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Pre-Service and In-Service English as a Second Language Teachers' Beliefs about the Use of Digital Technology in the Classroom

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Abstract

It has been long accepted that teachers' beliefs guide their classroom practices (Borg, 2006; Fang, 1996; Pajares, 1992; Woods, 1996). Yet, in the current high-tech age and with the push by mainstream education to incorporate technology in language teaching, little is known about what teachers think and feel about technology integration. Using Borg's (2006) framework of language teacher cognition, this study investigated the beliefs of pre-service and in-service English as a Second Language (ESL) teachers (n = 35) about the use of digital technology in the classroom and the factors that influence those beliefs. The participants completed a three-part beliefs' questionnaire and some (n = 10) were later met for one-on-one interviews. The results suggest that while the teachers value technology and its use in the ESL classroom, the two groups differed in their subscribed beliefs. These differences were traced back to the teachers' age, classroom practice, experiences with digital technology, context(s) in which digital technology was used, and the amount of technology-related training the teachers received.

Keywords

teacher cognition, teacher beliefs, pre-service, in-service, digital technology, English as a Second Language

1. Introduction

Marc Prensky was perhaps one of the first to suggest that 21st century learners "think and process information fundamentally differently" (2001, p. 1) from previous generations and, as such, require education that is not only different from that of the past, but that also employs technology to facilitate classroom learning. He claimed that in order to be an effective teacher today, instructors need to find ways to motivate learners by making the subject matter relevant, time spent on learning it valuable, and technology used to facilitate and/or enhance learning central to the process (Prensky, 2005). An increased use of advanced, personalized, mobile, and affordable technology (i.e., information and communication technology in particular) has already penetrated many educational institutions, where

abundant technological equipment and resources are being made available to learners and teachers regardless of their disciplines and institutional levels. In post-secondary contexts, for example, professors increasingly use digital projectors and presentation applications more than the traditional blackboard and chalk to deliver their lectures. Even in regular K-12 classrooms, educational policymakers actively emphasize the need to implement digital technology on a regular basis, hoping to capitalize on the promise of better student achievement (Jenson, Taylor, & Fisher, 2011) and increased learner engagement with the subject matter (Muir-Herzig, 2004). Similarly, in the field of Computer-Assisted Language Learning (CALL), numerous investigations (e.g., Hubbard, 2008; DuBravac, 2013) have confirmed the benefits that technology integration brings to second/additional (L2) language learning in the classroom. Among these are authentic language-related tasks and situations that can be personalized in terms of proficiency and opportunities to interact with native-speaker interlocutors (Tomlinson, 2012).

Despite these initiatives, teachers' use of technology has not yet reached the levels of implementation expected by the policymakers (Milton, 2003). That is, some teachers use technology exclusively for administrative purposes (e.g., Rother, 2005; Young, 2010), whereas others make it a regular feature in their classroom (Wozney, Venkatesh, & Abrami, 2006); even so, there are teachers who stay away from digital technology altogether (Lei & Zhao, 2007). In an effort to understand the reasons for this diversity, calls have been made to consider what teachers really think about the use of technology (Bax, 2003; Gee, 2003; DuBravac, 2013). This is because belief systems are said to influence the ways people behave, think, and feel (Rokeach, 1968). Studies of teachers' beliefs have, in fact, identified a strong link between teachers' beliefs and in-class behaviors among general (Clark & Paterson, 1986; Kagan, 1990; Pajares, 1992; Fang, 1996) and language teachers (Johnson, 1994; Woods, 1996; Borg, 2006) alike. What's more, teachers are seen as key agents of innovation in the way lessons are structured and delivered (Fullan, 1983; Rogers, 1995; Markee, 1993), suggesting that their instructional decisions directly impact the learning that takes place. Thus, if teachers perceive technology positively, they are more likely not only to integrate it successfully into their classroom, but also to "normalize" its use through frequent application (Bax, 2003).

While teachers' beliefs about technology have been researched in a number of countries and educational contexts (Feng, 2012), little effort has been made to understand what language teachers, specifically English as a Second Language (ESL) teachers, believe about the use of digital technology in the classroom. Such inquiry is important for several reasons. First, learning about what language teachers think regarding technology integration is paramount in the current high-tech age and given the push to incorporate technology in language teaching by the mainstream education. This is so because if teachers do not believe in the effectiveness of technology, it is very likely that they will not use it regardless of what public and policy makers say and what their students expect. This disaccord could lead to failed learning and teaching opportunities for both students and teachers. Second, such investigation is especially timely for countries like Canada that boast large ESL populations and

educational systems that place much focus on ESL instruction (People for Education, 2008). Third, despite country-wide campaigns for technology implementation, few reports on how teachers feel about this implementation have been produced. In fact, to date, only two studies have investigated the perceptions of public school teachers (Wozney et al., 2006) and high school ESL and French language teachers (Parks, Huot, Hamers, & Lemonnier, 2003) regarding the use of computer technology in the classroom. Both studies were carried out in the province of Quebec, leaving the rest of the country's teachers (and language teachers in particular) unrepresented. In light of this gap, the present study examines what pre-service and in-service ESL teachers in Ontario, the most populous province in Canada, believe about the use of digital technology in the classroom and identifies possible factors that may influence these beliefs. In line with DuBravac's (2013) definition, digital technology was operationalized as the various types of electronic equipment (e.g., desktop and laptop computers, printers, scanners, mobile devices such as cell phones and tablets, interactive whiteboard, digital projector, digital camera), general (e.g., word processing and presentation) and educational applications (e.g., Web CT, blackboard, online learning solutions, and language learning programs), as well as the Internet and Internet-based applications (e.g., email, instant messaging, Google, Skype). This investigation was guided by the following research questions: (1) What do pre-service and in-service ESL teachers believe about the use of digital technology in the classroom? and (2) What are the sources of those beliefs?

2. Literature Review

Defined as representations of human life (Rokeach, 1968), beliefs are said to influence what people feel, think, and how they behave. Research into language teachers' beliefs has shown that beliefs determine not only how teachers view "their roles, their students, the subject matter areas they teach, and the schools they work in" (Nespor, 1987, p. 317), but also what they do in the classroom (Breen, 1991; Johnson, 1994; Woods, 1996). This is true of teachers' general beliefs about teaching and learning (Johnson, 1994) as well as their beliefs about particular curricula topics such as teaching of grammar (Borg, 1999; Phipps & Borg, 2009), writing (Tsui, 1996), reading (Johnson, 1992; Fang, 1995), error correction (Schulz, 1996, 2001), and communicative language teaching (Nishino, 2012). In fact, the link between teachers' beliefs and their in-class actions is said to primarily depend on the length of the teachers' classroom practice and the depth of their theoretical knowledge (Breen, 1991). This link is also seen as dynamic, for as teachers acquire more teaching experience and expertise, their networks of beliefs, assumptions, and knowledge continue to evolve (Woods, 1996).

Individual factors can also play a role in shaping teachers' beliefs and influencing their teaching practices. The most up-to-date account of these factors as they affect language teachers is arguably that of Simon Borg (2006), who studied language teachers in various contexts (i.e., second/foreign language learning/teaching contexts) and with different levels of training (i.e., pre-service, in-service) and experience (i.e., novice, experienced, expert). Borg's framework of teacher cognition (i.e., teachers'

"beliefs, knowledge, theories, attitudes, assumptions, conceptions, principles, thinking, decision-making about teaching, teachers, learners, learning, subject matter, curricula, materials, activities, self, colleagues, assessment, and context", ibid, p. 283) conceptualizes the relationship between teachers' beliefs and classroom practices under the influence of three interrelated elements of schooling, professional coursework, and contextual factors, which are detailed next.

Schooling refers to teachers' previous learning experiences, which often remain a powerful influence on how teachers go about instruction delivery. This influence has been described by Lortie (1975) as "apprenticeship of observation"—the tendency for (novice and experienced) teachers to imitate the way they themselves were taught. In this way, beliefs that teachers hold about the act of teaching are often shaped by their experiences as learners. This is what Johnson (1994) found when investigating the beliefs of pre-service ESL teachers, who appeared to rely more on the images of language teachers they had encountered as language learners than on the teaching methods they were learning about during the teacher education program they attended. Johnson (1994) concluded that the pre-service teachers had less procedural knowledge in terms of language teaching, which they could acquire through actual teaching practice, and, as a result, performed familiar teaching practices they experienced as learners. Similarly, Peacock (2001) found little change in the beliefs of the pre-service English teachers in Hong Kong post a three-year teacher preparation program. Ashton (1990) argued further that pre-service teachers' pre-existing beliefs about teaching determine how they reflect on and react to the training they receive and, eventually to their future teaching practice. Finally, in their study of one novice and one experienced ESL teachers, Junqueira and Kim (2013) showed that the teachers' previous language learning experience remained a powerful influence on how they taught their classes. This is also true of technology integration. Brown and Warschauer (2006) found that the more pre-service teachers are exposed to the use of technology and have opportunities to actually use it, the more likely they are to incorporate technology into their teaching practice. The opposite has also been shown. In fact, Li and Ni (2011) reported that English as a Foreign Language (EFL) teachers in Chinese primary schools used technology only as a replacement for the previously used blackboards and audio equipment to plan and present lessons; this was because the teachers themselves did not have access to technology during their own schooling. Similarly, the pre-service teachers in Hayes and Ohrnberger's (2013) study chose to avoid digital games in their teaching because they had not used them as learners. This aligns with another study conducted with primary and secondary teachers in Quebec, Canada (Wozney et al., 2006), which found a strong link between teachers' previous technology use and their in-class practices.

Teacher education and professional development opportunities—the second factor that affects teachers' in-class practice—allow teachers to develop and adopt new knowledge about teaching, learning, learners, and schooling (Fang, 1996). Consistent engagement in professional coursework ensures review and reinforcement of the existing teacher knowledge (Tsui, 2005) and promotes change in beliefs. This change is especially important with novice teachers (Clark & Peterson, 1986; Fang, 1996), who may inadvertently propagate problematic beliefs without realizing that their current views may be

misaligned with the advances made in language teaching pedagogy (Johnson, 1992; Fang, 1996). Teachers may also seek change on their own. It is at these times that opportunities "to examine, elaborate, and integrate new information into their existing belief system" (Kagan, 1992, p. 77) may serve as a catalyst for change in both the teachers' beliefs and their classroom practices (Nespor, 1987; Fang, 1996). In terms of technology use, some have argued that, because teachers' technological and pedagogical knowledge affects how they view technology, formal training in the use of technology needs to be provided as part of pre-service teacher education programs and within in-service professional development opportunities (Chai, Koh, Tsai, & Tan, 2011; An & Reigeluth, 2011; Prestridge, 2012; Wozney et al., 2006). This is because teachers acquire and develop the necessary expertise for technology implementation through direct and indirect training experiences both before and during their teaching careers. In his examination of the teacher- and student-related factors in the use of technology in ESL classrooms, Feng (2012) found that the more teachers are exposed to technology before their teaching careers begin, the more they feel comfortable in its use. Fook, Sidhu, Kamar and Aziz (2011), in turn, showed that pre-service EFL teachers in Malaysia became more willing to use technology in teaching after completing technology-related training courses. Similarly, Besinger (2011) reported that pre-service teachers with positive attitudes about the use of digital games cited higher willingness to use these in their future classrooms. What's more, teachers often request technology-focused training to ensure more effective integration of digital technology (An & Reigeluth, 2011; Wozney et al., 2006).

Finally, Borg (2006) defined contextual factors as "social, institutional, instructional, and physical settings in which teachers work" (p. 275). Richards (2012) extended this definition to include "school culture" and "community of practice" (p. 49). Since their professional cultures and interactions with other professionals influence teachers' beliefs and practices (Putnam & Borko, 2000), Fang (1996) argued that these need to be investigated within the "psychological, social, and environmental realities of institutions" (p. 54) where the teaching practice takes place. Research on the role of context in teaching has repeatedly shown that context can affect what teachers do in the classroom. That is, context may promote or inhibit teachers' abilities to act on their beliefs (Davies, 1982; Fang, 1996; Borg, 2006). This is specially the case with technology integration. Kessler and Plakans (2008), for example, found that teachers with higher levels of contextual knowledge (i.e., "understanding the dynamics and relationships within the classroom and the rules and behaviors specific to a particular setting"; Richards, 2012, p. 49) tend to incorporate technology more readily than the teachers with higher levels of technological knowledge. On the other hand, such contextual factors as insufficient technological support, institutional support, time, and training opportunities constrain teachers' integration of technology (Shin & Son, 2007; An & Reigeluth, 2011; Feng, 2012). Institutional support, in particular, has been identified as the constraint that most influences what teachers do with technology. That is, teachers may be prevented from incorporating technology into their instruction if the institution they work for does not see the value in investing or using technology (Bauer & Kenton, 2008). At the

same time, even if adequate resources are available, teachers who do not appreciate the benefits of technology may refuse to incorporate it (Yunus, 2007). This was the case in Li and Ni's (2011) study of Chinese EFL teachers, who, despite governmental support, resisted technology implementation. Their negative attitudes, argued the authors, stemmed from their preference for a teacher-centered, rather than learner-centered instructional style, the latter of which is encouraged by the use of technology. More recently, Cuttrim-Schmid and Whyte (2012) found that, in spite of the positive social, institutional, and instructional conditions for the use of Interactive Whiteboards (IWB), EFL teachers in France and Germany chose not to use them, undermining their students' interactive and collaborative learning experiences.

To determine how language teachers' beliefs about digital technology and its use affect their classroom practices, the current study adopted Borg's (2006) framework of language teacher cognition. This was done for several reasons. First, to date, little research has applied Borg's framework to investigate language teachers' beliefs; instead, researchers in the field of general and language teacher cognition often chose to adapt the existing frameworks in educational technology; these include Technology Acceptance Model (TAM; Davis, Bagozzi, & Warshaw, 1989; Yunus, 2007) and Technological Pedagogical Content Knowledge model (TPACK; Angeli & Valanides, 2005; Chai et al., 2011). TAM focuses on the teachers' beliefs about the usefulness and ease of technology integration in the classroom and the factors that influence those beliefs. Such factors only address external reasons such as technical support and training opportunities. TPACK, in turn, considers teachers' general technical expertise and its influence on their use of information and communication technology in the classroom. While informative, studies that use these models have produced findings that are difficult to generalize to language teachers, suggesting that a different approach is necessary. Second, these frameworks have focused on a limited number of factors underlying teachers' beliefs, whereas Borg's framework offers a comprehensive approach and includes not only contextual factors and teachers' training experiences but also their language learning experiences. Finally, despite the unifying framework for understanding the relationship between teachers' beliefs and classroom practices that Borg's framework offers, there has been little research conducted with the model. The only study to date that has used Borg's framework (Borg, 2003) has been Nishino's (2012) examination of Japanese EFL secondary school teachers' beliefs (n = 139) about Communicative Language Teaching (CLT). The results showed that the contextual factors (i.e., exam-related expectations, student-related communicative conditions), CLT self-efficacy, and in-service teacher training strongly influenced teachers' beliefs about CLT. Furthermore, Nishino's study provides support for Borg's framework. However, one study is not enough to validate any theory and, as such, more investigations of the model are needed. These studies should examine different questions, contexts, and iterations of the framework. The current study does just that by examining teacher's beliefs about technology integration in an ESL context, using a new version of the framework (Borg, 2006) that is concerned specifically with language teachers rather than teachers in general (Borg, 2003).

3. Method

3.1 Participants

Two groups of ESL teachers (18 pre-service and 17 in-service) took part in the study (n = 35). There were 21 females (12 pre-service; 9 in-service) and 14 males (6 pre-service; 8 in-service), with a mean age of 28 for the pre-service group and 43 for the in-service group. The participants were asked to complete an online survey about their use of technology in the classroom, and 10 of them (4 pre-service; 6 in-service) volunteered to participate in semi-structured interviews conducted upon submission of the questionnaire. The pre-service teachers—defined as "engaged in initial teacher education programs (at undergraduate or postgraduate level) and who typically [had] no formal language teaching experience" (Borg, 2006, pp. 50-51)—were recruited through Bachelor of Education and TESL Certificate university programs in Ontario. The "in-service" participants—i.e., those "who have completed their initial training and (are working) in classrooms" (Borg, 2006, p. 75)—were drawn from private and public language schools, university-based ESL courses, and TESL Ontario, the professional organization serving ESL teachers province-wide. Almost all of the teachers (17 pre-service; 16 in-service) reported having had experience learning second/foreign languages (average length of study: 4.2 years for the pre-service group; 6.8 years for the in-service group).

The decision to recruit two groups of teachers was twofold. First, in-service teachers, regardless of their teaching experience, tend to show significant differences in their instructional decision-making compared to the teachers learning to teach (Tsui, 2005). This is likely due to the in-service teachers' extensive classroom experience and opportunities for ongoing professional development. In this sample, all but one of the in-service teachers (n = 16) reported having taught (average length: 5.1 years) compared to 11 participants with some teaching experience in the pre-service group (average length: 2.1 years). English was the language taught most by the participants in both groups.

Second, research has shown that these two groups of teachers differ in their beliefs and practices when it comes to the use of digital technology (Woolard, 2012). Pre-service teachers tend not only to hold positive attitudes towards digital technology, but they also have more experience using digital technology than their in-service counterparts (Besinger, 2011; Smerdon et al., 2000). On the other hand, in-service teachers, due to their extensive teaching experience, are better equipped to effectively integrate digital technology into their instruction and are more flexible in adapting new instructional ideas (Borg, 2006; Richards, 2012). When asked to self-assess their digital proficiency (using Wozney et al.'s (2006) categories), both groups indicated higher proficiency when using digital technology for personal purposes than for language learning/teaching. As language learners, the pre-service participants (78%) reported using digital technology more proficiently than their in-service counterparts (65%). However, as language teachers, the in-service group (94%) indicated higher proficiency than the pre-service group (66%). In terms of technology-related training, two-thirds (n = 12) of the pre-service participants and approximately half (n = 9) of the in-service participants reported having completed some kind of training programs. When asked about the purpose of the training, most

of the pre-service group (n = 15) indicated pursuing it as a part of the course/program requirement (average duration = 8 months), whereas the in-service group (n = 16) reported completing the training as part of professional development (average duration = 3 months).

3.2 Data Collection Tools

The data were collected by way of an online beliefs questionnaire and a follow-up interview. The questionnaire sought to determine the participants' background information (Part 1) and their attitudes towards the use of digital technology in the language classroom by way of two open-ended prompts (Part 2) as well as 31 closed-ended statements (Part 3). The interviews were carried out after the initial completion of the questionnaire. The objectives were to better understand the complexity of the participants' beliefs expressed in the questionnaire as well as to triangulate the questionnaire data. Only those who agreed to be interviewed were contacted and then met on a one-on-one basis.

3.2.1 Beliefs' Questionnaire

Before starting the questionnaire, the participants were presented with the definition of "digital technology". Similarly to Douglas (2014), this was done to establish a common definition for the term and to ensure that the participants kept the definition in mind as they completed the questionnaire. For Part 1 of the questionnaire, the participants' background information was gathered. This included: (1) demographics (i.e., age, gender, and teaching status: pre- or in-service), (2) experience in language learning and teaching, (3) experience using digital technology in learning, teaching, and personal life, and (4) experience with technology-related training. Since research shows that teachers' experiences inside and outside the classroom impact their decision about whether or not to use technology for learning and teaching (Parks et al., 2003; Wozney et al., 2006; Li & Ni, 2011), it was necessary to identify the participants' experiences with digital technology in their own learning, teaching, and personal use. The participants were asked to self-assess their proficiency with digital technology, to identify the purposes for technology-related use (i.e., instructional, communicative, informative, organizational, creative, recreational, evaluative, and expansive) as well as the frequency of use for each purpose (i.e., daily, weekly, monthly, rarely, and never), and to indicate the types of digital technology that they had used. To facilitate assessment of proficiency, the questionnaire-takers were provided with seven level descriptors, ranging from no experience to extreme proficiency in the use of digital technology; these were based on Wozney et al. (2006)'s study of public school teachers' perceptions of computer technology. Finally, since professional development opportunities influence teachers' beliefs (Borg, 2006) and the extent of technology-related training determines the teachers' willingness to use technology in the classroom (Wozney et al., 2006), the questionnaire also probed the participants' general and technology-specific training in terms of duration, purpose, and location.

In Part 2 of the questionnaire, the participants were asked to respond to two open-ended prompts. The first prompt dealt with the participants' actual use of digital technology whereas the second prompt sought their views on what would constitute their ideal use of technology in the classroom. The two items were included to capture the teachers' views beyond those probed by the Likert-style statements

as well as to ascertain that the participants' responses to these statements reflected their actual experience with technology. The latter reason was of special value since Borg (2006) cautioned that survey takers, whether they are teachers or learners, tend to respond to questionnaire items based on their ideal views about teaching/learning rather than on their actual practice. The issue with these ideals is that they may cause confusion for researchers when examining the data. Finally, Dörnyei (2003) recommended placing open-ended items towards the end of the questionnaire. In this study, however, these preceded the closed-ended items to ensure that the responses were a true reflection of the teachers' views and were not biased by the information in the prepared statements.

The 31 statements in Part 3 of the survey were based on Borg's (2006) framework of teacher cognition and probed the participants' beliefs about (1) experience with digital technology (in terms of the use and importance they assigned to technology), (2) expertise in using digital technology, and (3) the context(s) of use. On a scale of 1 ("strong disagreement") to 5 ("strong agreement"), the participants were asked to indicate the extent to which they agreed/disagreed with each item. The reliability of the 31 items was ascertained using the Cronbach Alpha coefficient. The negative statements (i.e., Q12, Q24, and Q28) were reversed prior to measurement. The computed values exceeded the minimum value of 0.7 (importance = .742, use = .749, expertise = .757, and context = .860), validating the internal item consistency (Pallant, 2011). The mean scores for each participant were computed per category. To ensure the representativeness of the beliefs categories (i.e., importance, use, expertise, and context), descriptive statistics were conducted confirming that each category was normally distributed. Table 1 illustrates the distribution of the items across the categories. The questionnaire was piloted and the statements were randomized prior to the administration (Dörnyei, 2003; Andres, 2012).

Table 1. Distribution of Closed-Ended Items across Categories

Category		N	Statement
Experience	Importance		Q1. I find digital technology useful in enhancing my performance as a teacher in the classroom.
			Q2. I find digital technology useful in improving my students' language skills (i.e., reading, writing, listening, and speaking) when I teach.
			Q4. As a teacher, I am enthusiastic about using digital technology in the classroom.
			Q19. I feel it is important for students to be enthusiastic about using digital technology in the classroom.
			Q20. I feel it is important for students to actively participate in activities using digital technology.
			Q24. The use of digital technology in the classroom limits my

		abilities as a teacher. Q25. I am willing to learn more about digital technology. Q27. I feel that it is important to use digital technology in the classroom. Q28. I feel that the use of digital technology interrupts the normal classroom activities. Q31. I feel that digital technology is beneficial in motivating my students to participate in the classroom activities.
	Use	Q3. I provide my students with opportunities to use digital technology. Q23. I am willing to make digital technology regular feature in my teaching. Q29. The use of digital technology makes lessons enjoyable for my students. Q30. The use of digital technology lets my students have fun in the classroom.
Expertise		Q5. I would describe myself as an early adaptor of digital technology compared to my fellow teachers. Q6. I can use digital technology to collect information from a variety of resources. Q7. I can use digital technology to facilitate academic learning. Q8. When I use digital technology in the classroom, I understand clearly how to use it. Q9. I can troubleshoot common problems when using digital technology. Q10. I can choose digital technology based on its appropriateness to specific tasks in the classroom. Q11. I can use digital technology to communicate with students. Q12. When I use digital technology in the classroom, I need help from other staffs. Q13. I am confident in using all kinds of digital technology available in my classroom.
Context		Q14. I have access to digital technology in my classroom. Q15. I am satisfied with technical infrastructure in my school (e.g., internet connection, digital technology equipment). Q16. I am satisfied with resources available in my school

	regarding the use of digital technology in learning and teaching language. Q17. I am encouraged to attend in educational programs regarding digital technology. Q18. Students are encouraged to use digital technology in the school. Q21. The teachers and staff in my school are enthusiastic about using digital technology. Q22. The teachers and staff in my school are encouraged to use digital technology. Q26. The teachers and staff in my school actively use digital technology.

3.2.2 Follow-Up Interview

Because questionnaires may not always grasp the realities of what the participants really think and feel, verbal commentaries may be employed to produce richer and more vibrant data (Brown & Rodgers, 2002; Borg, 2006; Dörnyei, 2007). The use of interviews (Prestridge, 2012; Yunus, 2007) and observations (Peacock, 2001; Judson, 2006) also allow researchers to obtain as much data as possible to enable data triangulation (De Groot, 2002; Bernat & Gvozenko, 2005; Nishino, 2012; Sato, 2013). A set of questions, based on the results of the beliefs questionnaire, guided the interview sessions. The questions sought additional explanations for the provided responses and probed the participants' overall satisfaction with their knowledge of, expertise with, and use of digital technology when teaching. The interviews were audio-recorded and transcribed. In order to "find patterns" (Dörnyei, 2007, p. 245) in the participants' responses, qualitative content analysis was employed.

4. Result

4.1 Research Question 1

To answer the first research question—*What do pre-service and in-service ESL teachers believe about the use of digital technology in the classroom?*—31 close-ended statements, two open-ended prompts, and the follow-up interviews were analyzed. Due to the small number of respondents, it was impossible to conduct a factor analysis on the close-ended items (Pallant, 2011); instead, descriptive statistics were used to identify the belief factors. Among the three major measures of central tendency (mean, mode, and median), the mean was chosen. This was not only because the mean indicates the "mathematical center" of the data, but also because it signals the "relative distance of the data from that center" (Rea & Parker, 1992, p. 108). Thus, the mean scores for each participant per category were calculated and later found internally consistent. Distribution analyses (i.e., plotting) were also performed to identify the beliefs that fell within or beyond the distribution.

Table 2. Beliefs about the Use of Digital Technology in the Classroom

Beliefs	Combined			Pre-service			In-service		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Importance	35	3.88	.500	18	3.70	.447	17	4.08	.490
Use	35	3.87	.596	18	3.64	.444	17	4.11	.650
Expertise	35	3.90	.542	18	3.82	.478	17	3.98	.605
Context	35	3.22	.836	18	2.87	.844	17	3.58	.675

As Table 2 shows, the data revealed four beliefs: *Importance*, *Use*, *Expertise*, and *Context*. The mean scores for *Importance* (M = 3.88), *Use* (M = 3.87), and *Expertise* (M = 3.90) were all close to 4 ("agree"), which suggests that both groups of participants perceived the use of digital technology positively. Yet, the in-service group (*Importance*, M = 4.08; *Use*, M = 4.11; *Expertise*, M = 3.98) seemed to have more positive attitudes overall than did the pre-service group (*Importance*, M = 3.70; *Use*, M = 3.64; *Expertise*, M = 3.82). Interestingly, the mean scores for *Context* in both groups (in-service, M = 3.58; pre-service, M = 2.87) were closer to 3 ("neither agree nor disagree"), suggesting mixed attitudes about the category. These may be due to the teachers' inability to affect change given the available technical infrastructure, resources, professional development opportunities, and existing perceptions among the administration. In light of this, the examination of a possible relationship between the participants' beliefs about *context* and their background factors was abandoned.

Thirty two out of 35 answers (16 pre-service; 16 in-service) were provided to the first open-ended prompt (actual use of technology in the classroom) and 33 responses (17 pre-service; 16 in-service) to the second prompt (ideal use). The "actual use" responses were categorized into the types of digital technology used, purpose of use, and frequency of use. The participants from both groups reported familiarity with various types of digital technology and experience using it for lesson planning, lesson reviews, lectures, communication with students, assignments, quizzes, class management, connecting students with various communities, and accommodating students' various learning styles and abilities. Although not many participants (n = 28) reported the frequency with which they employed digital technology, several teachers reported technology being a regular feature in their classrooms.

The "ideal use" responses were grouped in terms of uses and needs. While both groups recognized the growing use of technology in the classroom, the pre-service participants provided many comments about what their ideal use of technology would look like. They also displayed more variation when discussing their needs and concerns. The participants from both groups, however, felt that the best use of technology is through individualized learning opportunities made available for students with

different learning styles and/or disabilities. Moreover, they stressed the need for regular use of technology to promote interactive, dynamic, and collaborative learning experiences for all students that would also ensure their becoming digitally literate. Yet, several in-service participants cautioned against using technology as a mere replacement of the traditional teaching tools; instead, they felt that technology must be a catalyst for the creation of new ways to teach and learn. As one participant put it, "technology should […] take the traditional classroom experience to the next level". Participants from both groups felt that technology needs to be made more accessible to allow students/teachers to access resources and materials "beyond the brick and mortar of the classroom", thus increasing opportunities for language exposure and communication with "far-away" and "outside of classroom" communities. Still, as the following excerpts suggest, several teachers expressed concern that technology in the classroom could put traditional teaching practices at risk or become a distraction.

Excerpt 1. Students must learn traditional pen and paper work as well (Pre-service participant).

Excerpt 2. Old, "by the book" teaching methods are still effective (Pre-service participant).

Excerpt 3. Digital technology does not replace the human interaction vital for L2 learning and expression (Pre-service participant).

Excerpt 4. In the ideal classroom, students would leave their cell phones at the door […] (Technology) has become more of a distraction than a useful tool (In-service participant).

In terms of *needs*, both groups felt that access to up-to-date equipment and reliable infrastructure was necessary (e.g., "one tablet for each student", "ready access to Internet and electricity are necessary"). Some pointed to the importance of having "easy-to-use and set-up" equipment as well as a budget to equip classrooms. In addition, both groups expressed concerns about the existing low levels of digital literacy among students and teachers alike. To this end, several teachers felt it important to furnish instructors with training opportunities so that they might critically assess the quality and appropriateness of the available technology; this is to "add educational value" to how the teachers use technology by "testing and improving [it] to accomplish their pedagogical purposes".

The follow-up interviews confirmed the findings of the questionnaire. Specifically, the interviewees believed in the facilitative power of technology, suggesting that it promotes learner autonomy, improves students' language skills (e.g., pronunciation, listening, vocabulary learning), and allows for easy access to class materials and Internet resources. Technology was deemed especially valuable in the delivery of online courses as it allows for temporal and spatial freedoms. While some teachers used the Internet to locate new information and materials for their lessons, others drew on various software applications (e.g., MS Word, PowerPoint) to prepare lectures and learning management systems (e.g., Blackboard, WebCT) to communicate with students. Several teachers reported using technology to facilitate students' work by having them research, design, and present projects they collaborated on with peers. There were even those teachers who took technology to the next level by designing online ESL courses and modules. Despite all these benefits, the interviewees also experienced limitations in their use of digital technology. The main one had to do with the lack of available funding for equipment

and classroom resources. Another limitation stemmed from the software applications imposed on teachers by their workplace. One in-service teacher, for example, lamented about the software application he was required to use as a part of the curriculum. Because he saw its contents as limiting, he attributed students' boredom and disengagement directly to the software:

Excerpt 5. Then the program is not dynamic enough. It wasn't advanced enough. It needs to broaden the database as twice as it has. […] It is kind of repetitive, surely repetitive, boring (In-service participant).

Those teaching online were concerned about the loss of personal interaction with learners:

Excerpt 6. Sometimes you just want to experience that personal connection you would do in a real life situation, but you cannot get that in online learning (In-service participant).

Finally, there were teachers, who despite their best efforts, were unable to engage with technology, seeing it more as a distraction than an aid:

Excerpt 7. I found out technology sometimes, it's way too much. Sometimes, it did prevent, even distract because when students have their own laptops, computers, or else during all the lessons, they eventually started to be distracted, like going on Facebook (In-service participant).

4.2 Research Question 2

To determine the possible sources of the teachers' beliefs, correlational analyses were performed. This was done to identify any background factors that underlie the reported beliefs and to find any relationships between the four beliefs (i.e., importance, use, expertise, and context). The information collected during the interviews was also used to explain the quantitative results.

To investigate whether background factors predicted the teachers' reported beliefs, the following seven categories were investigated: (1) status (pre-service vs. in-service), (2) age, (3) gender, (4) language learning/teaching experience, (5) number of language (s) learned/taught, (6) proficiency in technology use, and (7) years of technology-related training. Pearson's correlation coefficient was calculated for each group (pre-service and in-service) separately and both groups together (i.e., combined). As mentioned earlier, the *context* belief was excluded from the analysis due to the teachers' inability to control the contextual factors of their instructional settings.

Table 3. Correlations between Background Factors and Beliefs

Beliefs	Background Combined		Pre-service		In-service	
Importance	Proficiency as Teachers	.353*	Technology-related Training	.535*	Proficiency as Teachers	.550*
Use	Teaching Experience	.414*			Proficiency as Personal users	.492*

Expertise	Proficiency as Teachers	.472**	Age	.667**	Proficiency as Teachers	.557*
			Technology-related Training	.556*		

Note: * $p < .05$, ** $p < .01$.

Table 3 shows that for the combined group, the participants' proficiency in using digital technology as language teachers ("proficiency as teachers") correlated significantly with the *importance* ($r = .353$, $p < .05$) and *expertise* ($r = .472$, $p < .05$) beliefs. This suggests that the higher one's proficiency in using technology in the classroom, the more likely one is to believe in the importance of technology and to possess greater knowledge about how to use it. The length of the participants' teaching experience correlated positively with the *use* ($r = .414$, $p < .05$) belief, suggesting that the teachers might use digital-technology more frequently if they have more teaching experience.

These results were similar for the in-service group, whose "proficiency as teachers" correlated significantly with the *importance* ($r = .550$, $p < .05$) and *expertise* ($r = .557$, $p < .05$) beliefs. Furthermore, their own proficiency in using technology ("proficiency as personal users") positively influenced the *use* ($r = .492$, $p < .05$) belief, suggesting that the more experience the in-service teachers had in the use of technology in their personal lives, the more confident they felt about incorporating it in their teaching practice.

On the other hand, the pre-service participants' experiences with technology-related training correlated positively with their beliefs of *importance* ($r = .535$, $p < .05$) and *expertise* ($r = .556$, $p < .05$). This means that pre-service teachers who receive training in the implementation of digital technology are better able to implement technology in the classroom and are thus more likely to view it as important. Age significantly correlated with the *use* ($r = .667$, $p < .01$) belief, suggesting that the pre-service participants linked their physical maturity with the length of their experience using digital technology. To determine how age influenced the *use* belief, the pre-service participants were split into two age groups—those below and those above the age of 30. Only the younger group's use of technology produced a significant correlation ($r = .797$, $p < .01$), suggesting that younger pre-service teachers assess their use of digital technology in teaching higher than do their older counterparts.

Table 4. Correlations between Four Beliefs Factors

		Importance	Use	Expertise	Context
Combined	Importance	1	.655**	.708**	.237
	Use	.655**	1	.610**	.529**
	Expertise	.708**	.610**	1	.140
	Context	.237	.529**	.140	1
Pre-service	Importance	1	.371	.598**	.294

	Use	.371	1	.557*	.711**
	Expertise	.598**	.557*	1	.262
	Context	.294	.711**	.262	1
In-service	Importance	1	.747**	.803**	-.164
	Use	.747**	1	.635**	.214
	Expertise	.803**	.635**	1	-.101
	Context	-.164	.214	-.101	1

Note: * $p < .05$, ** $p < .01$.

Table 4 illustrates the results of correlational analyses between the four beliefs. Significant correlations between (1) *expertise* and *importance* ($r = .708$, $p < .01$), (2) *expertise* and *use* ($r = .610$, $p < .01$), (3) *use* and *importance* ($r = .655$, $p < .01$), and (4) *use* and *context* ($r = .529$, $p < .01$) were found for the combined group. This means that the more participants know about the use of digital technology, the more likely they are to see it as important and to increase its use; if they use it more, their belief in the importance of technology may amplify even if it is regulated by the context in which they teach.

For the pre-service group, three correlations were identified as significant: (1) *expertise* and *importance* ($r = .598$, $p < .01$), (2) *use* and *context* ($r = .711$, $p < .01$), and (3) *use* and *expertise* ($r = .557$, $p < .05$). These suggest that the pre-service participants with high proficiency in the use of technology are more likely not only to view technology as important, but also to use it more in the classroom; yet, this use may be dictated by the instructional setting in which they operate.

Interestingly, the three significant correlations ascertained for the in-service group are identical to those of the combined group: (1) *expertise* and *importance* ($r = .803$, $p < .01$), (2) *expertise* and *use* ($r = .635$, $p < .01$), and (3) *use* and *importance* ($r = .747$, $p < .01$). The *context* belief, however, did not correlate with any other belief, possibly suggesting that for the in-service teachers context has little influence on how they view their expertise in the use of technology and whether or not they see technology as important.

The follow-up interviews confirmed the results of the correlational analyses and expanded on the role of the participants' backgrounds and views about technology in light of the four beliefs. Due to their extensive experience with it when learning, teaching, and using it for personal purposes, the majority found digital technology easy to navigate. Some in-service teachers, however, reported challenges with technology use. These mainly had to do with the lack of expertise when using unfamiliar types of technology and contextual constraints. To develop expertise in the use of digital technology, the teachers spoke about actively seeking and engaging in training opportunities they found on their own. Most appeared dissatisfied, however, with the training made available to them at work, because they felt it was not program/application-specific, did not instruct them on how to create technology-integrated activities, and did not provide sufficient time for practice. When addressing contextual limitations, the participants touched upon such variables as society, teachers, institutional

policy, support, and students. As contributing members of society, the teachers felt it their duty to learn as much as they could about digital technology and to find ways to implement it in their teaching:

Excerpt 8. I think we must teach [using digital technology] because that's a part of literacy we are teaching. That's part of computer and digital literacy (In-service participant).

Excerpt 9. I would be, definitely using [digital technology] in the future, definitely useful to have cause it is a really big, it's not like trends right now, but we kind of have to go with (Pre-service participant).

Yet, not all language teachers shared this sentiment. In fact, many hold negative views about digital technology in general and its integration in particular. These views, according to one participant, play a role in preventing her peers from learning about digital technology and how to use it:

Excerpt 10. Every time when I walked into the room, I hear again, again and again real negativity from teachers about [digital] technology in the classrooms (In-service participant).

Excerpt 11. Computer lab time for a lot of teachers means that they just sit at a desk and they have an hour to kill while their students are busy doing whatever they are supposed to be doing in ESL computer lab time (In-service participant).

Some participants suggested that institutional policy could be the decisive factor in the use of technology. If technology use is promoted, everyone benefits. If, however, the role of technology is not recognized by an institution, the teachers who wish to use it despite their best intentions will not be able to:

Excerpt 12. I am pretty sure with a SMART board that a school has to sign up for it to get a password, to use it. [If a school that I teach doesn't sign up] how can I be even able to practice or use it if I cannot access it (In-service participant)?

Technical and educational support made available to teachers could make a difference as well. The participants reported that the support they had access to was varied and depended in large part on equipment availability and accessibility. While some classrooms were well-equipped and the teachers received all the technical help they needed, the prevalent scenario resembled largely barren rooms with teachers trying to troubleshoot technical problems on their own. One teacher reported working abroad and being told to figure out how to use a newly installed TV and to then teach the other teachers about it:

Excerpt 13. They just set up a TV in my classroom, saying "you are going to be a demonstration teacher; here is the password for you to figure out on your computer during office hours". I was the person who was the first and I had to train other teachers. It was frustrating (In-service participant).

Finally, when the participants were asked about their students' reactions to the use of digital technology in the classroom, most were positive, saying that the students liked, even preferred, the lessons that utilized technology. Some indicated that technology encouraged their students to get involved in the lessons. Those with experience teaching younger learners, in particular, emphasized the facilitative role of technology in engaging learners with the subject at hand:

Excerpt 14. There were also games that were available, which the students really liked because, I mean,

they were like grammar games, vocabulary games that they liked to do because it was a kind of like playing on an iPad or something. It helped them to have fun (Pre-service participant).

Excerpt 15. You can try and make it [i.e., a lesson] easy through a game. There is always some kind of ESL activities that you can download. […] With the ESL students of the younger age or lower levels, those activities can be really interesting. They really intrigued them (In-service participant).

5. Discussion

5.1 Research Question 1

This study has demonstrated that overall both the pre-service and in-service participants hold positive attitudes towards the use of digital technology in the language classroom. This finding is in line with other research that found positive attitudes towards digital technology among pre-service (Fook et al., 2010; Brush, Glazewski, & Hew, 2008) and in-service teachers (Li & Ni, 2011; An & Reigeluth, 2011). However, compared to the pre-service group, the in-service participants regarded the use of digital technology as more important and used it more often to make lessons enjoyable for their students. While this finding goes against previous studies that reported more experienced teachers as less likely to integrate digital technology in their teaching practices (Jones, 2013; Smerdon et al., 2000), it supports the notion that in-service teachers with more teaching experience (i.e., five years and more, Tsui, 2005) show more flexibility in making pedagogical decisions and adopting new teaching ideas in response to their students' needs and instructional settings (Borg, 2006; Tsui, 2003, 2005).

The specific benefits reported herein (e.g., access to authentic materials and various resources, individualized teaching, learner autonomy, learner engagement, continuous reviewing) are supported by previous investigations into the advantages of digital technology in language education (Li & Ni, 2011; Bruess, 2003). The participants felt that among the four language skills (i.e., reading, writing, listening, and speaking), digital technology could benefit learners the most by providing them with listening and speaking opportunities. This is because access to authentic and linguistically accessible materials (e.g., audio- and video-clips on YouTube, free online texts) can increase learners' exposure to the target language (Levy, 2012; Tomlinson, 2012) and supply them with opportunities to communicate with various native/proficient speakers other than their teachers (Levy, 2012; Tomlinson, 2012; DuBravac, 2013). An in-service participant, for example, explained that she often uses audio materials as a way to provide her students with opportunities to listen to other native speakers. Another in-service participant reported using Skype to connect his students with a native speaker in another country for communicative practice. Several teachers also reported witnessing improvement in their learners' vocabulary and pronunciation abilities, attributing the changes to the technological applications that target specific language skills (Levy, 2012). This is in line with DuBravac's (2013) research that emphasized the role of digital technology in enhancing the CLT approach by enabling teachers to create a diverse range of learning tasks.

In fact, the participants in this study claimed that digital technology enabled them to modify their

teaching to suit individual learners' needs and abilities. One pre-service teacher, for example, shared her experience with a student who had a learning disability. This learner showed more progress when using computers in a writing activity than when using pen and paper. Access to visual and audio materials was reported as a way to help those students who need visual supports to understand content. A teacher explained how using a flashcard game on a computer helped him to motivate visual learners to take part in the activity. Other participants reported having successfully used educational games to engage younger students in classroom tasks; they credited the visual stimuli and interactive nature of the games for the said engagement. These findings are supported by research that promotes the use of different digital technologies to help teachers to match their practices to the students' learning styles and abilities (Tomlinson, 2012) thus motivating them to learn (DuBravac, 2013; Gee, 2003). Such affordances are rooted in a learner-centered approach to language education (Borg, 2006; Judson, 2006; An & Reigeluth, 2011; Lawrence, 2014) that holds the learner at its core. Digital technology is said to personalize education to each student's needs and, as such, deserves prominence in the modern educational system (Lawrence, 2014)—a statement echoed by the participants in this study: "In general digital technology is such a big part of our life […] so I think classrooms have to reflect students' lives to a certain degree. […] We must teach [using digital technology] because that's a part of literacy we are teaching" (In-service participant).

Many teachers praised the temporal and spatial flexibility that digital technology offers. One in-service teacher, in particular, applauded online instruction because it offered her flexibility in choosing a time and space in which to work. She especially enjoyed the freedom to upload course materials for her students to access at their convenience. Another in-service participant stressed the convenience technology offers in managing course materials. He explained that the use of an interactive whiteboard made it easy for him and his students to review previously learned materials at any time during/after class. This flexibility, he argued, promoted autonomous learning because the students were given access not only to the class materials (that they could peruse without the need for teacher's presence), but also to numerous other resources available on the Internet.

Both pre-service and in-service participants saw themselves as proficient users of technology inside and outside the classroom and reported using it often. Yet, despite this frequent use, the purposes for technology use and types varied among the teachers. Some reported using digital technology for communicative (e.g., emailing, online messaging, video-conferencing), informative (e.g., website search), organizational (e.g., record keeping, lesson plans), recreational (e.g., games), and evaluative (e.g., assignments, quizzes) purposes. Others relied on technology exclusively to plan and deliver lessons, to create interactive and collaborative learning tasks, as well as to provide students with designated lab time to engage with technology on their own. As for the types of technology used, it varied in terms of equipment (e.g., computers, interactive whiteboard, digital camera, digital projector, touch-screen TV), Internet-based applications (e.g., e-mail, Skype, Google, YouTube), educational (e.g., learning management systems such as Blackboard, Moodle), general (e.g., Word, PowerPoint), and

other available applications (e.g., computer games, music, movies). The variety of technologies used and the ease with which the study's teachers engage with technology can be seen as evidence for Bax's (2003) normalization stage (defined as a state when "technology is so integrated into our lives that it becomes invisible", ibid, p. 25) where technology is not regarded as extra but as an integral part of a curriculum (ibid). This view is confirmed further by the participants' reports of using technology on a regular basis for lesson delivery and management (Reinders, 2012) as well as relying on it exclusively to deliver courses online.

Yet, despite the generally positive beliefs about the use of digital technology in the language classroom, the participants expressed two main concerns. First, the teachers worried about using technology to the extent that it would lead to an abandonment of "tried and true" classroom activities or, worse, that it would replace traditional "face-to-face" learning altogether. The fear of losing the "human feel" (i.e., social interactions that occur between teachers and students or between students in traditional classroom settings, Lawrence, 2014) in language teaching/learning was presented as another concern. The teachers cautioned that no matter how well technology may be integrated, the lack of human interaction can lead to feelings of isolation among learners. This is precisely what Lawrence, Haque and King (2013) found in their e-learning feasibility study. The surveyed ESL instructors and learners alike felt that the face-to-face interaction with teachers and other students as well as the teacher's physical presence were not only crucial, but also beneficial to language learning; moreover, e-learning environments were seen as segregating. In this study, two in-service teachers with experience in online instruction lamented the physical divide integral to online teaching. One teacher, in particular, reported difficulties communicating with learners via voice and text messages, especially when trying to instruct the students on how to use different tools and options in an online application; the challenge was exacerbated with lower proficiency learners. Another in-service participant felt constrained by the limited space of the computer screen during face-to-face communication via Skype. She recounted a vocabulary lesson where she had to constantly move the camera to show objects that were out of the camera's range, distracting both herself and her students. These challenges, however, should not be viewed negatively, but rather seen as a call for discerning use of technology. After all, to ascertain its educational and pedagogical values and to ensure effectiveness, technology has to be evaluated prior to use. This is especially important in language education where the purpose for technology is to improve learners' language skills: "Ideally, technology is used to help improve student learning and I am hoping to use technology for education value" (pre-service participant).

5.2 Research Question 2

The correlational analyses performed on the (1) four beliefs, (2) background factors, and (3) within the three beliefs factors showed that classroom practice (i.e., language teaching experience and self-rated proficiency in using technology), technology-related training, experience with digital technology, context, and age were the determining factors behind the reported beliefs. Since teachers' pedagogical knowledge is formed through formal training and field experiences (Borg, 2006; Richards, 2012), it is

not surprising that what they know about teaching and what they do in the classroom determine their beliefs about digital technology. This was the case in this study, where the level of teaching experience and proficiency with technology dictated the teachers' views on technology integration in the classroom. That is, the in-service teachers were more likely to integrate technology than their less experienced/pre-service colleagues. This is unlike previous research that failed to link teaching experience and teachers' beliefs about technology (Jones, 2013). Shulman (1987) claims that teachers acquire pedagogical reasoning skills—a crucial component of teaching—mainly through experience. These skills then enable teachers to make instructional decisions about how to adapt materials and tools to best suit their pedagogical goals and the learners' needs (Tsui, 2005; Richards, 2012). This study reiterates Shulman's claim, suggesting that the more experienced teachers are more likely to utilize digital technology in their teaching practice. Furthermore, there is evidence that teaching experience coupled with expertise in technology use lead to more favourable attitudes towards technology integration (Chai et al., 2011; Prestridge, 2012; Reinders, 2012). In fact, Prestridge (2012) showed that teachers' competency (i.e., how much they know) and confidence (i.e., how proficient they perceive themselves to be) in technology use is instrumental in determining their beliefs about technology integration. Reinders (2012), in turn, stressed the importance of acquiring specific knowledge (i.e., ability to use specific software and to utilize online materials) to enable language teachers to integrate digital technology in their teaching.

Technology-related training predicted the *importance* and *expertise* beliefs of the pre-service teachers, suggesting that effective training opportunities may result in positive attitudes towards technology integration. This is in line with Fook et al.'s (2011) study, which found Malaysian pre-service teachers benefitting from their technology-related training experience and, as a result, displaying positive attitudes towards the use of technology. Two pre-service participants in this study reported that it was specifically their training experience that improved their expertise (*Excerpt 16*) and even changed their attitudes towards the use of digital technology (*Excerpt 17*).

Excerpt 16. If you learn one application and then it can be applied to many other ones. For example, I did have formal training for things like MS office. I think that it really inspired a lot of creativity [in terms of using it for learning and teaching] when you know how to navigate around systems (pre-service participant).

Excerpt 17. We have a lot of guest speakers and a lot of them talked about the use of technology and how students can access, like how communication was with teachers outside class, so they emphasize a lot the importance of the technology. This kind of lectures helped me know that technology can be fun for students […] and see that sometimes changes [using digital technology] is good (pre-service participant).

Although no significant correlation between training experience and the in-service participants' beliefs was found, their voluntary and active attempts to seek training opportunities are notable because they point to the teachers' need to increase their technological knowledge to respond to the rapid and

growing use of digital technology in language education (Kern, 2006). One in-service participant, for example, reported taking courses to learn how to teach online whereas another teacher explored ways to use digital technology by seeking additional help from a technology specialist in his school. The inclination to put extra effort into the development of their expertise is an important distinguishing characteristic of skilled teachers (Tsui, 2005). In fact, Wozney et al. (2006) concluded that in-service teachers attribute technology-related training to the use of technology in the classroom.

The participants' experience with digital technology correlated with the *use* belief, suggesting that familiarity with digital technology may affect the likelihood of technology integration in one's teaching. This conclusion is supported by a study of public teachers' perceptions about computer technology integration in Quebec (Wozney et al., 2006) that found that the teachers' personal use of computer technology was one of the factors that affected its incorporation in the classroom. Yet, the beliefs of the pre-service teachers did not seem to be affected by their experiences with digital technology. This can be explained by Hayes and Ohrnberger's (2013) study that investigated but did not find a relationship between pre-service teachers' previous experience playing digital games and their in-class use of the games. The authors concluded that because the pre-service teachers did not encounter digital games during their teacher training, but only experienced them for entertainment, they were unlikely to incorporate them in their teaching practices despite their availability. Similarly, in this study, several participants expressed concern about overuse of digital technology and emphasized the importance of traditional teaching methods. Such attitudes point to the teachers' dependence on their previous learning experiences that were limited or devoid of digital technology experience.

Similar to previous research (Borg, 2006; An & Reigeluth, 2011; Li & Ni, 2011; Bauer & Kenton, 2005), this study found evidence that context can support or constrain teachers' beliefs. Context was a constraint predominantly for the pre-service participants, whose limited teaching experience prevented them from envisioning ways they could integrate technology within a given instructional setting; this is often true of both the contexts the novices are familiar with and those they do not know (Johnson, 1994). While the in-service teachers, thanks to their experience in the classroom, reported being able to adapt to various teaching contexts, they were at times challenged by the limited institutional and technical support. These, in fact, have been found to hamper teachers' integration of technology despite signs of high motivation and expertise (Bauer & Kenton, 2005). Furthermore, the in-service participants expressed concern over the limited funding and time made available for additional teacher training, suggesting that all teachers may require comprehensive and focused training opportunities on ways to integrate digital technology in the classroom (An & Reigeluth, 2011).

Finally, age appeared to underlie the younger pre-service teachers' belief (age 21 to 29) about technological expertise. This finding is noteworthy since previous research did not indicate influence of age on teachers' beliefs (Robin & Harris, 1998). At the same time, this result finds support in Bruess' (2003) study of university ESL instructors' beliefs about the use of computer technology, where the younger teachers assessed their technological knowledge higher than did their mature peers. A more

recent study (Feng, 2012) associated younger age with higher familiarity and willingness to integrate technology. This familiarity and consecutively, willingness to use technology, can also be explained by Lortie's (1975) "apprenticeship of observation" in that the younger participants, compared to the older ones, likely had more experience using technology in the classroom as learners. Even though the sample size for the correlation was small (n = 11), it is possible that age could play a role in the perception of expertise among teachers.

6. Conclusion

To summarize, this study has shown that both pre-service and in-service teachers hold positive views about the use of digital technology in the classroom and that these attitudes are determined by the teachers' classroom experience, technology-related training, proficiency in using technology, context, and age. These findings are theoretically and pedagogically relevant. Theoretically, they validate Borg's (2006) framework of teacher cognition within the ESL context and address the topic of digital technology use outside the frameworks prevalent in technology integration research. As such, this study has cast a wider net in determining the factors (i.e., teaching experience, technology-related training experience, age, context, self-assessed proficiency in using digital technology as teachers and personal users) from the teachers' personal lives that can affect their pedagogical choices. Specifically, training and self-assessed proficiency in the use of digital technology seem to originate in the teachers' personal experience with technology outside the classroom. Hence, this research contributes to Borg's framework by suggesting that personal experience not related to teaching can impact how one perceives "teaching, teachers, learners, learning, subject matter, curricula, materials, activities, self, colleagues, assessment, [and] context" (Borg, 2006, p. 283).

Pedagogically, the findings of this research are meaningful for teacher educators, administrators, and teachers themselves because they underscore the possible factors that may affect teachers' beliefs about technology integration in the classroom (Judson, 2006). Teacher educators, for example, may value the results because they point to prospective teachers' appreciation and need to be taught about and with digital technology. Administrators, in turn, will recognize the need of all teachers to receive ongoing and customized training in the use of digital technology as well as support when using technology in the classroom; hence, teacher educators and administrators alike should develop training opportunities for both pre-service and in-service teachers to educate them in how to critically assess digital technology and to apply it effectively to technology-enhanced language teaching practices. Finally, teachers themselves can draw on the opinions of their peers, reflecting on their own chosen or ideal implementation of technology. Exposing these beliefs may lead to new innovations and the breaking down of preconceived notions. In fact, one of the in-service participants in this very study was challenged by the widespread technological negativity among her peers to urge teachers to: "embrace technology and bring it in our classroom instead of fighting against it".

References

An, Y., & Reigeluth, C. (2011). Creating technology-enhanced, learner-centered classrooms: K-12 teachers' beliefs, perceptions, barriers, and support needs. *Journal of Digital Learning in Teacher Education*, *28*(2), 54-62.

Andres, L. (2012). *Designing & Doing Survey Research*. Thousand Oaks, CA: SAGE.

Angeli, C., & Valanides, N. (2005). Pre-service elementary teachers as information and communication technology designers: An instructional systems design model based on an expanded view of pedagogical content knowledge. *Journal of Computer Assisted Learning*, *21*(4), 292-302.

Ashton, P. T. (1990). Editorial. *Journal of Teacher Education*, *41*(1).

Bauer, J., & Kenton, J. (2005). Toward technology integration in the schools: Why it isn't happening. *Journal of Technology and Teacher Education*, *13*(4), 519-546.

Bax, S. (2003). CALL—Past, present, and future. *System*, *31*, 13-28.

Bensiger, J. (2011). *Perception of Pre-service Teachers of Using Video Games as Teaching Tools*. ProQuest Digital Dissertations.

Bernat, E., & Gvozdenko, I. (2005). Beliefs about language learning: Current knowledge, pedagogical implications, and new research directions. *TESL-EJ*, *9*, 1-21.

Borg, S. (1999). Studying teacher cognition in second language grammar teaching. *System*, *27*, 19-31.

Borg, S. (2003). Teacher cognition in language teaching: A review of research on what language teachers think, know, believe, and do. *Language Teaching*, *36*, 81-109.

Borg, S. (2006). *Teacher Cognition and Language Education: Research and Practice*. New York, NY: Continuum.

Breen, M. P. (1991). Understanding the language teacher. In R. Phillipson, E. Kellerman, L. Selinker, M. S. Smith, & M. Swain (Eds.), *Foreign/Second Language Pedagogy Research: A Commemorative Volume for Claus Fœrch*. Bristol, PA: Multilingual Matters Ltd.

Brown, D., & Warschauer, M. (2006). From the university to the elementary classroom: Students' experiences in learning to integrate technology in instruction. *Journal of Technology and Teacher Education*, *14*(3), 599-621.

Brown, J. D., & Rodgers, T. S. (2002). *Doing Second Language Research*. Oxford, UK: Oxford University Press.

Bruess, L. (2003). *University ESL Instructors' Perceptions and Use of Computer Technology in Teaching*. ProQuest Digital Dissertations.

Brush, T., Glazewski, K. D., & Hew, K. F. (2008). Development of an instrument to measure preservice teachers' technology skills, technology beliefs, and technology barriers. *Computers in the Schools*, *25*(1-2), 112-125.

Chai, C. S., Koh, J., Tsai, C., & Tan, L. (2011). Modeling primary school pre-service teachers' Technological Pedagogical Content Knowledge (TPACK) for meaningful learning with Information and Communication Technology (ICT). *Computers & Education*, *57*, 1184-1193.

Clark, C. M., & Peterson, P. L. (1986). Teachers' thought processes. In M. C. Wittrock (Ed.), *Handbook of Research on Teaching*. New York, NY: Macmillan.

Cuttrim-Schimid, E., & Whyte, S. (2012). Interactive whiteboards in state school settings: Teacher responses to socio-constructivist hegemonies. *Language Learning & Technology, 16*(2), 65-86.

Davies, G. (1982). *Computers, Language and Language Learning*. London, UK: CILT.

Davis, F., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

De Groot, E. (2002). Learning through interviewing: Students and teachers talk about learning and schooling. *Educational Psychologist, 37*, 41-52.

Dörnyei, Z. (2003). *Questionnaire in Second Language Research: Construction, Administration, and Processing*. Mahwah, NJ: Lawrence Erlbaum Associates.

Dörnyei, Z. (2007). *Research Methods in Applied Linguistics*. Oxford, UK: Oxford University Press.

Douglas, S. R. (2014). Teacher perceptions of task-based language teaching and learning across Canada. In H. M. McGarrell, & D. Wood (Eds.) *Contact—Refereed Proceedings of TESL Ontario Research Symposium*, *40*, 2. Retrieved from http://www.teslontario.net/publication/research-symposium

DuBravac, S. (2013). *Technology in the L2 Curriculum*. Boston, MA: Pearson Education Inc.

Fang, Z. (1995). On paradigm shift in reading/literacy research. *Reading Psychology*, *16*(2), 215-260.

Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research*, *38*(1), 47-65.

Feng, Y. (2012). *English Language Teachers' Perceptions of Computer-Assisted Language Learning.* ProQuest Digital Dissertations.

Fook, C., Sidhu, G., Kamar, N., & Aziz, N. (2011). Pre-service teachers' training in information communication and technology for the ESL classrooms in Malaysia. *Turkish Online Journal of Distance Education-TOJDE, 11*(3), 97-108.

Fullan, M. (1983). Research into educational innovation. In H. L. Gray (Ed.), *The Management of Educational Institutions*. Lewes, UK: The Falmer Press.

Gee, J. P. (2003). *What Video Games Have to Teach Us about Learning and Literacy*. New York, NY: Palgrave Macmillan.

Hayes, E., & Ohrnberger, M. (2013). The gamer generation teaches school: The gaming practices and attitudes towards technology of pre-service teachers. *Journal of Technology and Teacher Education, 21*(2), 153-177.

Hew, K., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Education Tech Research Dev*, *55*, 223-252.

Hubbard, P. (2008). CALL and the future of language teacher education. *CALICO Journal, 25*(2), 175-188.

Jenson, J., Taylor, N., & Fisher, S. (2011). *Critical Review and Analysis of the Issue of "Skills,*

Technology and Learning". Retrieved from http://www.edu.gov.on.ca/eng/research/jenson_ reporteng.pdf

Johnson, K. E. (1992). The relationship between teachers' beliefs and practices during literacy instruction for non-native speakers of English. *Journal of Reading Behavior*, *24*(1), 83-108.

Johnson, K. E. (1994). The emerging beliefs and instructional practices of pre-service English as a Second Language teachers. *Teaching & Teacher Education*, *10*(4), 439-452.

Jones, N. T. (2013) *Veteran Teachers' Perceptions of the Factors Influencing the Incorporation of Advanced Technology into Their Classrooms*. ProQuest Digital Dissertations.

Judson, E. (2006). How teachers integrate technology and their beliefs about learning: Is there a connection? *Journal of Technology and Teacher Education*, *14*(3), 581-597.

Junqueira, L., & Kim, Y. (2013). Exploring the relationship between training, beliefs, and teachers' corrective feedback practices: A case study of a novice and an experienced ESL teacher. *The Canadian Modern Language Review/La revue Canadienne des langues vivantes*, *69*(2), 181-206.

Kagan, D. M. (1990). Ways of evaluating teacher cognition: Inferences concerning the Goldilocks principle. *Review of Educational Research*, *60*, 419-469.

Kagan, D. M. (1992). Implications of research on teacher beliefs. *Educational Psychologist*, *27*, 65-90.

Kern, R. (2006). Perspectives on technology in learning and teaching languages. *TESOL Quarterly*, *40*(1), 183-210.

Kessler, G., & Plakans, L. (2008). Does teachers' confidence with CALL equal innovative and integrated use? *Computer Assisted Language Learning*, *21*(3), 269-282.

Lawrence, G. (2014). A call for the human feel in today's increasingly blended world. In H. M. McGarrell, & D. Wood (Eds.) *Contact—Refereed Proceedings of TESL Ontario Research Symposium*, *40*, 2. Retrieved from http://www. teslontario.net/ publication/research-symposium

Lawrence, G., Haque, E., & King, J. (2013). *Rationale and recommendations for implementing e-learning in Ontario non-credit adult ESL programs: A feasibility report*. Toronto, Canada: The Toronto Catholic District School Board.

Lei, J., & Zhao, Y. (2007). Technology uses and student achievement: A longitudinal study. *Computers & Education*, *49*, 284-296.

Levy, M. (2012). Technology in the classroom. In A. Burns & J. C. Richards (Eds.), *The Cambridge Guide to Pedagogy and Practice in Second Language Teaching*. Cambridge, U.K.: Cambridge University Press.

Li, G., & Ni, Y. (2011). Primary EFL teachers' technology use in China: Patterns and perceptions. *RELC Journal*, *42*(1), 69-85.

Lortie, D. C. (1975). *School-Teacher: A Sociological Study*. Chicago, IL: The University of Chicago Press.

Markee, N. (1993). The diffusion of innovation in language teaching. *Annual Review of Applied Linguistics*, *13*, 229-243.

Milton, P. (2003). *Trends in the Integration of ICT and Learning in K-12 Systems*. Retrieved from http://www.cea-ace.ca/publication/trends-integration-ict-and-learning-k-12-systems

Muir-Herzig, R. (2004). Technology and its impact in the classroom. *Computers & Education*, *42*, 111-131.

Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies*, *19*(4), 317-328.

Nishino, T. (2012). Modeling teacher beliefs and practices in context: A multimethods approach. *The Modern Language Journal*, *96*(3), 380-399.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, *62*(3), 307-332.

Pallant, J. (2011). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using the SPSS Program* (4th ed.). Crows Nest, N.S.W. Australia: Allen & Unwin.

Parks, S., Huot, D., Hamers, J., & Lemonnier, F. (2003). Crossing boundaries: Multimedia technology and pedagogical innovation in a high school class. *Language Learning & Technology*, *7*(1), 28-45.

Peacock, M. (2001). Pre-service ESL teachers' beliefs about second language learning: A longitudinal study. *System*, *29*(2), 177-195.

People for Education. (2008). *Language Support for Newcomer Students: From The Annual Report on Ontario's Public Schools*. Retrieved from http://www.peopleforeducation.ca/wp-content/uploads/2011/07/Language-Support-for-Newcomers-2008.pdf

Phipps, S., & Borg, S. (2009). Exploring tensions between teachers' grammar teaching beliefs and practices. *System*, *37*, 380-390.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On The Horizon*, *9*(5), 1-2.

Prensky, M. (2005). Listen to the natives. *Educational Leadership*, *63*(4), 8-13.

Prestridge, S. (2012). The beliefs behind the teacher that influences their ICT practices. *Computers & Education*, *58*, 449-458.

Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning. *Educational Researcher*, *29*(1), 4-15.

Rea, L. M., & Parker, R. A. (1992). *Designing and Conducting Survey Research: A Comprehensive Guide* (3rd ed.). San Francisco, CA: Jossey-Bass Publishers.

Reinders, H. (2012). Online and blended instruction. In A. Burns, & J. C. Richards (Eds.), *The Cambridge Guide to Pedagogy and Practice in Second Language Teaching*. Cambridge, U.K.: Cambridge University Press.

Richards, J. C. (2012). Competence and performance in language teaching. In A. Burns, & J. C. Richards (Eds.), *The Cambridge Guide to Pedagogy and Practice in Second Language Teaching*. Cambridge, U.K.: Cambridge University Press.

Robin, B. R., & Harris, J. B. (1998). Correlates among computer-using teacher educators' beliefs, beaching and learning preferences, and demographics. *Journal of Educational Computing*

Research, *18*(1), 15-35.

Rogers, E. (1995). *Diffusion of Innovations* (4th ed.). New York, NY: Free Press.

Rokeach, M. (1968). *Beliefs, Attitudes, and Values: A Theory of Organization and Change*. San Francisco, CA: Jossey-Bass Inc.

Rother, C. (2005). Teachers talk tech. *T.H.E. Journal*, *32*(3). Retrieved from http://www.thejournal.com/Articles/2005/10/01/Teachers-Talk-Tech.aspx

Sato, M. (2013). Beliefs about peer interaction and peer corrective feedback: Efficacy of classroom intervention. *The Modern Language Journal*, *97*(3), 611-633.

Schulz, R. A. (1996). Focus on form in the foreign language classroom: Students' and teachers' views on error correction and the role of grammar. *Foreign Language Annals*, *29*(3), 343-364.

Schulz, R. A. (2001). Cultural differences in student and teacher perceptions concerning the role of grammar instruction and corrective feedback: USA-Colombia. *The Modern Language Journal*, *85*(2), 244-258.

Shin, H., & Son, J. (2007). EFL teachers' perceptions and perspectives on Internet-assisted language teaching. *CALL-EJ Online*, *8*(2). Retrieved from http://www.tell.is.ritsumei.ac.jp/callejonline/journal/8-2/h-js_j-bs.html

Shulman, L. S. (1987). Knowledge and teaching: Foundations for the new reform. *Harvard Education Review*, *57*(2), 4-14.

Smerdon, B., Cronen, S., Lanahan, L., Anderson, J., Iannotti, N., & Angeles, J. (2000). *Teachers' tools for the 21st century: A report on teachers' use of technology*. Washington, D.C.: National Center for Education Statistics, U.S. Department of Education.

Tomlinson, B. (2012). Materials development. In A. Burns, & J. C. Richards (Eds.), *The Cambridge Guide to Pedagogy and Practice in Second Language Teaching*. Cambridge, U.K.: Cambridge University Press.

Tsui, A. (1996). Learning how to teach ESL writing. In D. Freeman, & J. C. Richards (Eds.). *Teacher Learning in Language Teaching*. New York, NY: Cambridge University Press.

Tsui, A. (2003). *Understanding Expertise in Teaching*. New York, NY: Cambridge University Press.

Tsui, A. (2005). Expertise in teaching: Perspectives and issues. In K. Johnson (Ed.), *Expertise in Second Language Learning and Teaching*. New York, NY: Palgrave MacMillan.

Woods, D. (1996). *Teacher Cognition in Language Teaching: Beliefs, Decision-making and Classroom Practice*. Cambridge, UK: Cambridge University Press.

Woolard, J. (2012). *Behind the Scenes: Understanding Teacher Perspectives on Technology Integration in a Suburban District Technology Initiative*. ProQuest Digital Dissertations.

Wozney, L., Venkatesh, V., & Abrami, P. (2006). Implementing computer technology: Teachers' perceptions and practices. *Journal of Technology and Teacher Education*, *14*(1), 173-207.

Young, J. R. (2010). Reaching the last technology holdouts at the front of the class. *The Chronicles of Higher Education*. Retrieved from http://www.chronicle.com/article/College-20-Reaching-the-

Last/123659/

Yunus, M. (2007). Malaysian ESL teachers' use of ICT in their classrooms: Expectations and realities. *ReCALL, 19*(1), 79-95.