 2011) validated the precision and consistency of ELAM through two empirical studies for which a survey that measures ELAM's validity and reliability was administered to 386 pre-service teachers from Asian countries. ELAM has become increasingly popular and influential in scholarly literature in this field, especially in relation to effort expectancy and performance expectancy (Bjekic, Krneta, & Milosevic, 2010; Koc & Bakir, 2010; Lambert & Gong, 2010; Umrani-Khan & Iyer, 2009; Teo, 2011).

Daukilas, Kaciniene, Vaisnoriene, and Vascila (2008) conducted a study with 79 teachers who e-teach at the Lithuanian University of Agriculture, and identified a number of specific environmental preconditions for the uptake and effectiveness of e-learning, consistent with ELAM's facilitating conditions. These included: virtual structure and environment, such as its capacity to facilitate communication, interactivity and cooperation; the content, including learning material, its changeability/adaptability/flexibility; resource allocation, including qualified, experienced support staff availability; program vision and leadership; and adequate student assessment mechanisms (Daukilas et al., 2008). Another study conducted with 89 pre-service teacher participants enrolled in an educational institute in Singapore found the perceived usefulness of e-learning was significantly influenced by: Course delivery, tutor attribute, and

facilitating conditions (Teo, 2011). These can be understood as behaviour, personal, and environmental aspects, respectively.

Lambert & Gong (2010) have found that while information and communication technology (ICT) training influences teacher adoption of e-teaching, perceived usefulness and teacher efficacy in e-teaching remain crucial to its broader adoption for classroom teaching. Moreover, Umrani-Khan & Iyer (2009) suggest that while effort expectancy (or perceived ease of use) is most important for student acceptance, performance expectancy (or perceived usefulness) is most important for teachers. Teacher acceptance is also inextricably linked with his or her own learning experience, which will have been set in a much lower-tech era (Korthagen, 2010).

Transactional Distance Theory

In the 1970s and 1980s, Moore drew on the fields of both behavioural and social psychology to develop the concept of transactional distance as a communication and psychological space between teacher and learner input where potential for miscommunication exists (Gorsky & Caspi, 2005). This definition has now been refined to the "distance in understanding between teacher and learner" (Giossos, Koutsouba, Lionarakis, Skavantzos, 2009, p. 1). In 1993, Moore more fully developed this concept into transactional distance theory (TDT) premised on the notion that pedagogy has a more important effect on teaching and learning than spatial and temporal distance between teachers and learners (Gorsky & Caspi, 2005). TDT holds that different transactional distances require: 1) different levels of structure (course, instruction, use of media etc.), 2) types of dialogue (live-time/synchronous, asynchronous, videoconference, etc.), and 3), different degrees of learner autonomy (self-directed, self-paced, highly monitored, etc…) (Benson & Samarawickrema, 2009). TDT is widely regarded as theoretically foundational to distance studies and a significant contribution to e-learning and e-teaching scholarship (Garrison, 2000; Jung, 2001).

As Figure 1 demonstrates, dialogue aligns with behavioural and social interaction, although specifically focused on the behaviour of dialogue as a measure of engagement (Benson & Samarawickrema, 2009). Structure aligns with environmental and facilitating conditions, although specifically focused on course structure (Benson & Samarawickrema, 2009). Autonomy aligns with personal and expectation, although specifically focused on self-motivation and self-discipline.

According to Moore's TDT (1991), the relationship between structure and dialogue is an inverse relationship, although learner autonomy plays a role (Benson & Samarawickrema, 2009). However, the inverse relationship between structure and dialogue does not apply as well in blended and e-learning contexts, especially in web 2.0 environments. To address this, Dron, Seidel, and Litten (2004) later introduced the concept of transactional control in relation to e-learning (and blended learning); wherein, "[s]tructure equates to teacher control, dialogue to negotiated control, and autonomy to learner control" (Benson & Samarawickrema, 2009, p. 79).

Empirical Developments in The EPEC Hierarchy of Conditions for E-learning Competence

Phase one of this study showed that e-learning was preferred equally or above in-person learning among pre-service teachers (Woodcock, Sisco, & Eady, 2015). Overall, pre-service teachers

showed a favourable response to e-learning, especially favouring its flexible, engaging, and interactive qualities (Woodcock, Sisco, & Eady, 2015). Participants reported that the online synchronous platform was easy to use, encourages participation, increases teacher confidence, and is generally a good platform for learning and understanding (Woodcock, Sisco, & Eady, 2015). However results were mixed in terms of interactivity, and the effectiveness of this training was highly contingent on Internet connectivity and personal preferences (Woodcock, Sisco, & Eady, 2015).

The study showed that e-learning synchronous technology can be an effective learning tool in enhancing pre-service teachers' e-learning competency in subject matter and information communication technology skills (Woodcock, Sisco, & Eady, 2015). However, drawing on the theoretical framework shown in Figure 1, it also found that pre-service teachers' competency to learn and implement e-learning for students is dependent on four hierarchal conditions: 1) ease of use, 2) psychologically safe environment, 3) e-learning self-efficacy, and, 4) competency (Woodcock, Sisco, & Eady, 2015). The theoretical foundation of this hierarchy is the Sisco-Woodcock-Eady social cognitive, e-learning acceptance and transactional distance theoretical framework (see Figure 1), which informs its component preconditions (see Figure 3).

Building on phase one, this article discusses the implications and further recommendations for using synchronous technology as an effective tool for enhancing pre-service teachers' competency drawing on the EPEC hierarchy of conditions for e-learning competence (see Figure 2).
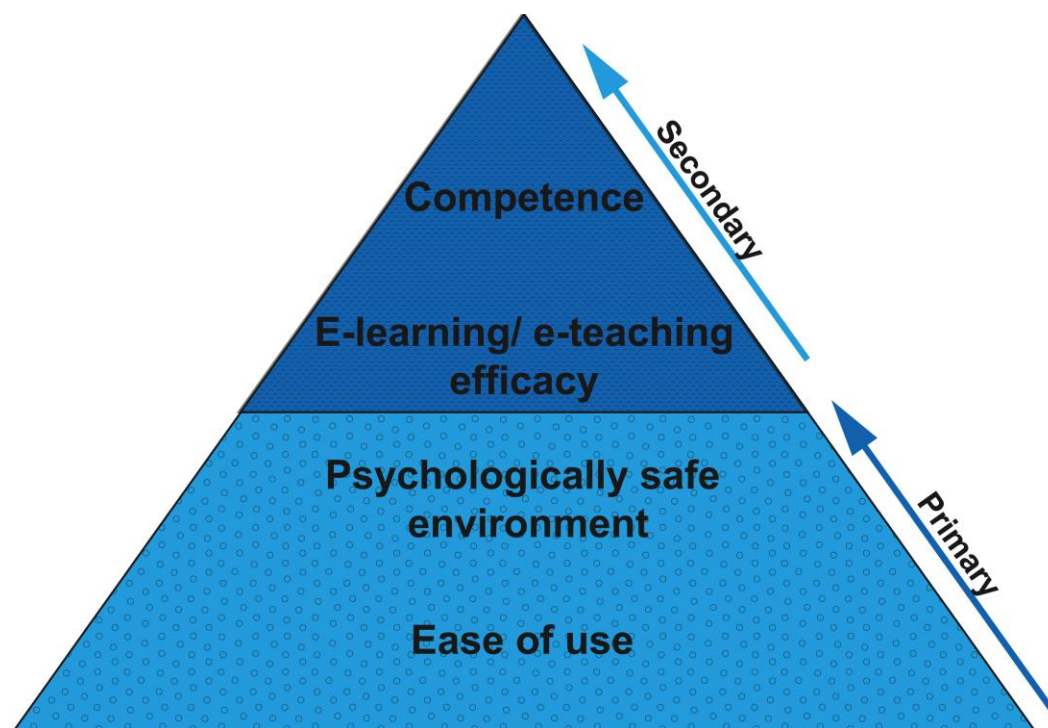

Figure 2. EPEC hierarchy of conditions for e-learning competence (Woodcock, Sisco & Eady, 2015).
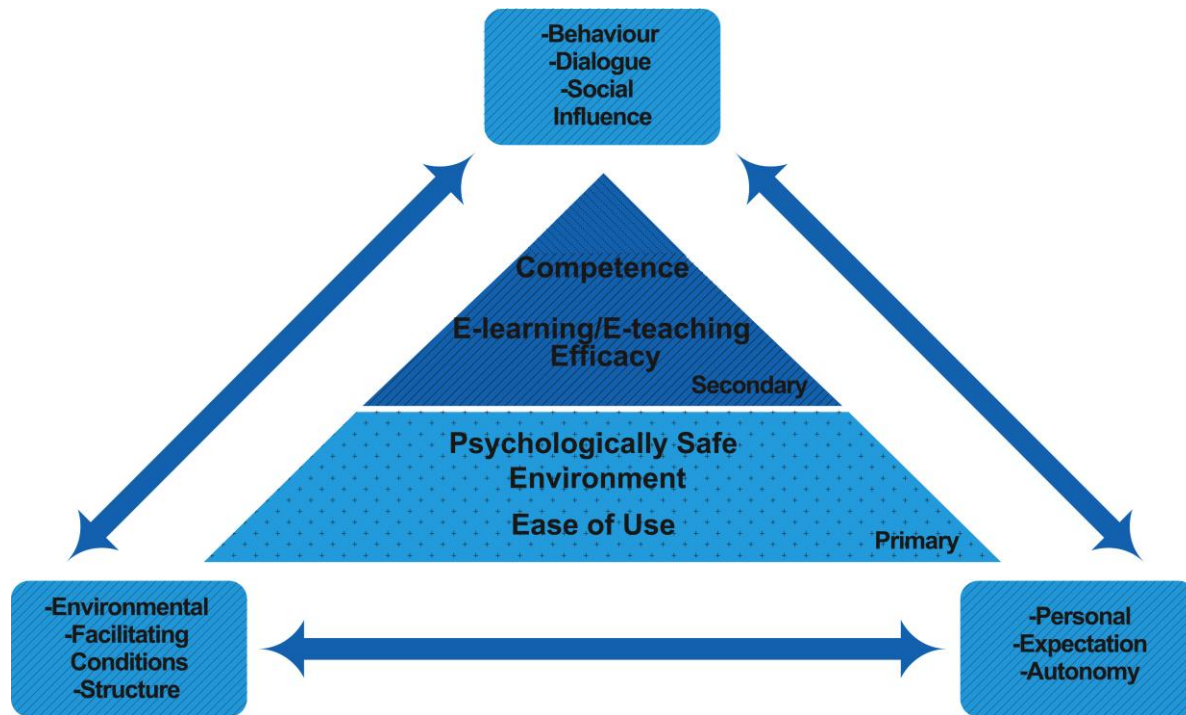
Figure 3. EPEC hierarchy of conditions for e-learning/e-teaching competence (version II)

While phase one of this study provided insight into pre-service teachers' perspectives on e-learning, phase two provides their perspectives on e-teaching. Such perspectives are essential to the design and delivery of effective pre-service teacher training, especially because teacher perceived usefulness of e-learning is linked with both their intentions to use it and its effectiveness (Bjekic, Krneta, & Milosevic, 2010; Teo, 2011; Umrani-Khan & Iyer, 2009). As such, this article seeks to answer the question: How do pre-service teachers feel about teaching with technology?

Methodology

Participants

Participants in this study included fifty-three pre-service teachers at a large Australian university, who were enrolled in a primary teacher education course. Participants' ICT skills and distance from the university varied; some lived close to the university and others commuted a substantial distance. Their gender ratio, 25% male and 75% female, is similar to that of primary teachers in Australia (Callan, 2004). Random sampling was used to select participants enrolled in two tutorial groups from a total of 16, consisting of a total sample population of 432 pre-service primary school teachers.

Context

This empirical study examined pre-service teacher engagement with an online, live-time platform within a course at an Australian university. Phase one of this study examined pre-service teachers' experiences as *e-learners* using the platform and phase two of this study, which

is the focus of this article, examined their experiences as *e-teachers*. This online synchronous platform (CENTRA$^{©}$) presents like a face-to-face classroom, and provides a range of features (i.e. instant messaging, talking and chatting; content sharing; and breakout chat rooms for group work), which has been used for early childhood to adult education internationally, including with adult learners across Ontario and primary students (K-12) in South Australia (Porter & Sturm, 2006). The research team employed a blended learning approach in phase two of this study, offering students opportunities to teach both face-to-face and using the synchronous platform.

Materials

This study employed a semi-structured open-ended interview guide (Table 1) and a survey instrument containing both closed- and open-ended items. The interview and survey items were developed based on a literature review and designed for participants to self-asses their experience e-teaching with the online synchronous platform. While closed-ended questions are effective in yielding quantitative data, open-ended questions are effective in yielding judgments, thoughts, and feelings; capturing nuance in individual responses (see e.g., de Vaus, 2002; Fraenkel & Wallen, 2006); and investigating research questions, which are more exploratory in nature (Creswell, 2003). All relevant ethics approval was granted by the participating university's Human Research Ethics Committee.

Procedure

Random sampling was used to select participants enrolled in a core 13-week course taught in the third year of the Bachelor of Education (BEd) primary degree at an Australian university. Two tutorial groups were randomly selected from a total of 16 (consisting of 26-29 students each and a total sample population of 432 pre-service teachers) to participate in the blended learning course, which included the online synchronous platform. The remaining 14 tutorial groups received only face-to-face classroom instruction throughout the semester. The participants in the two selected tutorial groups received a document with instructions, both text and graphics, explaining how to access and use the platform from home. They also attended an introductory session during which they downloaded and signed into the platform, and a one-hour orientation session during which they learned how to use the platform and it's various tools.

Pre-service teacher participants enrolled in the two tutorial groups selected for this study covered the same content and used a similar approach as the other fourteen face-to-face tutorial groups. As noted in phase one of this study,

> The platform gave students the opportunity to respond to questions through the use of interactive icons (e.g., clapping hands, laughing, yes/no), as well as a microphone and video camera. Students were also able to: Share applications and websites; import PowerPoint slides and documents; participate in surveys and breakout room sessions (where students are placed in virtual mini classrooms to work in smaller groups); text chat; write and draw on the whiteboard; and save their work in PDF format. Moreover, all sessions in the synchronous online platform were recorded, so that students could revisit them at any time. (Woodcock, Sisco, Eady, 2015, p. 23)

At the end of the 13-week semester, students were assigned to teach a lesson style presentation either face-to-face or online. All students, but one chose to deliver their presentations using the online synchronous platform. When all student lesson style presentations were complete, participants were invited to voluntarily participate in semi-structured, open-ended interviews and complete the survey about their experience e-teaching with the platform.

Qualitative analysis included conducting a thematic content analysis of open-ended interview and survey question responses. Specifically, this involved checking for *accuracy of fit* (Ritchie & Lewis, 2003; Siverman, 2000 as cited in Glasser & Strauss, 1967) by using a constant comparative method to code and organize data into tables of recurring themes and sub-themes as they emerged (Guba & Lincoln, 1985). Thematic content analysis was used because it allows researchers to relatively easily analyse large data sets systematically (Stemler, 2001). The EPEC framework for development and evaluation of e-teaching experience shown in Table 2 (see Appendix A) was also used to guide the application of the EPEC hierarchy of conditions for e-learning/e-teaching competence to this analysis, which is captured in the Discussion of Results section. Quantitative analysis included the generation of basic descriptive statistics for select close-ended survey responses.

Table 1

Open-Ended Questionnaire

Semi Structured Interview Guide
What are your overall comments about your presentation on the platform?
What were the disadvantages to presenting on the platform as compared to in class?
What were the advantages of presenting on the platform as compared to in class?
What differences occurred in regards to the planning?
Did it take more or less planning time for the presentation?
Was the quality of what you presented (content) maintained by doing it online as opposed to in class?
How do you feel the peer interactions/responses were during the presentation online in comparison to had you presented in the classroom?
Now that you have done it this initial time, would you do it again?
If you were to do it again do you feel that the planning/preparation would get easier?
As preservice teachers which ways can this tool be applied as a teaching tool?

Results

Overall, 98% of participants preferred the online synchronous platform to in-person presentations. Participants who preferred the online platform said it was "new and exciting", "effective" (high quality and increases student engagement), "flexible and convenient for learner", and "easy to use" (any skill level), as well as effective in increasing their confidence and comfort. Furthermore, those participants who preferred the online platform reported that

preparation for the online presentation was as time consuming as an in-person presentation, but that the online platform becomes easier with use. However, these participants also mentioned a number of disadvantages to using the platform, including: "Difficulty monitoring student interest", "potential for thwarting of in-person presentation skills", "technical difficulties", and "time management". The next few sub sections elaborate on some of the key themes that emerged in relation to pre-service teacher perspectives of e-teaching using an online synchronous platform.

Preferred Over In-person Presentations

All participants, but one (52 out of 53) said they would choose to present via the online synchronous platform over in-person. Common reasons provided included they are "comfortable using the platform", the "tools provide versatility", "its novelty", and the "increased comfort level presenting online". Twenty-two participants reported that they liked presenting online via the synchronous platform simply because it was "new", "different", "interesting", and "easier to present with". Moreover, participants liked the option of saving presentations, and found the platform's tools fun and interactive, as one participant noted "the whiteboard like marking and all the symbols…it's pretty interactive and fun so it gets everyone involved." Results were mixed in terms of whether participants would prefer presenting online from home or in class. Twenty-seven (51%) out of the 53 participants preferred presenting on Centra to Face-to-Face, compared with 14 (26%) who preferred Face-to-Face, and 12 (23%) who were neutral.

As Good or Better Than In-person

Participants seemed to agree that the online platform did not compromise, but may have enhanced the quality of the presentations. For example, 49 out of 53 participants rated the platform as 5 or 6 (on a scale of 0 to 6 where 0 is very poor, and 6 is excellent). Participants said that students appeared more interested in the delivery of presentations online because of the tools. They also noted that the online platform provided a "distraction-free" environment because students were logging in individually and wore headphones that served to drown out surrounding noise. As one participant noted, "I think it's better because you're on your own, like you're on your own laptop and you're only focused on that, whereas, if you're in the classroom you got people next [to] you that are like, talking, or on their phone."

Moreover, 10 participants (19%) suggested that students were more accountable to respond, and, thus, remain engaged using the icons, although, one participant said the "anonymity of the forum decreased student accountability for engagement." While 92% of participants rated the presentation quality as very good or excellent, the challenges are different than face-to-face and teachers need to take this into consideration. For example, one participant referred to the inability to decipher facial expressions as a challenge:

> I think it's pretty much the same but like again with like the facial expressions and stuff [be]cause you can't see what they're thinking about what you're saying, you don't know which points to elaborate on and that kind of stuff but I think it was still very much the same.

Flexible and Convenient

Overall, participants rated the platform as extremely convenient (M=5.7 on a scale of 0 to 6, where 0 is very inconvenient and 6 is extremely convenient). Participants, located in over eight different suburbs near the campus, provided very positive feedback about the convenience of e-teaching from anywhere with an Internet connection for their presentations. For example, one participant stated, "[w]e get to stay home, we can do it from wherever. I thought it was… I think it's so good." The flexibility of online learning also allows pre-service teachers to connect with and include in their lectures guest speakers at a distance. For example, two participants invited a senior government official to speak remotely as a part of their presentation. The online platform allowed him to join in without leaving his office. One of these participants stated, "[w]e were able to interview someone. Like you can't do that in a classroom unless you drag them all the way into the classroom, and make them sit there for the whole presentation", and the other participant added, "[s]o it wasn't an inconvenience for him to come here."

Increased Student Engagement

Overall, participants rated the participation opportunities for students during the online sessions as very good or excellent (M=5.4 on a scale of 0 to 6, where 0 is very poor and 6 is excellent). Participants said that it was easier to engage kids using the online synchronous platform's tools, resources, and capabilities. They said kids were more comfortable and, thus, more forthright in answering questions and contributing to dialogue online. As one participant noted, the platform provided both increased comfort because participation was more anonymous (in writing and not in person), and increased engagement because of the built in accountability of some of the tools,

> …when we have the whiteboard and you can write up what you think you get a lot more responses than what you get in class if people have to put up their hand and then everyone knows what they've said… If you can just write it people say a lot more things, give more opinions. And then if you've got a green check mark you have to say something, you can't just sit there [be]cause everyone knows.

Seven participants (13%) identified course structure as a critical aspect of the effectiveness of the presentations (in terms of student reflection and learning), including the use of breakout rooms and structured tasks following the presentations.

One participant stated that others at the university seemed interested in the online presentation and "other people would be interested to use it, if the option was there." Moreover, the need to train pre-service teachers in teaching with technologies was cited by one participant, "they're using a lot of technology…web pages…the classes have all got smartboards so I feel like I have really limited knowledge so I feel…it's a good step forward because it's gonna go that way". Another participant also noted the importance of the computer and ICT skills they were gaining.

Two participants mentioned that the synchronous online platform's capacity for carrying on side conversations with co-presenters was also seen as a strength in the pre-service teacher presentations, because it allowed them to discretely discuss how to cater their presentation in response to the audience's interests. One participant explained: "Well I remember at one point we kind of like added something else in [the presentation] where we got them to give us some

more feedback or something… so we could just take the control key off and just be like, 'Should we do this?'".

Yet another participant said it was easier to present well using the online platform because visual performance was a non-issue:

> …on the day if you are able to write a script that doesn't sound as if you are reading it and you're able to know what you are talking about and pause every now and then and just discuss it a little bit you're more prepared. Where, if you had been a lecturer and you've got the notes there flipping, looking at it more consistent than you are looking up then you're not a really good presenter where here it's just you've got your book and if you wanna talk about something, get back to the script, it's just the same.

Easy to Use, Despite ICT Skill Level

As in other studies reviewed, participants reported varied, but generally basic prior levels of computer skills and experience, citing their informal experience with the Internet and social media and using Mac computers and basic software programs (e.g. Microsoft Office Word Processing, PowerPoint and Excel and various maths programs from the first year university computer course, etc.…). Six participants also referred to their experience learning how to create basic websites. However, none had prior experience with synchronous e-learning tools.

Nevertheless, participants rated the platform for e-teaching as extremely easy to use (M=5 on a scale of 0 to 6, where 0 is not easy at all and 6 is extremely easy). They reported that it was simple to learn, and easy to use, even for the least technically savvy. They expressed that only basic ICT skills were required, including general comfort with the Internet, social media and the core Microsoft Office programs. However, participants mentioned training as a contributing factor to the online synchronous platform's ease of use. One participant stated, "[y]ou basically ran us through it all at the start and so it was easy enough to pick up on using it" and another participant noted, "I surprisingly remembered most of the stuff to do on the day". Furthermore, one participant reported that their confidence was initially low, but increased with use. This suggests that perceived ease of use increases with experience using the program and, thus, it becomes easier with use.

Increased Teacher Confidence and Comfort

Overall, participants rated themselves as somewhat more confident presenting online than face-to-face (M=4.2 on a scale of 0 to 6, where 0 is less confident and 6 is more confident), although results were very mixed with 18 participants M= > 4 and 6 M=< 2. The general consensus was that both pre-service teachers and students are comfortable and confident using the online synchronous platform, which is conducive to more effective teaching and learning:

> The best thing about...[the online synchronous platform]…is…as a presenter you are confident and comfortable in your surrounding and the people who are listening are also confident and comfortable in their surrounding.

One participant attributed their comfort presenting online, in part, to the fact that the audience were peers rather than children. Therefore, the audience represents a third variable that might have influenced the pre-service teachers' comfort with the presentations rather than, or in addition to, the online aspect.

Preparation Was as Time Consuming

Fifty percent of pre-service teacher participants said that it took about the same amount of time to prepare their presentations because preparation is similar. As one participant stated, "you still have your PowerPoint, you still have your speech notes like that's generally what you prepare for a presentation in class." Seventeen percent of participants said it's prepared earlier, easier to practice and quicker to put together because PowerPoint is simpler. One participant said, "I found usually when I do one in the classroom I'll write my speech notes up and then I'll do my slides to match up but with this one…its more like a script and I found it a lot easier to run through with it." Seventeen percent of participants said they found it difficult to think of ways to make their presentations more interactive, so they could ensure students were engaged without the nonverbal cues upon which they are accustomed to relying.

Planning, Preparing For, and Using the Platform Becomes Easier

Nearly all participants (86%) highlighted that they thought the planning and preparation for presenting via the online platform would become easier. They suggested it could bring "sister schools" together. One participant said,

> …[a]nd you would present together, so you could have a group of students that some are from your classroom, some are from a classroom from like a remote area and they get to present their ideas together to another group of students.

Furthermore, they also suggested it would be a good forum to use while teaching in the classroom about computers, for guest speakers at a distance, for virtual excursions, or as an alternative for those who cannot make it into class. Moreover, 17% of participants reported that the online platform became easier with use.

Peer Responses

One participant said that the interaction was slow to start but great once it begun in breakout rooms. Thirteen participants (25%) suggested that the anonymity the online platform could provide increased comfort, willingness to respond, and, in turn, interactivity. Ten participants (19%) said that sharing ideas was easier on the synchronous online platform. One participant said this feedback made the presentation more comfortable:

> I think they're heaps more responsive on line be[cause] it's like the most horrible thing when you're doing a presentation, you ask a question and no-one answers and everyone just sits there and you're like 'okay, so, moving on!' But in the online presentation I think because of what we were saying before where there's kind of you're a little bit more anonymous, or faceless, I guess, and so you get more feedback from people and especially in the break out rooms, like everyone just, the stuff they come up with is usually really good.

Another participant said it forced people to interact with people whom they might not normally interact:

> …well they had to interact, and they were forced with people they didn't know, 'cause usually you're sitting with people you know so you just go with them, that's your group. But this way you talk to new people.

At the same time, one participant argued that there is a larger degree of accountability for participation:

> …well in the classroom you don't have to respond, especially if you're sitting at a group table like, you know, someone will always put their hand up. But if you're the only one with your name, like you have to respond so it sort of makes everyone get involved.

One participant explained their group chose not to reveal names of participants when discussing answers, so that participants remained accountable to presenters but anonymous to peers. This reportedly encouraged participation.

According to one participant, the tools also helped to better structure and facilitate dialogue:

> …the hand tool, um, you can tell whose coming first and who's next, whereas in the class you might not notice the order of who's raised their hand. So that was really beneficial. And also with the true/false when they do the tick afterwards or when they do the cross you know who's answered and who hasn't.

The tools also provided distinct roles for pre-service teachers because some would speak, while others wrote. Another participant commented that this made the experience more inclusive.

Disadvantages

When asked about the disadvantages of the online synchronous platform, compared with in-person learning, participants identified: Difficulty monitoring and encouraging student engagement and interest; the potential for thwarting of in-person presentation skills; technical difficulties; and time management. Regarding engagement with the online synchronous platform, one participant said:

> I don't really know how involved they're getting, cause they could be, you know, watching TV in the background or…having some breakfast or something…if you're in the classroom you can see straight away who's doing what, and how you can motivate them more.

Another participant added: "I found it awkward, like when you're talking cause you can't hear or see what they're doing and every now and again you're like 'Are they even there?'"

Moreover, without student nonverbal cues (i.e., facial expressions and body language), more than half (55%) of pre-service teacher presenters had difficulty gauging student interest and

comprehension. Another participant noted that questions could be asked to ensure students are engaged, interested, and understanding material:

> In a classroom you do have visual cues um automatically given to you by the students by the nodding, looking and paying attention to you, you know. Where on…[the online synchronous platform]…you do have to every now and then ask a question to make sure that they are paying attention.

Another participant added that this lack of nonverbal cues, sometimes led to several participants talking at once, which made dialogue difficult to decipher. Although, one participant stated the icons were considered useful to some degree in conveying emotions:

> I guess it's good that you can still do putting up your hand, and laughing, clapping and things like that, and answering questions with a yes or no.

One participant actually identified the comfort with the anonymity of online presentations as a disadvantage because, from their perspective, it inhibits in person presentation skill development and comfort. More than half of participants (58%) suggested that the use of the video tool would have resolved many of these aforementioned issues, and one participant suggested more icons might be useful in in this regard.

Nine participants (17%) said they had many or very many technical difficulties. These participants noted that the experience was "a little stressful" because they had difficulty logging in with their passwords, but once the technical difficulties were resolved, "it was a good learning experience." Time management emerged as another area of concern, as one participant stated:

> I think our only flaw was that we had a mix up on the time. We should have focused on the time we pressed record… Sometimes you do tend to want to add more information, give them more, [but] you have to stay in that time limit.

Similarly, another participant stated that while the tools and capabilities of the synchronous online platform were great for learning, there was not enough time to make use of them.

Discussion of Results

The following sub-sections provide an analysis of pre-service teachers' perspectives of e-teaching using the EPEC hierarchy of conditions for e-learning/e-teaching competence. This analysis is discussed by condition: 1) ease of use, 2) psychologically safe environment, 3) e-learning/e-teaching efficacy, and 4) e-learning competence.

Ease of Use

Umrani-Khan & Iyer (2009) suggest that effort expectancy (or perceived ease of use) is most important for student acceptance. Once effort expectancy is lowered, pre-service teachers are more likely to use and, thus, teach with the technology. Overall, the results suggest that the majority of participants found the online platform easy to e-teach with (high perceived ease of use) despite one's skill set, and progressively easier with time. Participants found sharing ideas, presenting/teaching and bringing in presenters was easier online, and no more time consuming

than presenting in-person. This was attributed in part to the distraction-free environment the platform provided. Moreover, the reported flexibility and convenience of e-teaching also imply that the equipment, space, and platform were easy to access. Last, the results suggest that the training was accessible and easy to understand and remember. Several participants noted gaining ICT skills. Nevertheless, some results reveal technical difficulties, time management, difficulty monitoring and encouraging student engagement, and lack of non-verbal cues as potential areas of concern in this regard.

Two particularly important findings emerged out of this study in relation to ease of use. First, many participants said that they perceived e-teaching as difficult and daunting prior to use of the online platform. Second, contrary to common belief, one does not need to be tech-savvy to e-teach. This is particularly important because the literature and findings from this study suggest that most teachers are limited to basic ICT skills. Taken together, these findings emphasize the importance of pre-service e-teaching training, as a means to dispel some of these false assumptions about e-teaching's ease of use prior to in-service teaching when they might not be obligated or interested.

Psychologically Safe Environment

Overall, the results suggest participants found the online synchronous platform provided a psychologically safe e-teaching environment. In accordance with the Sisco-Woodcock-Eady social cognitive, e-learning acceptance and transactional distance theoretical framework (see Figure 1), a psychologically safe environment is one in which groups of individuals feel comfortable to interact effectively.

As discussed in the previous section, participants demonstrated low effort expectancy (or high perceived ease of use) in sharing ideas, presenting/teaching and bringing in presenters; low effort expectancy is conducive to a more psychologically safe environment (Beaumont et al., 2003; Fisher et al., 2000; Kreijns et al., 2003; Sun, Finger, & Liu, 2014). Additionally, they described the platform as convenient and flexible because it allowed them to e-teach from their location of preference (home, school, etc...). This created a sense of comfort and allowed participants to select psychologically safe environments from which to e-teach. Last, participants expressed comfort using the platform.

High student engagement seemed to indicate the participants' abilities to facilitate psychologically safe environments for students, which in turn, created a more psychologically safe environment for themselves. Interaction was described as slow to start, but better over time. In terms of dialogue, authentic student interaction is difficult to measure, and likely depends on personal attributes of participants, such as autonomy (motivation and self-discipline). Most participants reported that anonymity made the experience less "nerve wracking", increasing comfort, willingness to respond, and, in turn, interactivity even among people who might not normally interact. At the same time, this anonymity reduced student transparency and accountability to interact, which inhibited student monitoring.

Participants also mentioned peer feedback and responsiveness was helpful and made the presentation more comfortable, particularly because of the anonymous nature of the dialogue. This supports the work of Li (2009), which has shown peer critique and evaluation are helpful in

an online learning context. Nevertheless, the aforementioned challenges (technical difficulties, time management, difficulty monitoring and encouraging student engagement, and lack of non-verbal cues) remain potential areas of concern in terms of the psychological safety of the e-teaching environment.

E-learning/E-teaching Efficacy

Umrani-Khan & Iyer (2009) suggest that while effort expectancy (perceived ease of use) is more important for e-learning, performance expectancy (or perceived usefulness) is more important for e-teaching. Both social influence and peer influence affect the perceived usefulness, and thus, actual usefulness of e-teaching.

The results suggest that participants demonstrated increased perceived usefulness of the platform (e-teaching effectiveness and self-efficacy e-teaching) with use, as their confidence and comfort using the platform increased with experience. This supports Lambert & Gong's (2010) study, which found that pre-service e-teachers became more comfortable with and more optimistic about the value of technology in education, suggesting that increased exposure leads to increased perceived usefulness.

E-learning Competence

Last, the results showed perceived e-teaching effectiveness, as presentation quality was considered the same or better than in-person presentations. The literature suggests that performance expectancy (perceived usefulness and e-teaching self-efficacy) can be an important indicator of teacher uptake and effectiveness of technology, and its broader adoption for classroom teaching (Korthagen, 2010; Lambert & Gong, 2010). Moreover, the results showed that participants felt the platform would be of interest and use to other pre-service teachers. Specifically, the study demonstrated pre-service teachers' perceived usefulness represented the end of a process in which e-teachers worked through Geoghegan's (1994) and Rogers's (1995) (as cited in Lambert & Gong, 2010) five stages of teacher acceptance of teaching with a new technology: Knowledge (learning about the platform in the course); persuasion (determining whether they will choose to present via the platform); decision (deciding to present via the platform); implementation (presenting via the platform) and; confirmation (determining that they would prefer to present via the platform over in-person in the future).

Geoghegan (1994) and Rogers (1995) argue that teachers are limited to progressing through the first three stages in the pre-service stage, with the prospect of progressing through the remaining two while in-service (as cited in Lambert & Gong, 2010). However, the practical nature of the course used for this study's intervention allowed pre-service teachers to progress through all five stages; implementation and confirmation were simultaneously achieved via the online presentations. In this regard, it addresses Koc & Bakir's (2010) call for, "opportunities for pre-service teachers to implement technology available in field placements" (p. 15) to provide authentic experiences that improve pre-service teacher education quality.

Moreover, this study supports the literature, which suggests that inexperienced, and young teachers are more likely to accept and learn more about teaching with new technology as well as to have high performance expectancy e-teaching (Daukilas et al., 2007). As noted in the

literature review, it has been hypothesized that teacher acceptance is linked with previous learning experience, which will have been set in a much lower-tech era (Korthagen, 2010). The literature suggests that beliefs and attitudes about technology become more entrenched over time, such that teachers become increasingly resistant to changing their approach even with increased access to technology (Jimoyiannis & Komis, 2007; Koc & Bakir, 2010). In any case, these findings underscore the importance of pre-service training.

Implications for Future Research and Practice

Building on phase one of this study, which suggested that providing e-learning training to pre-service teachers increased their e-learning competence, the results from phase two indicate that providing e-teaching training to pre-service teachers through the EPEC model can bring about greater teacher confidence in their ability to effectively e-teach. Furthermore, although these results do not indicate the most effective methods to train teachers to e-teach, they do indicate that there needs to be a more comprehensive overview of the way in which teachers are trained in consideration of the primary and secondary conditions from the EPEC model. As well, experience needs to encourage reflection on the implementation of e-teaching approaches in the classroom as well as the opportunity to view appropriate role models. At the same time, given the low confidence and difficulty amongst the pre-service teachers at the beginning of the course, through careful consideration in making the platform easy to use, and the environment psychologically safe, the pre-service teachers became more comfortable and confident to attempt and participate in the teaching experience.

Future research is required to determine the most appropriate method of preparing pre-service teachers to be effective e-teachers. While there have been repeated requests for more adequate teacher preparation in this area (Jones, 2010; Pillay & Reynold, 2014; Starcic, 2010; Woodcock, 2010), what is not known is the appropriate amount of content knowledge, practice, and support that is optimal to prepare teachers to be confident and effective e-teachers.

Limitations of the Study

There are several limitations to this study. Foremost, this study is limited in the representativeness of its sample, as participants include pre-service teachers enrolled in the same course at a single teacher training institution; accordingly, future studies would profit from studying pre-service teachers from other institutions and other countries. The transition from pre- to in-service teacher could be further investigated in order to ascertain how e-teaching might change over time and in different contexts. Another limitation in the present study is the reliance on self-reporting as opposed to actual observations of e-teaching. Some researchers query the use of self-report data sets, due to factors around social desirability and subsequent unreliability (see for example, Cook & Campbell, 1979). However, Clunies-Ross, Little, and Kienhuis (2008) found that observational data on teachers' strategies was validated by the same teachers' self-reports. As Chan (2009) contended, the questionable nature of self-reported data is often overstated, and more problematic in experimental studies than studies such as the present one. Nonetheless, future research might observe pre-service teachers while on placement.

Conclusion

Teachers are generally poorly prepared to e-teach the growing number of e-learners in Australia, as they do not receive the pre-service training required. The findings of phase two of this study suggest that providing e-teaching training to teachers at the pre-service stage is critical to addressing this challenge. However, the effectiveness of such training depends greatly on ensuring pre-service teachers have the personal (autonomy and expectations), environmental (facilitating conditions and structure), and behavioural (social influence and dialogue) supports in place to achieve the EPEC hierarchy of conditions for e-learning/e-teaching competence: 1) ease of use, 2) psychologically safe environment, 3) e-teaching efficacy, and 4) e-teaching competence. The study found that participants generally achieved these conditions for e-teaching competence, culminating in perceived e-teaching effectiveness, as presentation quality was considered the same or better than in-person presentations.

This study fills an important gap by demonstrating the provision of authentic opportunities to e-teach in the field at the pre-service stage (Koc & Bakir, 2010) and showing that, contrary to Geoghegan's (1994) and Rogers' (1995) assertions, (all five stages of) e-teaching acceptance can occur at the pre-service stage. It also reveals false assumptions about perceived level of difficulty (low ease of use) and high ICT skills required to e-teach as potential challenges to be addressed in future research (as cited in Lambert & Gong, 2010). This study suggests that providing e-teaching opportunities at the pre-service stage is important because teachers are more willing to accept new technologies early in their career, and such exposure allows them to disrepute false assumptions about level of difficulty and required ICT skill level before deep-rooted attitudes and beliefs develop that are more difficult to change.

Last, this study served to further develop the EPEC hierarchy of conditions for e-learning competence by adapting it for an e-teaching context (into the EPEC hierarchy of conditions for e-learning/e-teaching competence) and providing an evaluation tool based on its theoretical underpinnings. It also contributes to the developing body of empirical research in support of EPEC as a tool for use in developing, implementing, and evaluating e-learning and e-teaching programs. Future research is needed to further develop and substantiate this model.

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Appendix A: EPEC Framework for Development and Evaluation of E-teaching Experience

Table 2

Evaluation of Environmental Aspects of EPEC Framework For E-Teaching

Environmental Aspects	Ease of Use	Environment*	Self-Efficacy	Competence
Has ICT training…	…been accessible? Is the teaching style easy to understand?	…been delivered in a psychologically safe environment?	…left you feeling confident e-teaching?	…contributed to your competence e-teaching? If so, how?
Are technical issues…	…frequent? Are they debilitating to teaching experience?	…creating a psychologically unsafe environment?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Is connectivity to the Internet…	…accessible, reliable, easy to use and sufficiently fast?	…creating a psychologically safe environment?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Is equipment, space and the online platform…	…accessible, reliable and easy to use?	…creating a psychologically safe environment?	…supporting your confidence e-teaching?	…supporting your e-teaching competence?
Is technology support…	…easily accessible and helpful in resolving issues?	…enforcing a psychologically safe environment?	…fostering your confidence e-teaching?…	…fostering your e-teaching competence?
Is the course structured in a way that…	…is easy to e-teach?	…promotes a psychologically safe environment?	…promotes your confidence e-teaching?	…promotes your e-teaching competence?
Is the use of multimedia…	…easy to access and teach with?	…affecting the psychologically safety of the environment? If so, how?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?

Table 3

Evaluation of Behavioural Aspects of EPEC Framework For E-Teaching

Behavioural Aspects	Ease of Use	Environment*	Self-Efficacy	Competence
Is your teaching style…	…easy to e-teach with?	…fostering a psychologically safe environment?	…building your confidence e-teaching?	…affecting your e-teaching competence? If so, how?
Is the synchronous or asynchronous format of the dialogue…	…easy to e-teach with? East to use to connect with students?	…affecting the psychological safety of the environment? If so, how?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Is the use of multimedia…	…easy to e-teach with?	…affecting the psychological safety of the environment? If so, how?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Is coordinator or supervisory support…	…easily accessible? Helpful in supporting ease of e-teaching?	…creating a psychologically safe environment?	…building your confidence e-teaching?	…building your e-teaching competence?
Is peer support…	…easily accessible? Helpful in supporting ease of e-teaching?	…enforcing a psychologically safe environment?	…building your confidence e-teaching?	…building your e-teaching competence?
Do peers…	…perceive it to be easy to e-teach?	…promote a psychologically safe environment?	…help foster your confidence e-teaching?	…help foster your e-teaching competence?
Are peer perceptions of e-teaching…	…impacting ease of e-teaching?	…promoting a psychologically safe environment?	…helping to foster your confidence e-teaching?	…helping to foster your e-teaching competence?
Is relating to students…	…easy through e-teaching?	…affecting the psychologically safety of the environment? If so, how?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?

Behavioural Aspects	Ease of Use	Environment*	Self-Efficacy	Competence
Is student engagement…	…easy to promote via e-teaching?	…affecting the psychologically safety of the environment? If so, how?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?

Table 4

Evaluation of Personal Aspects of EPEC Framework For E-Teaching

Personal Aspects	Ease of Use	Environment*	Self-Efficacy	Competence
Are your physical abilities…	…affecting your ability to e-teach? If so, how?	…promoting psychological safety for you in your e-teaching environment? For your students?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Are your cognitive abilities…	…affecting your ability to e-teach? If so, how?	…promoting psychological safety for you in your e-teaching environment? For your students?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Is your level of self-motivation…	…affecting the ease of e-teaching for you?	…promoting psychological safety for you in your e-teaching environment? For your students?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Is your level of self-discipline…	…affecting the ease of e-teaching for you?	…promoting psychological safety for you in your e-teaching environment? For your students?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Is your learning style (self-directed, self-paced, etc...)…	…affecting the ease of e-teaching for you?	…promoting psychological safety for you in your e-teaching environment? For your students?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?

Personal Aspects	Ease of Use	Environment*	Self-Efficacy	Competence
Is your ability to cater to the learning styles of your students…	…affecting the ease of e-teaching for you?	…promoting psychological safety for you in your e-teaching environment? For your students?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Is your effort expectancy (or perceived ease of use)…	…affecting the ease of e-teaching for you?	…promoting psychological safety for you in your e-teaching environment? For your students?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?
Are other beliefs and/or attitudes…	…affecting the ease of e-teaching for you?	…promoting psychological safety for you in your e-teaching environment? For your students?	…affecting your confidence e-teaching? If so, how?	…affecting your e-teaching competence? If so, how?

Note. In accordance with Woodcock, Sisco, and Eady's (2015) first article based on this study, a psychologically safe environment is one in which groups of individuals feel comfortable to interact effectively. This requires a number of conditions, including:

- Trust and care about one another's feelings;
- Closeness and cohesion in collaborating and scaffolding each other's learning;
- Judgment-free, mutual respect for one another's opinions; and
- A space of equals that facilitates respect for one another's diverse skills and assets, and understanding that everyone's input is equally valued in the conversation

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