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Exherent and inherent value beliefs about technology: missing pieces in the puzzle of technology integration?

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ABSTRACT

The preparation of student teachers in terms of integrating technology into curricula has been an essential element of second language teacher education programs in order to address to the evolving needs of the 21st century learners. Therefore, the issue of student teachers' perspectives on technology integration has been a focus of attention for many years. However, research shows that student teachers do not feel well prepared to use technology in their future classrooms. Adopting a constructivist grounded theory approach to delve into this familiar situation, the study aimed to provide further insight on factors related to student teachers' uptake of technology. A comprehensive survey was conducted to 814 student teachers in 18 different universities and four concomitant interviews were held with 20 student teachers in 4 different universities. The study has come up with two new perspectives on belief-related barriers and extends the existing research on student teachers' concerns about their incompetency in making successful use of technology for instructional purposes. The implications arising from these findings for teacher education programs are discussed.

Introduction

There has been a growing interest in the use of technology in many areas of education including second and foreign language teaching. Not only developed countries but also developing countries like Turkey have made high investments in building technology infrastructure in schools and many initiatives have been undertaken for effective integration of technology in classrooms. It has been assumed that increased presence of technology in classrooms would improve the quality of teaching and learning (Cuban, 2001). Yet, despite considerable efforts, research has shown that effective integration of technology remains low in classrooms (Goktas, Gedik & Baydas, 2013; Tondeur, Pareja Roblin, van Braak, Voogt & Prestridge, 2017). Concerning this problem, several authors (e.g. Ertmer, 1999, 2005; Hew & Brush, 2007) have listed a number of barriers that prevent successful implementation of technology in classrooms. Teachers, schools and policymakers have been highlighted as three interconnected constructs to be addressed in the effective use of technology (Mumtaz, 2000). However, the critical importance of teacher-level barriers was overemphasized among other

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frameworks (e.g. Bate, 2010; Ibieta, Hinostroza, Labbe & Claro, 2017; Petko, 2012) since teachers act like ultimate determinants in the implementation of innovations (Hargreaves & Fullan, 2012)

This study has a particular focus on student teachers' adoption of technology because there are many researchers (e.g. Kay, 2006; Sang, Valcke, Braak & Tondeur, 2010; Tondeur et al., 2012) stating that as teachers of future, student teachers do not feel well prepared to integrate technology into curricula. Although several studies have focused on factors affecting student teachers' decisions about the prospective implementation of technology, most of them mainly centred on one single or two variables at a time such as student teachers' self-efficacy beliefs about technology (e.g. Wang, Ertmer & Newby, 2004), student teachers' pedagogical beliefs and technology (e.g. Tondeur, van Keer, van Braak, & Valcke, 2008), student teachers' attitudes towards technology (e.g. Teo, 2008) or student teachers' technology knowledge and skills (e.g. Lei, 2009). However, Sang et al. (2010) suggest that there is a need for more holistic approaches for describing and explaining teacher-related factors with respect to the integration of technology in classrooms. Mainly drawing on teacher cognition research (Borg, 2003, 2006), we therefore examined student teachers' (i) prior learning experiences, (ii) undergraduate experiences, (iii) knowledge, (iv) skills, (v) beliefs and (vi) needs in relation to instructional technologies in order to investigate what is really going on about this enduring problem. Given that each of these interrelated constructs determines how much effort teachers put in integrating technology into their classrooms, investigating them in a single study might provide fresh perspectives on existing research and further insight for teacher education programs that act as a bridge between the past and future of student teachers.

Technology Use in Education

With the emergence of a wide variety of technologies since the early 1900s, educators have been fascinated by the promises of technology to help transform educational practices (Hew & Brush, 2007). Many researchers (e.g. Bate, 2010; Ottenbreit–Leftwich, Glazewski, Newby, & Ertmer, 2010) highlighted the potential of technology for teaching and learning processes. Particularly, the close relationship between language teaching and technology has long been stressed by Teaching English to Speakers of Other Languages (TESOL) educators (e.g. Levy, 2009; Thomas & Reinders, 2010; Warschauer & Healey, 1998). Research has shown that technology provides access to authentic materials, interaction opportunities, feedback and motivation (Zhao, 2003) and it significantly contributes to the development of language skills (Levy, 2009). The belief that technology will enhance the quality of teaching and learning has thus led international and national education policymakers to promote the implementation of technology in educational contexts.

One-to-one technology programs are among those large-budget-projects initiated both by developed countries and by developing countries. For example, Turkey has launched one of the world's largest educational technology projects called Movement of Enhancing Opportunities and Improving Technology (FATIH). Valued at US$1.8 billion, the project aims to raise the quality of learning and teaching, ensure equality of opportunities in education and provide hardware and software infrastructure (MoNE, n.d.). The project also involves the provision of e-content and inservice training to teachers for effective integration of technologies in classrooms (Pouzevara, Dincer, Kipp & Sariisik, 2014). Yet, it seems that the ambitious FATIH project has resulted in mere presence of technologies in some classrooms so far (Hobbs & Tuzel, 2017; Uluyol, 2012) like in other large-scale initiatives such as Escola project undertaken in Portugal (Trucano, 2012).

Given that the availability of technology does not ensure the uptake of technology in classrooms, several studies have investigated what other factors hinder technology implementation in education. Not confined to the field of English Language Teaching (ELT), these factors have been categorized in different ways: external (first-order) and internal (second-order) barriers (Ertmer, 1999), direct and indirect barriers (Hew & Brush, 2007), and individual level, school level and educational system level barriers (Petko, 2012). However, teacher-level barriers among others have received special attention since teachers, inservice and preservice, play a key role in the successful implementation of innovations. When investigated what influences teachers' uptake of technology in learning and teaching activities, a myriad of variables come under the research microscope. For example; Williams, Coles, Wilson, Richardson and Tuson (2000) suggest that access to ICT, appropriate training and ongoing support are three main factors associated with increased use of technology by teachers. This study focuses on the teacher training variable and in particular hones in on factors related to student teachers given that student teachers' prior learning and formal training experiences form the basis of their future career as in-service teachers.

Technology Use in Pre-service Teacher Education

Student teachers are in a unique situation of providing window into the future implementation of technology in classrooms (Bate, 2010). Teacher education programs are hence well situated to change student teachers' incomplete images of instructional practices and to prepare teacher candidates to address to the evolving needs of the 21st century learners. In this respect, many governments (e.g. USA, Australia, China) have launched several initiatives to revise teacher education programs in terms of providing student teachers with the necessary qualities to teach with technology. In the case of Turkey, two important reform movements have been undertaken to improve the content and scope of teacher education programs in 1998 and 2006 respectively. As a result of these revisions, three technology-related courses have been introduced into teacher education programs to ensure the integration of technology in the practice of teaching.

With regard to the actual strategies employed by teacher education programs to introduce technology to student teachers, Kay (2006) identified some key strategies such as integrating technology in all courses, modeling how to use technology, collaboration among student teachers etc. However, despite all the insights gained so far, evidence shows that these initiatives have not ensured any clear outcomes for student teachers' preparedness to use technology (Tondeur et al., 2017). Thus, further exploration is needed to advance our understanding about this enduring problem through the lenses of different frameworks.

Conceptual Framework

The field of second language teacher education (SLTE) has been influenced by many factors, but none has been "more significant than the emergence of a substantial body of research now referred as teacher cognition" (Johnson, 2006, p.236). Influenced by the epistemological shifts that have moved away the emphasis from teacher behaviors to what teachers know, believe and think, this research area suggests that teacher cognition takes the central role in the process of teaching and it is shaped by the interplay between schooling, professional coursework, contextual factors and classroom practice (Borg, 2003). In Borg's model, schooling refers to early learning experiences teachers go through as students. Professional coursework is defined as the education student teachers receive in teacher education programs. According to Borg (2003), teachers' prior learning experiences and professional education act as precursors in the development of teacher cognition and they have a lasting impact on teachers throughout their professional lives. Leaning on several developments in SLTE such as research on prior learning experiences, reflection, personal practical knowledge and pedagogical content knowledge, teacher cognition has also contributed to the reconceptualization of the knowledge base of L2 teacher education (Crandall & Christison, 2016). It has been suggested that teacher education programs must equip pre-service teachers not only with necessary skills and knowledge but also with opportunities to understand the reasons behind their actions (Johnson, 2009). Thusly, based on the insights gained from teacher cognition research, we formulated the following research questions to guide the present study in order to provide depth and breadth into the technology integration barriers at pre-service level:

1. What perceptions do student teachers hold about their early learning experiences related to technology?
2. What perceptions do student teachers hold about their undergraduate experiences related to technology?
3. What knowledge and skills do student teachers have about the use of technology in English language teaching (ELT)?
4. What beliefs do student teachers hold about the use of technology in ELT?
5. What are the needs of student teachers with regards to technology-related courses?

Given that each of these separate but interrelated constructs determines how much effort teachers put in integrating technology into their classrooms (Hew & Brush, 2007), investigating them in a single study might provide fresh perspectives on existing research and further insight for teacher education programs that act as a bridge between the past and future of student teachers.

Research Design

Because the aim of this study was to "… gain a fresh perspective in a familiar situation" (Stern, 1980, p. 20), a grounded theory approach was adopted. We took up a stance closer to constructivist grounded theory because Charmaz (2000, 2006) has extended the former versions of grounded theory with a constructivist worldview and highlighted the importance of subjective experiences of the researcher, and his/her interaction with the participants and the social world. In grounded theory, both qualitative and quantitative methods can be used (Thornberg & Charmaz, 2014). In the case of this study, both methods were used. Data collection and data analysis took place concurrently and the results of the analysis informed what data to collect next. Through constant data collection and analysis processes, theoretical saturation was reached and concepts were developed. In addition to memo-writing, triangulation of methods and space, thick description, and peer debriefing were used to minimize subjectivity and improve the validity of the study (Creswell, 2007)

Context and Participants

The study was undertaken in the ELT programs of Turkey in the first semester of 2015-2016 school year. Because the study aimed to obtain an overall picture of the current status of technology use among student teachers in the ELT programs countrywide, it was intended to be carried out in as many universities as possible. With this aim, a comprehensive survey was developed. Since student teachers who had completed receiving technology-related courses would evaluate themselves more properly, the participants were a convenience sample of third and fourth graders.

The number of universities which had ELT programs and the population size were found out in the 2013-2014 school year guides of Higher Education Entrance Exam (YGS). The documents displayed that the maximum number of student teachers studying their 3rd and 4th years could be 6000. In order to determine the sample size for the study, the sampling error formula was used. With a confidence interval of 95%, it was calculated that 362 responses would be enough for obtaining a representative assessment. An e-mail describing the study and asking for voluntary participation was sent to all ELT programs. The final number of the universities that took part in the study was 18. A total number of 1196 respondents completed the survey. However, the final sample included 814 student teachers after removing incomplete surveys. Of the 814 student teachers, 223 of them were male and 591 female. Furthermore, data obtained from the survey led the researchers to conduct subsequent interviews until theoretical saturation was reached. The researchers

carried out four semi-structured interviews with a purposeful sample of 20 student teachers from four different universities. Of the 20 interview participants, 9 were male and 11 female.

Instruments

Survey

Because there was no tool that matched good with the aims of the study, a survey was developed to describe the trends in student teachers' thinking in relation to instructional technologies. The instrument investigated the following information:
(1) Demographic data regarding gender
(2) Technological Knowledge: Within the context of this study, technological knowledge refers to the knowledge domain which emerges from the interaction of content, pedagogy, and technology knowledge (TPACK). Thus, the questionnaire of English as a foreign language teachers' Technology Pedagogy and Content Knowledge (EFL-TPACK) (Bostancıoğlu, 2014) was used. The tool was found to be a reliable and valid tool with a cronbach alpha ranging from .81 to .89 across the factors.
(3) Technology Use in Daily Life: In order to discover student teachers' frequency of technology use and technological skills, a variety of technologies were listed. Student teachers were asked to indicate the degree of agreement using a 5-point Likert scale ranging from always to never for the frequency of use sub-section and from excellent to very poor for the technological skills sub-section.
(4) Technology Use for Instructional Purposes: The same list of technologies was used in the fourth section to investigate how applicable student teachers find these technologies to ELT and how well prepared they feel to use these technologies for instructional purposes. Student teachers were asked to rate on a 5-point Likert scale ranging from no opinion to high for the applicability to ELT sub-section and from not at all to perfectly for the preparedness for instructional use sub-section.
(5) Learning Experiences Related to Technology: The fifth section asked questions about student teachers' prior learning experiences and undergraduate experiences with respect to the use of technology. This section consisted of Yes/No questions
(6) Open-ended Questions: The last section sought to understand student teachers' beliefs about technology. It intended to find out where technology stood for student teachers for instructional practices. This part also investigated what student teachers needed to be able to integrate technology into instruction effectively.

Since the aim of the survey was not to explore or to test relationships between variables or explain causality, it was descriptive in nature. It was pretested with 100 student teachers and examined by three experts in the area of instructional technologies to ensure the conciseness, clarity and completeness of the items. Based on the feedback and suggestions for improvement, the survey was revised and sent out for another round of review. After a consensus of opinion on the clarity of all items, it was examined by the human research ethics committee and was granted approval.

Interviews

Semi-structured interviews were employed to gain further understanding of survey findings. A total of four interviews were conducted concomitantly until the data set yielded no new insights. Each interview lasted for about 90 minutes. Some student teachers preferred giving answers in Turkish. Relevant passages were translated from Turkish to English, and afterwards examined by an EFL instructor.

Data Analysis

Closed-ended items in the survey were analyzed for both descriptive and inferential purposes using the Statistical Package for Social Sciences (SPSS) 21.0. Descriptive statistics was used to report percentage, mean scores and standard deviation. Independent samples t-tests were conducted to find out whether there were differences between Yes/No respondents in terms of the subscales of applicability to language teaching, preparedness for ınstructional use, and technological pedagogical content knowledge. Based on the data analysis procedure suggested by Charmaz (2000, 2006), the initial coding phase started with the analysis of open-ended questions at the end of the surveys. Written responses of the student teachers were examined line by line and incident to incident and each line of data was named on each page of the written data. In some places, in vivo codes were used. Memos were kept to clarify ideas about the emerging data and to discern the gaps to be investigated by further data collection. Emerging concepts and detected gaps from the written responses led the researchers to conduct face-to-face interviews. Each comparison revealed similarities and differences in patterns within the datasets and led to the process of category development through which concrete data were linked to more abstract ideas. When the fourth interview was analyzed and compared with the previous segments of data, it was recognized that new data yielded no new insights. Following the focused-coding process, themes were identified and concepts were developed, and afterwards the related literature was reviewed in depth to find out where the data emerged fit in with it. To establish the coding reliability, the researcher and a second coder independently coded the data. When contradictions arose, the coders were engaged in a negotiated agreement process to achieve consensus.

Results and Discussions

In order to construct a profile of student teachers' technology use, they were asked some questions inquiring the duration of technology use for educational purposes, frequency of technology use and competency level with technology. 7% of the student teachers reported that they do not use technology, 16 % of them said that they have been using it less than 1 year, majority of the student teachers (47%) stated that they use technology between 1-5 years, 11% of them indicated that they use technology between 5-8 years and 19% of them reported that they use technology more than 8 years. While the Internet, computers/laptop/tablets, smartphones/cellphones, social networks, video sharing sites, presentation software and word processors were the most highly rated technologies (M>4.0); mashup, clickers, software development, edmodo, podcasts, web page development tools, simulations, databases and tutorials were among the least rated technologies (M<3) on the subscales of frequency of technology use (Overall Mean=3.16) and skills (Overall Mean=3.41) on a five point scale. Based on the analysis results, five categories emerged and two main themes were generated as explained below in detail.

Inefficiency of student teachers' prior learning experiences with respect to the use of technology in ELT

Majority of the student teachers (%76) reported that technology tools were used in their early learning experiences. Over half of them (53%) stated that their previous learning experiences were unable to show them the relationship between teaching, learning and technology and their early learning experiences have failed to be exemplary for their future career (54%). The study also investigated whether the Yes/No respondents differed in the subscales concerning the interaction between technology and instructional practices. An independent samples t-test was conducted and no significant difference was found between the groups as can be seen in Table 1 (p>.05).

Table 1
Differences between Yes/No respondents about the Use of Technology in Their Early Learning Experiences

What perceptions do student teachers in ELT programs in Turkey have about their primary and secondary education experiences related to technology?	Technological tools were used	n	M	SD	p
Applicability to Language Teaching	No	199	3.32	0.66	.409
	Yes	615	3.37	0.61	
Preparedness for Instructional Use	No	199	3.19	0.70	.368
	Yes	615	3.14	0.67	
TPCK	No	199	3.73	0.70	.533
	Yes	615	3.69	0.74	

Note: significance level at p<.05

These results were consistent with those of Kimmons et al. (2015) who implied that what matters in the use of technology for instructional purposes is how well it is used rather than if it is used at all. Nevertheless, student teachers who think (a) their early learning experiences have helped them understand the relationship between teaching, learning and technology, and (b) their early learning experiences with technology will help them incorporate technology in their future career had higher mean scores in the aforementioned subscales compared to the student teachers who do not think in the same way (p<.05). Table 2 illustrates these results.

Table 2
Differences between Yes/No Respondents about the Usefulness and Effectiveness of Their Early Learning Experiences regarding Technology

What perceptions do student teachers in ELT programs in Turkey have about their primary and secondary education experiences related to technology?		Applicability to ELT			Preparedness for Instructional Use		TPCK		
		N	M	SD	M	SD	M	SD	p
My early learning experiences helped me understand the relationship between teaching, learning and technology	No	429	3.23	.59	3.01	.67	3.57	.75	.000*
	Yes	385	3.49	.64	3.31	.64	3.84	.68	
My early learning experiences with technology will help me incorporate technology in my future career	No	440	3.26	.60	3.02	.67	3.58	.75	.000*
	Yes	374	3.46	.64	3.31	.64	3.84	.69	

*p<.05

In line with survey results, interview data also referred to the inadequate and unexemplary use of technology in student teachers' early learning experiences. The following comments indicate this shortfall:

> *I think that in our educational system, technology is only used for some kind of get-away... It is not being used effectively… You know it is something like we open the page, watch some videos, listen to some songs and that's all and this is not teaching and this is not appropriate for classroom teaching. So, I cannot say that technology was used as it must be.*

Likewise, another participant said, "No, we did not use technology tools. It is just about our education system because we had an exam and we just focused on that examination."

Taken together, these findings support previous studies (e.g. Darling-Hammond, 2006) which stress the crucial role of schooling experiences as a key factor in shaping student teachers' perceptions about the teaching process. While effective uses of technology in student teachers' prior learning experiences positively influence student teachers in relating technology with the teaching practice, inadequate and ineffective uses of technology in student teachers' early schooling experiences act as a crucial barrier in the path of technology integration since the use of technology doesn't occupy a prominent place in their images of teaching practices. Thus, teacher education programs must take on responsibility for providing student teachers with meaningful experiences through which their incomplete images about the role of technology are challenged and their inaccurate propositions are eliminated.

Inefficiency of teacher education programs in terms of technology training

Although teacher education programs are well situated to change student teachers' naive understanding about teaching practices, survey findings and interview data have revealed that over half of the student teachers (53%) find the technology-related courses in undergraduate programs theory-based and for acquiring basic ICT skills. Almost two-thirds of the survey respondents said that their courses were not practice-based (66%) and contextualized for ELT (70%).

Table 3
Differences Between Yes/No Respondents Based on Their Views about the Technology Education They Received

What perceptions do student teachers in ELT programs in Turkey have about their undergraduate experiences related to technology?		Applicability to ELT			Preparedness for Instructional Use		TPCK		
		N	M	SD	M	SD	M	SD	p
Theory-based	No	379	3.44	.65	3.28	.67	3.81	.70	.000*
	Yes	435	3.28	.59	3.03	.66	3.60	.74	
For Acquiring Basic Skills	No	387	3.42	.62	3.29	.65	3.80	.68	.000*
	Yes	427	3.29	.63	3.03	.68	3.60	.76	
Practice-based	No	538	3.15	.62	3	.65	3.58	.68	.000*
	Yes	276	3.77	.63	3.45	.68	3.93	.76	
Contextualized for ELT	No	569	3.17	.50	3.03	.63	3.59	.72	.000*
	Yes	245	3.8	.66	3.43	.69	3.96	.70	
I have received adequate training in the use of technology for teaching	No	436	3.20	.6	2.97	.65	3.51	.75	.000*
	Yes	378	3.54	.61	3.37	.64	3.92	.65	
My teacher training experiences have helped me understand the relationship between teaching, learning and technology	No	413	3.2	.59	2.95	.64	3.49	.73	.000*
	Yes	401	3.52	.62	3.37	.64	3.92	.66	
My teacher training experiences encouraged me to use technology effectively in teaching and learning	No	431	3.2	.6	2.96	.65	3.5	.75	.000*
	Yes	383	3.53	.61	3.36	.64	3.92	.65	

*p<.05

These results further support the ideas of Goktas, Yildirim and Yildirim (2009), and Mishra and Koehler (2006) who indicated that student teachers need more practicing opportunities to align technology with subject matter and pedagogy. Findings have also shown that over half of the participants find the technology training they received inadequate (54%) and ineffective (51%) in helping them understand the relationship between teaching, learning and

technology, and encouraging them to use technology in teaching and learning (53%). Independent sample t-test analysis has revealed statistically significant results for student teachers who had more positive learning experiences with technology in their undergraduate programs as can be seen in Table 3 ($p<.05$). These findings further support the idea that the quality of a teacher is directly proportionate to the quality of a teacher education program (Darling-Hammond, 2006). Concurring with Hersh (2013), we therefore contend that the more knowledge, practice and exposure to technology in teacher education programs, the more prepared student teachers feel about integrating technology into teaching and learning.

Inadequate training on developing student teachers' technology knowledge & technology skills

Descriptive statistics for the subscale of *applicability to ELT* (Overall Mean=3.36) and *preparedness for instructional use* (Overall Mean=3.15) has demonstrated that student teachers know only a limited number of technologies applicable to ELT and they do not feel properly prepared to use the majority of the technologies listed. While most of the student teachers reported little insight about the clickers, databases, mashups, software and webpage development ($M<3$); the Internet, computers/laptops/tablets, presentation software and interactive whiteboards were found highly relevant to ELT ($M>4$).

Interview data also demonstrated that the technology courses in the teacher education programs fell short of enhancing student teachers' technology knowledge and they did not feel well prepared to use technologies for instructional purposes. For example, one interviewee stated,

> All of us used the technology in the same way. There was no difference among us. I mean we always used what we already know such as YouTube, slides but we did not use any creative or alternative technologies. We always used the easier ones.

Reproaching about the limited types of technologies used in university classrooms, one of the participants said, "I need to see more innovative technology tools other than projectors and PowerPoint". In alignment with this, another participant stated, "I would like to learn about different technologies that can be used for educational purposes rather than only focusing on office programs."

Moreover, pointing to the failure of their universities in teaching them how to use technology for teaching English language, one of the participants stated "We did not learn something like…Any special program which can be used in our teaching… Just…I mean there is nothing new. We do not know any special program that can be used in ELT." Similarly, another participant said, "I did not have any chance to practice. So, my technology skills did not develop. Actually, what we learnt from the course was so superficial that I did not feel the necessity to practice it"

These findings indicate that student teachers do not know how to make instructional uses of different types of technologies and they use technology for low-level tasks such as using the Internet for searching information, preparing lesson plans and presentations etc. These results match those observed in earlier studies (e.g. Ertmer, 2005; Ibieta, 2017). However, results for the construct of the TPACK have shown that student teachers rated themselves above average ($M=3.7$). While this finding confirms the ideas of Horzum (2013) who stated that student teachers generally report high levels of TPACK, it is not consistent with the results obtained from the interviews and the subscales of applicability to ELT and preparedness for instructional use that provided further insight into student teachers' technological knowledge and skills within this study. This inconsistency may be explained by the fact that student teachers evaluated their TPACK drawing on the technologies they already know; without being aware of various technologies available that can be utilized in ELT.

Inadequate training on developing technology awareness in student teachers

Findings obtained from the qualitative data have displayed that student teachers want to be aware of the potential of technology for ELT. For example, one of the participants pointed out, "I have not discovered the real power of technology for ELT yet. I need to learn it." Similarly, another student teacher said, "We must be taught what we can do with technology in education."

Awareness about the rationale of using technology in language classrooms was another emergent category from the data. Wondering why it is necessary to use technology in instructional practices, one respondent questioned, "Teacher educators only say that we should use technology and it is important but why?" In a similar vein, another participant indicated, "We were informed that we must use technology but I cannot still understand why this is that important. We should be made aware of the reasons."

These findings are consistent with prior studies (e.g. Mumtaz, 2000) that noted the importance of raising student teachers' awareness about the potential and rationale of using technology. Hence, we argue that teacher education programs should increase student teachers' awareness about the capabilities, strengths and weaknesses of technology by providing them with opportunities to experience technology integration practices.

Teacher educators' lack of technology knowledge and skills

Another emergent category from the data was about teacher educators' incompetency in using technologies. Reproaching about the mundane uses of technology by teacher educators, the following comments summarize participants' concerns aptly:

> Some of our professors are using it redundantly. We have got our books open on our desks. They run the courses with presentations. But these presentations should include different things from our books. Instead of translating the same thing and showing it on the PowerPoint they must summarize them briefly but clearly…

> I am not saying that technology is not important, but it is not a must because I have not learnt English with technology. But, I can say that if the teacher is so knowledgeable about the use of technology, then this teacher educator must certainly use it so that learners can have aha moments but I am wondering where such teachers are…

These findings indicate that teacher educators fail to provide student teachers with good examples in the successful use of technology and match those previous findings (Ocak, 2010). However, teacher educators are expected to act as role models since they can help student teachers develop confidence and competence in technology integration (Tondeur et al. 2012). With this aim, teacher educators should be provided with professional development activities through which they can change their technology beliefs and improve their technological knowledge and skills.

Lack of technology resources

Despite increasing investment in technology infrastructure in educational settings, inadequate hardware and software were mentioned as another barrier that impede student teachers' uptake of technology. For example, one participant said,

> We are also aware of some software programs that we can use but we do not have the chance to access them either because of pricing and sometimes they can be very expensive but if we have such kind of lab here so we could be acquainted with them…

Similarly, another participant indicated, "… Making listening activities through earphones cannot be compared to making it through just one loudspeaker for 40 students. Our university lacks technological hardware..."

These results further support previous research (e.g. Hew & Brush, 2007; Ertmer, 1999, 2005) which indicate that access to technology is one of the primary factors that provide teachers with opportunity to integrate technology into the classrooms.

Inadequate training on helping student teachers transform exherent value beliefs about technology into inherent value beliefs

Teachers' beliefs are highlighted as a particularly influential area on teachers' uptake of technology given that they are strong predictors of teachers' behaviors (Ertmer, 2005). Hence, one can come up with various types of beliefs in the related literature such as teacher expectation of learner success, self-efficacy in their own ability to teach, beliefs about the value of specific teaching strategies or materials and content-specific beliefs (Kim, Lee, Spector, & DeMeester, 2013). Furthermore, it can be seen that much research concerning teachers' beliefs and technology focuses on teachers' self-efficacy beliefs (e.g. Lee & Lee, 2014; Wang, Ertmer & Newby, 2004) and epistemological beliefs in relation to technology (e.g. Liu, 2011). Although these studies have considerably contributed to our conceptualization about the relationship between technology integration and teacher beliefs, the current findings suggest that the literature still lacks beliefs that are directly related to technology. More precisely, the responses student teachers provided for describing the role of technology for educational settings were grouped under ten sub-categories: (a) barrier in the path of creativity, (b) device, (c) facilitator, (d) helper, (e) quality enhancer, (f) resource provider, (g) exhilarator, (h) motivator (i) time saver and (j) part of education, and two main categories which are technology as a supplementary tool and technology as an integral part of classrooms. When the roles ascribed to technology are examined, it can be seen that nine out of ten sub-categories refer technology just as a supplementary tool. Only one sub-category reveals that technology is regarded as an integral part of classrooms. Accordingly, descriptive statistics has revealed that the majority of the participants (72%) regard technology as an add-on and the minority of them (5%) view it as part of the classes. Some of the responses (23%) were unable to be categorized because some participants had not written anything at all or they had not provided any rationale for their statements (e.g. "Technology has an important role in language teaching."). The following comments summarize the general trend in student teachers' thinking about technology aptly: "I am not saying that technology is not important but it is not a must because I have not learnt English with technology."

> If there is no technology, the learning-teaching process can be managed in different ways. However, if technology is used, learning can be easier and time can be used efficiently... If the teachers always use technology, this influences his/her professional development as well. If he/she says that let's play a song and listen or dance, these lessons won't be useful since teacher doesn't spend much effort for preparing these lessons.

Only one sub-category shows that technology is regarded as an integral part of classrooms. Here, student teachers mention the requirements of the 21st century learning and think that technology should be an indispensable part of classrooms. For example, one participant stated,

> I think technology was not a matter of issue in the past but it is a must in today's world. Students always see tablets, computers, LCD TVs, smartphones around. If technology is part of students' lives, it should be part of education.

Likewise another student teacher stated "Today's kids have cell phones and computers even at the age of five. As they are growing up with technology, if we do not keep up with them, we will be like an outsider in the classroom."

The results indicate that technology is viewed just as a supplementary tool by most of the participants. However, we contend that if student teachers perceive technology as *a smooth partner* for their classrooms, they can then be expected to make frequent and successful use of technology. We thus argue that teachers' beliefs about *technology for technology's sake* should come to the fore. On this matter, we refer to Feenberg (2002) who suggested that there are two established perspectives of technology: instrumental and substantive view. In instrumental view, technology is viewed as a means to ends which is the dominant view in today's modern society. Technology is only seen as a tool ready to serve its users. According to Chen (2011), learners who have instrumental view separate themselves from the technologies they use. In other words, technology just assists learners in gaining knowledge and skills and it has an external role in learners' cognitive processes. On the other hand, substantive theory underlines that "technology constitutes a new cultural system that restructures the entire social world as an object of control" (Feenberg, 2002, p. 6-7). Here, technology is perceived as value-laden. Concurring with Chen (2011), we advocate that student teachers should not be purists about instrumental or substantive views. They should redress the balance between two perspectives so that they can be aware of the mediating and transformative nature of technology.

Drawing on the implications of two fundamental philosophical perspectives, we thus suggest the bidimensional construct of "perceived value of technology" that consists of two subconstructs: exherent value beliefs and inherent value beliefs with respect to technology. It can be seen that the concept of perceived value is a commonplace term which is used by different fields (e.g. marketing, tourism, business etc.) and it means having an internal feeling about the worth of a product. In this context, perceived value refers to the position of technology for classrooms in the eyes of student teachers. Exherent value beliefs about technology indicate that technology is just a supplementary tool to increase the efficiency of instruction. Technology is regarded performing separately from learners' mental processes, and as an add-on that teachers utilize from at will. In addition it is used for achieving low-level tasks. On the other hand, inherent value beliefs about technology refer to the integrity of technology with the teaching process. Technology is seen as an integral part of language classrooms. It accompanies teachers and learners as a smooth partner in the teaching and learning process. More precisely, it is used by teachers in a manner that contributes to planned and deliberate ways of instruction. As to the learners, they develop new ways of learning through technology. They accomplish high level tasks through thinking, exploring, planning, designing, creating, producing and reflecting. The use of technology is internalized by teachers and learners in such a way that it becomes an indispensable and also an invisible part of language classrooms. In a similar vein, Chen (2011) points out that learners who hold more substantive views develop tool-mediated thoughts and actions. They embody with technology since technology withdraws from learners' consciousness when they are truly engaged in the learning task.

Consequently, we suggest that technology education must start with investigating whether student teachers hold exherent value beliefs or inherent value beliefs about technology since these beliefs determine how integrally student teachers relate technology to language teaching and learning. Teacher education programs should provide student teachers with experiences to help them enhance their inherent value beliefs about technology so that they can discover the unfulfilled potential of technology for language teaching.

Conclusion

Driven by the motive to better understand why student teachers do not feel well prepared to integrate technology into curricula, this study has strengthened the idea that student teachers' early learning and undergraduate experiences largely fail to provide them with exemplary and meaningful experiences of technology integration. Although the generalizability of the study is limited to 18 universities, the findings have extended existing research on teacher-level barriers such as lack of technological knowledge, skills and awareness. Based on these insights, the study has gone some way towards enhancing our understanding of teachers' technological beliefs. With the introduction of two original constructs which are exherent and inherent value beliefs about technology, the most striking issue emerging seems to be that student teachers still do not see technology as part of their classes although it is a reality of their out-of-school lives and most of them keep having the traditional idea that technology is useful but not essential. In the light of the current findings, what is now needed is considerably more investigation into what helps student teachers transform their exherent value beliefs about technology into inherent value beliefs to develop the idea that technology is a smooth partner both for teachers and students.

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REFERENCES

Bate, F. (2010). A bridge too far? Explaining beginning teachers' use of ICT in Australian schools. *Australasian Journal of Educational Technology, 26*(7), 1042–1061.

Borg, S. (2003). Teacher cognition in language teaching: A review of research on what language teachers think, know, believe, and do. *Language Teaching, 36*(2), 81–109.

Borg, S. (2006). *Teacher cognition and language education: Research and practice*. London: Continuum.

Bostancıoğlu, A. (2014, May). *EFL–TPACK: The development of a questionnaire to measure technology pedagogy and content knowledge (TPACK) of English as a foreign language (EFL) Teachers.* Paper presented at the EUROCALL Teacher Ed SIG, Nice.

Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 509–535). Thousand Oaks, CA: Sage.

Charmaz, K. (2006). Constructing grounded theory. Thousand Oaks, CA: Sage.

Chen, R. (2011). Preservice mathematics teachers' ambiguous views of technology. *School Science and Mathematics, 111*(2), 56–67.

Crandall, J., & Christison, M. A. (2016). An overview of research in English language teacher education and professional development. In J. Crandall & M. A. Christison (Eds.) *Global research on teacher education and professional development in TESOL* (pp. 3 – 34). New York, NY: Routledge/Taylor & Francis.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Boston: Pearson.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. London: Harvard University Press

Darling–Hammond, L. (2006). Assessing teacher education: The usefulness of multiple measures for assessing program outcomes. *Journal of Teacher Education, 57*(2), 120–138.

Ertmer, P.A. (1999). Addressing first– and second–order barriers to change: Strategies for technology integration. *Educational Technology Research and Development,47*(4), 47–61.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development, 53*(4), 25–39.

Feenberg, A. (2002). *Transforming technology: A critical theory revisited.* New York: Oxford University Press.

Goktas, Y., Gedik, N., & Baydas, O. (2013). Enablers and barriers to the use of ICT in primary schools in Turkey: A comparative study of 2005–2011. *Computers & Education, 68*, 211–222.

Goktas, Y., Yildirim, S., & Yildirim, Z. (2009). Main Barriers and Possible Enablers of ICTs Integration into Preservice Teacher Education Programs. *Educational Technology & Society, 12*(1), 193–204.

Hargreaves, A., & Fullan, M. (2012). *Professional capital: Transforming teaching in every school.* London, England: Routledge.

Hersh, E. C. (2013). *Change and challenge: The influence of technology integration in teacher preparation programs*. Doctoral Dissertation, Manhattanville College, New York.

Hew, K. F., & Brush, T. (2007). Integrating technology into K–12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development, 55*(3), 223–252.

Hobbs, R., & Tuzel, S. (2015). Teacher motivations for digital and media literacy: An examination on Turkish educators. *British Journal of Educational Technology, 48*(1), 7–22.

Horzum, M. B. (2013). The investigation of technological pedagogical content knowledge of student teachers. *Technology, Pedagogy and Education, 22*(3), 303–317.

Ibieta A., Hinostroza J. E., Labbe, C & Claro, M. (2017). The role of the internet in teachers' Professional practice: activities and factors associated with teacher use of ICT inside and outside the classroom. *Technology, Pedagogy and Education, 26*(4), 425–438.

Johnson, K. E. (2006). The sociocultural turn and its challenges for second language teacher education. *TESOL Quarterly, 40*(1), 235–257.

Johnson, K. E. (2009). *Second language teacher education: A sociocultural perspective.* London: Routledge.

Kay, R. H. (2006). Evaluating strategies used to incorporate technology into pre–service education: a review of the literature. *Journal of Research on Technology in Education and Information Technologies, 38*(4), 383–408.

Kim, C., Kim, M. K., Lee, C., Spector, J. M., & DeMeester, K. (2013). Teacher beliefs and technology integration. *Teaching and Teacher Education, 29*, 76–85.

Kimmons, R. (2015). Examining TPACK's theoretical future. *Journal of Technology and Teacher Education, 23*(1), 53–77.

Lee, Y., & Lee, J. (2014). Enhancing student teachers' self–efficacy beliefs for technology integration through lesson planning practice. *Computers & Education, 73*, 121–128.

Lei, J. (2009). Digital natives as preservice teachers: what technology preparation is needed? *Journal of Computing in Teacher Education, 25*(3), 87–97.

Levy, M. (2009). Technology in use for second language learning. *The Modern Language Journal, 93*(1), 769782.

Liu, S. H. (2011). Factors related to pedagogical beliefs of teachers and technology integration. *Computers & Education, 56*(4), 1012–1022.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054.

Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: a review of the literature. *Journal of Information Technology for Teacher Education, 9*(3), 319–341.

Ministry of National Education (MONE) (n.d.). *Fatih Project*. Retrieved from http://fatihprojesi.meb.gov.tr/en/

Ocak, M. A. (2011). *Why are faculty members not teaching blended courses? Insights from faculty members. Computers & Education, 56*(3), 689–699.

Ottenbreit–Leftwich, A. T., Glazewski, K. D., Newby, T. J., & Ertmer, P. A. (2010). Teacher value beliefs associated with using technology: addressing professional and student needs. *Computers & Education, 55*(3), 1321–1335.

Petko, D. (2012).Teachers' pedagogical beliefs and their use of digital media in classrooms: Sharpening the focus of the 'will, skill, tool' model and integrating teachers' constructivist orientations. *Computers & Education, 58*(4), 1351–1359.

Pouezevara, S., Dincer, A., Kipp, S., & Sariisik, Y. (2013). *Turkey's FATIH project: A plan to conquer the digital divide or a technological leap of faith?* Research Triangle Park, NC & Istanbul, Turkey: RTI International & Education Reform Initiative (ERI).

Sang, G., Valcke, M., van Braak, J., & Tondeur, J. (2010). Student teachers' thinking processes and ICT integration: predictors of prospective teaching behaviors with educational technology. *Computers & Education, 54*, 103–112

Stern, P.N. (1980) Grounded theory methodology: Its uses and processes, *Image,12*(1), 20-23.

Teo, T., (2008). Pre–service teachers' attitudes towards computer use: A Singapore survey. *Australasian Journal of Educational Technology, 24*(4), 413–424.

Thomas, M. & Reinders, H. (eds.) (2010). *Task–Based Language Teaching and Technology.* New York: Continuum.

Thornberg, R., & Charmaz, K. (2014). Grounded theory and theoretical coding. In U. Flick (Ed.) *SAGE Handbook of qualitative analysis* (pp. 153–69). London: Sage.

Tondeur, J., Pareja Roblin, N., van Braak, J., Voogt, J., & Prestridge, S. (2017). Preparing beginning teachers for technology integration in education: ready for take–off? *Technology, Pedagogy and Education, 26*(2), 157–177.

Tondeur, J., van Braak, J., Sang, G., Voogt, J., Fisser, P., & Ottenbreit–Leftwich, A. (2012). Preparing student teachers to integrate technology in education: a synthesis of qualitative evidence. *Computers & Education, 59*(1), 134–144.

Tondeur, J., van Keer, H., van Braak, J., & Valcke, M. (2008). ICT integration in the classroom: Challenging the potential of a school policy. *Computers & Education, 51*(1), 212–223.

Trucano, M. (2012). *Around the World with Portugal's eEscola Project and Magellan Initiative.* Retrieved from http://blogs.worldbank.org/edutech/portugal

Uluyol, C. (2013). ICT integration in Turkish schools: recall where you are coming from to recognize where you are going to. *British Journal of Educational Technology,44*(1), E10–E13.

Wang, L., Ertmer, P. A., & Newby, T. J. (2004). Increasing student teachers' self–efficacy beliefs for technology integration. *Journal of Research on Technology in Education, 36*(3), 231–250.

Warschauer, M., & D. Healey. (1998). Computers and language learning: An overview. *Language Teaching, 31*(2), 57–71.

Williams, D., Coles, L., Wilson, K., Richardson, A., & Tuson, J. (2000). Teachers and ICT: Current use and future needs. *British Journal of Educational Technology, 31*(4), 307–320.

Zhao, Y. (2003). Recent developments in technology and language learning: a literature review and meta–analysis. *CALICO Journal, 21*(1), 7–27.