AN ANALYSIS OF TPACK INTEGRATION INTO ENGLISH LANGUAGE TEACHER EDUCATION PROGRAMS: A COMPARATIVE STUDY OF TURKEY AND DENMARK

By

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ABSTRACT

Technology has always been a part of teaching process and being able to teach with technology requires an understanding of how technology, pedagogy, and content interact to support student learning. Recently, studies on developing TPACK skills of teachers have been emerged; however, studies on TPACK in pre-service education on a specific domain, more specifically English Language Teaching, are limited and none of the existing studies have attempted to compare pre-service teachers' TPACK in different countries or contexts. Therefore, this study compares pre-service English language teachers' TPACK in two countries, Turkey and Denmark, at two Teacher Education Institutions' (TEI) contexts. Through a mixed-method design, results of the study indicated the differences not only in definition of technology, but also in technology applications and teaching processes. Based on these findings, suggestions for teacher education and future research were made.

Keywords: Comparative Education, Educational Discourse, TPACK, Teacher Education, ELT, Phenomenology.

INTRODUCTION

Technology has always been the part of language teaching. Technological Pedagogical Content Knowledge (TPACK) is an extension of Pedagogical Content Knowledge (Shulman, 1986). While Pedagogical Content Knowledge focuses on the development of understanding of how students learn specific content areas, TPACK focuses on "the connections, interactions, affordances, and constraints between and among content, pedagogy, and technology" (Mishra and Koehler, 2006, p. 1025). That is, teachers not only need to know how to use computer and software, but also be aware of the strategies to incorporate Information and Communication Technologies (ICT) tools to enhance student understanding of a particular subject's content (Hu and Fyfe, 2010).

The relationships of the knowledge domains of TPACK are 'illustrated' with the Venn diagram in Figure 1. Firstly, the three forms of knowledge are listed as,

- Pedagogical Knowledge (PK i.e., knowledge about the processes, practices, or methods of teaching and learning, and knowledge about educational aims, values, and purposes);
- Content Knowledge (CK i.e., knowledge about the subject matter that is to be learned or taught); and
- Technological Knowledge (TK i.e., knowledge about more commonplace technologies including overhead projectors, blackboards, and modern technologies, such as computers, the Internet, interactive whiteboard).

Secondly, TPACK converges complex interplay of three bodies of knowledge explained as,

- Pedagogical Content Knowledge (Shulman, 1986);
- Technological Content Knowledge (knowing what kind of technology tools is available for teaching what); and
- Technology Pedagogical Knowledge (able to choose an ICT tool based on its affordances to address a particular teaching/learning need (Mishra and Koehler, 2006, p. 6).

Although TPACK domains are shown in a Venn diagram (Figure 1), a 'dynamic equilibrium' between the different categories of knowledge should be considered (Koehler and Mishra, 2008, p.1029) 'with no domain totally distinct or separate from the other' (Niess, 2011, p. 305). Hence, the expansive definition of TPACK then is "a knowledge of the dynamic, transactional negotiation among technology, pedagogy, and content and how that negotiation impacts student learning in a classroom context" (Cox, 2008, p. 78). That is, "TPACK emphasizes the connections among technologies, curriculum content, and specific pedagogical approaches, demonstrating how teachers' understandings of technology, pedagogy, and context can interact with one another to produce effective discipline-based teaching with educational technologies" (Harris, Mishra, and Koehler, 2009, p. 396) and TPACK enables teachers to use their knowledge about technology, pedagogy, content, learners, and context to provide transformative teaching and learning experiences (Angeli and Valanides, 2008).

Limited research has been conducted on Pre-service Teachers (PTs) in language education (Solak and Çakır, 2014; Oz, 2015; Ersanlı, 2016). For instance, Wu (2013) examined 24 empirical studies related to TPACK published from 2002 to 2011. Regarding the distribution percentages of the sample groups analysed, PT has the highest ranking (54.2%), followed by high school teachers (20.8%), elementary school teachers (16.7%), and university or college teachers (8%) in sequence. However, Wu (2013) further reports that more than half of the empirical TPACK studies (66.7%) focused on teachers' domain-general TPACK, and relatively fewer studies explored teachers' domain-specific TPACK. Among the Domain-Specific studies, Language (4.2%), Social Studies (4.2%), and Geography (4.2%) subject domains are the least examined ones compared to Science (20.8%) and Mathematics (12.5%).

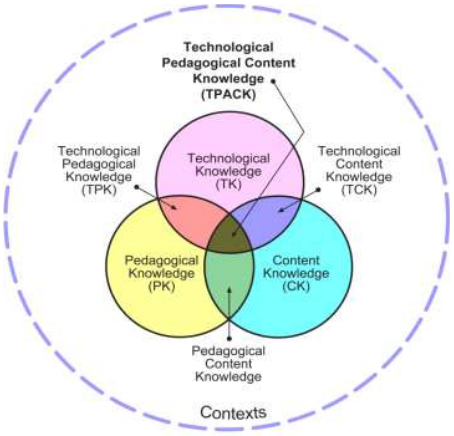

Figure 1. The TPACK Framework and its Knowledge Components (TPCK, 2010)

To date, the limited literature investigating TPACK skills of pre-service English Language Teachers (ELT) shows that curriculum at Teacher Education Institutions' (TEI) technology integrated courses and workshops positively impacted, when the scores based on English as a Foreign Language (EFL) pre-service teachers' self-reported beliefs of their TPACK competencies in teaching with technology were analysed. Also, these studies have focused on participants at a national level, such as Chinese, Turkish, Tai, Ethiopian etc. (Yan and Yuhong, 2012; Oz, 2015; Kwangsawad, 2016; Abera, 2014, respectively). None of the existing studies have attempted to compare PTs' TPACK in different countries or contexts. However, in the field there is a need to explore the possibility of cultural differences in teachers' TPACK perceptions (Koh, Chai, and Tsai, 2010). Therefore, this present study aims to compare educational discourses in which TEIs, specifically ELT programs, prepare PTs for integrating technology in their classroom practices both in Denmark and Turkey. The following research questions guided the studies.

(1) Is there any difference between Turkish (TR) and Danish (DK) pre-service English language teachers' self-reported beliefs of their TPACK?

(2) From PTs' perspective, how do the TEIs prepare pre-service English language teachers for the integration of technology?

Answering to these questions might shed light into the curriculum and course designs in TEIs in different countries and it can contribute to the self-evaluation of pre-service English language teachers in terms of TPACK integration into their teaching practices.

1. Studies on TPACK with Pre-service English Language Teachers

As pre-service language teachers' TPACK have recently begun to draw attention of researchers, limited research

conducted in different countries are summarized below.

Koçoğlu (2009) conducted a qualitative study on 27 pre-service EFL teachers attending to a four-year undergraduate ELT program at a Turkish university. The study explored how pre-service EFL teachers developed the knowledge and skills in integrating technology into L2 teaching through a semester-long 'Computer-Assisted Language-Learning' course. The findings revealed that, the course was confirmed as being helpful in developing pre-service teachers' TPCK and supporting them in practicing their TPCK.

Yan and Yuhong (2012) took the course 'Comprehensive English', a compulsory course for English majors trained to be teachers, as an example to show how ICTs can be effectively infused into subject-teaching and how the pre-service English teachers can benefit from the integration of ICTs both as English language learners and would-be teachers in China. They highlight that no matter how much the teacher knows about ICT, the knowledge he knows cannot be automatically transformed into ability in utilizing it in teaching. Also, they report that the integration of ICTs on pre-service English teacher education impacts shifting the focus from the teaching knowledge to teaching competence, from teacher-centred to student-centred learning, facilitating learners to construct knowledge.

Kurt, Akyel, Koçoğlu, and Mishra (2014) examined the TPACK development of Turkish pre-service EFL teachers as they engaged in an explicit TPACK development program based on Learning Technology by Design approach (Mishra & Koehler, 2006). The findings of their study revealed that, after a 12-week treatment there was a statistically significant increase in TK, TCK, TPK, and TPACK scores of participants without prior training on technology integration into L2 teaching. Another significant finding of their study was that the TPACK development program helped PTs to gain high confidence in choosing technologies, that enhances the teaching approaches and students' learning in a lesson.

Abera's (2014) study addressed the existing literature on technological pedagogical framework and teacher education in Ethiopia in general and English language teacher education in particular. The results revealed that, the existing literature failed to demonstrate the application of TPACK in language teacher education in the country. The TPACK of classroom English language teachers was also found to be low in this study.

Solak and Çakır (2014) examined 137 Turkish pre-service EFL teachers' TPACK competencies at the end of four-year teacher education program in terms of gender and academic achievement. Based on TPACK Competency Survey (Archambault and Crippen, 2009), the results of the quantitative research suggested that males' TK was higher than females; however, females were better than males in PK. Moreover, no significant difference was found between TPACK mean and academic achievement.

Similar to Solak and Çakır (2014), Oz (2015) assessed 76 pre-service EFL teachers' TPACK at the end of four-year teacher education program in Turkey. Based on TPACK Scale (Schmidt et al., 2009) with some open-ended questions, the findings revealed a highly developed knowledge of TPACK (Mean > 3.5; 81%). Qualitative data analysis also revealed that compared with cooperating teachers, faculty members in the department used more TPACK in a classroom lesson. Oz concluded that, the integration of TPACK into the existing teacher education curriculum and fostering technologically-rich environment for language learners would contribute to quality learning and teaching.

Ersanlı (2016) explored the effectiveness of a five-week workshop and training sessions of an ELT Methodology Course on TPACK of Junior 59 pre-service EFL teachers enrolled at a state university in Turkey. In a mixed-method design, data was gathered through TPACK Competency Survey (Archambault and Crippen, 2009) and participants' journals, they kept prior to and after the training and workshops. The results indicated a statistically significant improvement in TPACK scores of both male and female PTs. Moreover, the journal entries clearly indicated an increase in several possible applications and websites that could be used in the classroom with more effective and to the point objectives. Participants have also displayed better performance in manufacturing and tailoring language learning / teaching materials with specific goals.

Kwangsawad (2016) examined senior 33 EFL PTs' TPACK

through TPACK Survey (Schmidt et al., 2009), lesson plan assessments and classroom observations of actual practice in Thailand. The results showed high scores for all domains (Mean > 3.5). The highest mean score was 3.98 for TPK and the lowest 3.64 for CK. Analysis of lesson plan documents showed a well-presented theoretical development of the participants' technology integration skills. The actual practice got closer to self-report survey data to assessing teachers' ability to apply their TPACK than the lesson plans. All the domains of TPACK apart from TPK reported higher scores in the EFL PTs' actual practices as compared to their self-report. Kwangsawad concluded that, the program have proved to be successful in training teachers with highly developed TPACK knowledge, that provides them with skills and knowledge of technology to be implemented in their practical teaching.

2. Methodology

2.1 Theoretical Framework

In this present study, the TPACK framework was used as a theoretical background because, the TPACK framework (Mishra and Koehler, 2006) has already been embraced as theoretical basis for structuring ICT curriculum in teacher education programs (Angeli and Valanides, 2009; Chai, Koh Tsai, and Tan, 2011).

2.2 Context of the Study and Participants

The present study was conducted in ELT departments at universities both in Turkey and Denmark. In selecting the participants, the researchers employed convenience sampling technique, a common non-probability sampling technique in L2 research where an important criterion of sample selection is the convenience to and resources of the researcher (Dörnyei, 2007). A total of 99 PTs (DK=46) (TR=53) enrolled in a four-year ELT program participating voluntarily in the study.

In Turkey participants were senior level PTs at a state university located at the southern part of Turkey. The four-year ELT program has approximately 400 undergraduate students. The components of the undergraduate program consists of professional courses including methodological and pedagogical approaches to EFL teaching as well as courses raising students' awareness of the English language system. The program also offers courses on first and second language acquisition and organizes practice teaching in selected schools. In the program, other content courses and subject-specific method courses PTs are provided an opportunity to gain TPACK skills. These courses and in which order they will be offered is decided by Higher Education Council. In that, there is standardization among the programs around the country. However, to what extent technology will be integrated into courses varies among universities depending on instructors' TPACK.

Related to technology, PTs receive three courses: Computer (I and II), Technology and Materials Design and Computer-Assisted Language Teaching. The Computer course, which is a standalone technology course received in the freshman year, focuses on the development of basic computer skills such as learning how to use office programs and selected software, and how to use the Internet effectively. Technology and Materials Design course enables PTs to design handmade teaching materials, websites, and e-portfolios. Lastly, Computer-Assisted Language Teaching course, in general, aims to teach PTs how to teach English using technology.

All PTs, as the requirement of School Experience I/II courses in the senior year of the program, are placed to the schools organized by the department to do their practicum. School Experience I course, offered in the first semester of senior year, requires pre-service teachers to do structured observation tasks followed by discussions related to theoretical and experiential considerations in EFL. The School Experience II course, in the second semester, is based on observation and supervision of carefully prepared student teaching followed by critical appraisal. PTs are supposed to carry out both micro and macro-teachings during their practicum. During practicum courses PTs are expected to observe and experience technology use in collaborating schools. In line with the significant educational reform efforts being made by the European Union (EU) countries, Ministry of National Education (MoNE) in Turkey has emphasized the use of technology as an important instructional tool within schools across the country through Movement of Enhancing Opportunities and Improving Technology (FATIH) Project (MoNE, 2010). The project has five components: Providing Equipment and Software Substructure, Providing

Educational e-content and Management of e-content, Effective Usage of ICT in Teaching Programs, In-service Training of the Teachers, and Conscious, Reliable, Manageable and Measurable ICT Usage. Through these components, the project aimed to improve technology in schools for the efficient usage of ICT tools in the learning-teaching processes through providing tablets and LCD Interactive Boards as well as in-service trainings for teachers.

As in Turkey, in Denmark participants were senior level PTs enrolled at a four-year ELT program at a state university. Similar to Turkish PTs, Danish PTs have to accomplish 240 points in the European Credit Transfer System (ECTS points). However, different from Turkish one, the program consists of the following four main elements: The teacher's foundational competences (60 ECTS points), Main subjects (140 ECTS points), Teaching practice (30 ECTS points), and Bachelor of Education project (10 ECTS points).

'The teacher's foundational competences' is mandatory for all students and it has two subdivisions: 'Pedagogy and the teaching profession' and 'General education'. Pedagogy and the teaching profession prepares the student for developing the fundamental teaching competences needed to ensure the pupils' learning, development and well-being. General education prepares the student for implementing the mission statement of the Danish school system: to develop professional ethics and to deal with complex challenges within the teaching profession in the context of cultural, value-based and religious pluralism (UFM, 2015).

'Main subjects' provide the students with subject-specific knowledge and skills. They constitute the students' primary areas of teaching competence compared to the Danish schools. The student is expected to qualify to teach at least two main subjects, with three main subjects being the norm. A student with only two main subjects is expected to have significant specialized knowledge of their chosen subjects. All main subjects are based on subject specific knowledge, didactics, and pedagogy. In addition, the main subjects each include subject specific knowledge and skill objectives aimed at inclusion, information, and communication technology as a teaching tool, teaching bilingual pupils, innovation, and cross-professional cooperation (UFM, 2015).

During 'teaching practice', the student teaches children and participates in other teacher tasks at a primary and/ or lower secondary school, a private school at the same levels, or at a continuation school, under the guidance of one or more teaching practice tutors (UFM, 2015).

The 'Bachelor of Education project' tests the student's ability to independently research, investigate, develop, and communicate as the basis for professional analysis, evaluation, and action-oriented reflection on tasks, and challenges within the teaching profession (UFM, 2015).

The building blocks of the teacher program are modules of 10 to 20 ECTS points (5 – 15 ECTS for teaching practice modules). These modules involve either: (a) specific subjects, (b) interdisciplinary subjects, or (c) cross-professional subjects. Unlike Turkish one, there is no standard curriculum defining the content of the teacher education program in Denmark. Instead, the program is centrally defined through output-based areas of competence, each constituted by a number of practice oriented skills and corresponding knowledge objectives (UFM, 2015).

Different from Turkey, in Denmark the university has hired technology specialists, who have expertise in at least two different content areas, work closely with PTs and professors at the department. Moreover, in courses one can observe the specificity of the ICT and content integration in Denmark case and a general scope in Turkey. While in Turkey the technology courses have broad scope such as Computer I, II, and Computer-Assisted Language-Learning, in Denmark they are more focused ones; such as Digital Storytelling and Intercultural Competence.

2.3 Data Collection and Analysis

This study employed a mixed design (Creswell, 2012; Dörnyei, 2007) involving both qualitative and quantitative research methods. The data collected through TPACK scale (Schmidt et al., 2009) with open-ended questions and classroom observations conducted both in Turkey and Denmark.

Several survey instruments were reviewed (e.g. Archambault and Crippen, 2009; Graham et al., 2009; Lee and Tsai, 2010; Schmidt et al., 2009). Among them, TPACK

survey (Schmidt et al., 2009) was identified as the most well-designed tool designed specifically based on the TPACK framework for assessing knowledge of PTs (Abbitt, 2011). Other available instruments were subject-specific (e.g. Graham et al., 2009) and hence limiting their use in ELT PT education program. Regarding the TPACK Survey, two limitations were reported in related literature. Firstly, this instrument was context-dependent as it was specifically designed for PTs majoring in elementary or early childhood education with a focus on four content areas of social studies, mathematics, science, and literacy. However, in this present study, this context limitation didn't apply because in Turkey a four-year ELT program doesn't allow any specialization to teach at different levels. In other words, after graduation, pre-service English language teachers can teach English at all levels. In Denmark pre-service English language teachers attending to both English (1^{st}-6^{th} grade) and English (4^{th}-10^{th} grade) participated to the study. The other limitation reported was that, it was designed as a self-assessment tool; therefore, it may be prone to student under- or over-reporting (Hofer and Grandgenett, 2012). As with any self-reporting measure, the ability of the instrument to accurately represent knowledge in the TPACK domains is limited by the ability of the respondents to assess their knowledge and respond appropriately to the survey items. Therefore, TPACK assessment is advised to be conducted in different ways (Koehler and Mishra, 2008; Harris et al., 2010; Abbitt, 2011) and at different times (Koehler and Mishra, 2008). Hence, in this present study for cross examining the results of findings from survey, the open-ended question part of the survey and classroom observations were utilized to collect additional data for triangulation purposes.

The survey (Schmidt et al., 2009), a 5-point Likert confidence scale, included multiple items related to each of the seven types of knowledge represented in the TPACK construct (Figure 1). The survey also included open-ended items that focused on the respondents' perceptions of how the TPACK was modelled by school-teachers, faculty, and participants themselves. The survey was administered to the pre-service ELT teachers at the end of the spring semester of 2014 both in Turkey and Denmark. The statistical data was analysed through independent samples t-test. As the participants were in ELT, only Literacy subcategory of Content Knowledge (CK) domain in the survey was included into the analysis.

The qualitative data from the open-ended question part of the survey was analysed through Phenomenological Data Analysis (Moustakas, 1994). To increase credibility, codes, and themes emerged from the data were checked by another colleague. Moreover, the researcher, as an observer, participated to ten lessons -40 minutes each at both TEIs in Turkey and Denmark- and took field notes during the observations and then organized the notes accordingly. The field notes of classroom observations were also used to triangulate the data gathered through the open-ended questions.

3. Findings

3.1 Is there any difference between Turkish and Danish pre-service ELTs' self-reported beliefs of their TPACK?

The results of an independent samples t-test comparing mean scores of TPACK domains of Turkish and Danish PTs are given below.

TK: There was a significant difference in the scores for TR (M= 26.96, SD=4.53) and DK (M=20.36, SD=4.25) conditions; t (97)=-7.42, p = 0.000. These results suggest that, TK really does have an effect on the environment they have received education. Specifically, the results suggest that, PTs in Turkey self-rated their TK higher than their peers in DK.

CK-Literacy: There was not a significant difference in the scores for TR (M=11.92, SD=2.59) and DK (M=11.86, SD=2.36) conditions; t (97)=-0.11, p = 0.913. These results suggest that, Literacy doesn't have an effect on the environment they have received education. Specifically, the results suggest that, self-rated Literacy scores are same both in TR and DK.

PK: There was a significant difference in the scores for TR (M=29.57, SD=2.96) and DK (M= 26.63, SD=3.21) conditions; t (97)= -4.73-, p = 0.000. These results suggest that, PK really does have an effect on the environment they have received education. Specifically, the results suggest that, PTs in Turkey self-rated their PK higher than their peers in DK."

PCK: There was a significant difference in the scores for TR

(M=14.16, SD=3.38) and DK (M=11.90, SD=1.76) conditions; t (80.56)=-4.26, p = 0.000. These results suggest that, PCK really does have an effect on the environment they have received education. Specifically, the results suggest that, PTs in Turkey self-rated their PCK higher than their peers in DK."

TCK: There was a significant difference in the scores for TR (M= 13.35, SD=3.15) and DK (M=11.58, SD=2.48) conditions; t (97)=-3.07, p = 0.003. These results suggest that, TCK really does have an effect on the environment they have received education. Specifically, the results suggest that, PTs in Turkey self-rated their TCK higher than their peers in DK."

TPK: There was a significant difference in the scores for TR (M=21.47, SD=2.83) and DK (M=32.61, SD=5.38) conditions; t (65.91)=12.59, p = 0.000. These results suggest that, TPK really does have an effect on the environment they have received education. Specifically, the results suggest that, PTs in Denmark self-rated their TPK higher than their peers in TR."

TPACK: There was a significant difference in the scores for TR (M= 30.64, SD=4.76) and DK (M=11.16, SD=2.22) conditions; t (75.89)= -26.58, p = 0.000. These results suggest that, TPACK really does have an effect on the environment they have received education. Specifically, the results suggest that, PTs in Turkey self-rated their TPACK higher than their peers in DK."

Modelling of Faculty and School-teachers: There was a significant difference in the scores for TR (M=26.16, SD=5.76) and DK (M=21.96, SD=4.54) conditions; t (97)=-3.98, p = 0.000. These results suggest that, Modelling really does have an effect on the environment they have received education. Specifically, the results suggest that, PTs in Turkey self-rated their Faculty and School-teachers' Modelling of TPACK higher than their peers in DK."

In the survey, Models of TPACK section asks the percentage of the professors' and the practicum teachers' model use of technology in their lessons: There was a significant difference in the scores for TR (M= 7.43, SD=2.17) and DK (M=6.23, SD=2.28) conditions; t (97)=-2.67, p = 0.009. These results suggest that, Models of TPACK really does have an effect on the environment they have received education. Specifically, the results suggest that, PTs in Turkey self-rated their Models of TPACK higher than their peers in DK.

3.2 From PTs' perspective, how do the TEIs prepare pre-service English language teachers for the integration of technology?

There were three open-ended questions at the end of the survey (Schmidt et al., 2009). These questions asked participants to describe a specific episode where their professors at their department, practicum teachers, and the participants themselves effectively demonstrated or modelled combining content, technologies, and teaching approaches in a classroom lesson. For these questions the participants were asked to describe, what content was being taught, what technology was used, and what teaching approach(es) was implemented. Through Phenomenological Data Analysis (Moustakas, 1994), reflecting essences of the experience from both Turkish and Danish participants' perspectives, findings regarding this research question are presented through the subheadings of Practicum teachers' TPACK modelling in practicum schools, Faculty members' TPACK modelling, and PTs' own modelling.

3.2.1 Practicum Teachers' TPACK Modelling in Practicum Schools

Turkish participants stated that during their practicum and school visits, practicum teachers didn't use technology in their lessons. One of the participants complained, "there are computers, projectors, and smart-boards but I have never observed such a lesson using those technologies." Besides reporting that, some participants explained the reasons for it as "Although it is necessary to use technology in public schools, many teachers lack of knowledge about how to use it. They generally think that crowded classes hinder using technology in class", "in schools there are just some technological equipment such as computer and projector. However, as they are not working we can't use them" and "Also, they don't have a tendency to use technology. They don't want to use technologies. They only use course books. Course books are very important."

Regarding technology integration modelling in practicum schools, few participants mentioned DynED, an English

learning program that, MoNE in Turkey mandate all schools to practice English for at least two-hours per week in labs. About this practice, a participant noted "My teacher in the practicum school do not use any kind of instructional technology. They only let the students play (not use) with DynEd for an hour. It is not useful!" This quotation indicates that even the mandatory use of technology in ELT classes is not effective.

According to the Turkish participants, at schools technology is often used to assist school-teachers to do their job easier rather than to transform learning and teaching practice. One of the participants explained,

"school-teacher just uses technology especially listening materials during the lessons. The teacher used laptop, projector, and audio speakers in order to show some animals' pictures and let students hear their sounds. In this way he could teach their names to the students easily. The lessons mostly are based on Grammar Translation Method, so the teacher doesnot give importance to using technology usage in the classroom".

Danish participants reported,

"half of the classrooms have smart-boards; the rest ordinary blackboards. Many Danish schools do not have the facilities yet. Technology is not really a part of the education yet in DK. Waiting for tablets (iPods) to be introduced in the Danish school system at all levels. The use of technology is an issue in the Danish school system, needs to be possible a separate class".

Despite this critique, the current use of technology in practicum schools were more advance compared to Turkish examples. For instance, several Danish participants stated that smart-boards were used for various TPACK integrated teaching episodes. Some of the examples are: "School teacher used the smartboard to help the learners to find their ways on a webpage with children books. She was showing pictures on the smartboard and writing on it" and "an English teacher used different programs on the Internet to create different cartoons written in English."

3.2.2 Faculty members' TPACK Applications

Instead of writing technology integration episodes, several Turkish participants answered to that question through writing a list of technological devices (Table 1).

That is, Turkish PTs consider technology as only hardware and TK. Therefore, for Turkish participants 'dynamic equilibrium' between the different categories of TPACK knowledge, such as TK, CK and PK (TPACK), hasnot been established and TPACK domains are 'totally distinct or separate from the other compared to Danish participants.

Different from Turkish PTs, Danish PTs' definition of technology is TPK and software rather than hardware. For instance; "use of smart-board, PowerPoint to present content. The internet looking for information and to show films/ music". Another example is

"We had an English teacher teaching us how to use Notebook and smart-boards in English lessons. She illustrated how to make it possible for all pupils to work on the smart-board. We had to arrange sentences, correct mistakes, underline/ highlight sentences".

Moreover, most of the Turkish participants provided vague descriptions of technology integration episodes of their professors: "In our university, our professors use technologies in the classroom effectively. It is no matter what course it is. Also, they try to make [us] use technology in our lesson". However, only few Turkish participants mentioned technological devices the least and gave some details about the application of technology in their courses and specifically on language skills: "In the college lots of teachers use technology to enhance learning and create good learning atmosphere. Especially in listening and

TR	DK	
Laptops	Notebook (Laptop)	Web 2.0 tools
Projectors	IAW, IWB, smart-board	Google translate
Cameras	Video camera, Digital cameras	Prezi
USB-flash memory		Email
Tape recorder		Interactive grammar games, British Council website for EFL activities
CD-DVD player		www space
LCD TV		
Overhead projector		
ppt, word	ppt, word	Quiz with links
Internet	Internet (film, music, search info)	Photostory
Video clips	Watching films on the internet, Movie excerpts	Youtube
Movie maker	i-movie, movie maker	Smartphone & Apps

Table 1. The Coding of Turkish and Danish PTs' Episodes of Technology Integration

speaking classes, teachers use technologies such as videos, PowerPoint, listening records, etc." Through the descriptions, it is clear that only few Turkish PTs were able to make connections between TK, CK, and PK.

On the other hand, Danish PTs provided more details showing the connection among TK, CK, PK, and TPACK:

"Our professor used movie excerpts and pictures frequently in his teaching. In our classroom there is an interactive board, which allows us to write comments, make lines etc. on top of the movie/picture. First we watched the excerpt, then we discussed in groups, and at last we made notes 'on top of the movie'"

"A prof used the interactive smartboard to combine syllables by dragging them. One student at a time went to the board to try. More often they use ppt and word to demonstrate their lectures."

"Interactive board was used for teaching grammar. The students had to move around words and put them in the right boxes e.g. adv. adj etc."

Statements of Danish PTs highlight TPACK integration in Faculty members' courses.

Additionally, based on the classroom observations I conducted at both Turkish and Danish TEIs, the author observed that professors integrate technology into their classes with a difference. Teaching in Turkish contexts included the professors' PowerPoint presentation through the projector and students' taking notes to their paper notebooks. Another example was students made the presentation of the topic using PowerPoint to their peer through teachers' supervision. There was very limited interaction through, which technology and whole class interact and construct knowledge together. However, in Denmark TEI has hired technology specialists, who have expertise in at least two different content areas. Each lesson the expert introduced different software to PTs. First as a whole class they practiced the operation of the software, and then they explored how it could be included into their teaching. As homework, the expert wanted PTs to design lessons using the application and software they have practiced. Also, professors in DK were in close contact with the expert. In a lesson, a professor used the smartboard and a software program, PTs, and the expert practiced earlier, to do brainstorming with the whole class. Each student posted their opinion on the topic using their laptops and smart-board. Within seconds smartboard was full of opinions and the professor and the students discussed them as a whole class.

3.2.3 PTs' Own Applications

Turkish participants' TPACK integration is at a low level compared to Danish participants. Some of the examples of Turkish participants' own application episodes are given below:

"Especially in micro teaching classes, I use technology to provide students meaningful and real like inputs. In listening and reading classes we use different technologies, such as blogs, videos, online books, stories, songs, etc."

"In our lessons we have used technology so much we used computer, projector. In my lesson, I taught the name of the animals. I used slide show, video. I created the video by way of technology. I wrote the script to the program and the characters in it spoke my script."

"I can prepare a lesson by combining content, technologies, and teaching approaches very well. I have taught 'Present Continues tense' by using ppt presentation, video, song, about the topic."

On the other hand, Danish participants' examples are more TPACK integrated applications than Turkish ones. For example:

"I was teaching English grammar=> syntax. I had prepared exercises on a smartboard Notebook presentation which was an interactive grammar game. 1/3 of the class worked together on the blackboard. 1/3 solved exercises on paper, and 1/3 was with me getting more in-depth information about grammar. After 20 minutes the groups switched stations. In this way the interactive board acted as a second teacher, since the program was devised to correct the students."

"I was telling a story about Dracula and then the learners helped me finding pictures of him on the Internet and describing the pictures in English"

"In my teacher training practice I had a class about the structures and different genres in a newspaper. The pupils

learned about genres through an interaction with the whiteboard were they had to place and come up with words that explained in different genres."

"In English class I used a quiz with links to the topics that the students found difficult".

These quotations, firstly, show that Danish participant use of technology not only TK level but also PK, CK, and integrated TPACK domains level. Secondly, these quotations highlight that technology is used for different purposes in Danish context. For example, in the first Danish PT's quotation technology is used as a blended learning tool, different from Turkish examples in which technology is used for presenting information purpose. In the second quotation technology enabled student-centred learning environment as students found pictures from the Internet and talking about them in English. In that, it differs from Turkish examples in which teachers' presentation information though PowerPoint and projector is a common way of "teaching", which is teacher-centred. The last quotation is an example of using technology as an assessment tool of learning process. In Turkish examples the researcher could not find an example of use of technology in a different way than presenting information. Furthermore, when the episodes were examined, the use of 'technology' is also one-way direction: as a teacher to present the content, in other words, to teach, to the students. On the other hand, Danish PTs' episodes descriptions included the interactive way of technology integration letting students to learn through interaction and constructing the content information by the help of technology.

Furthermore, different from Danish participants, Turkish participants' use of technology is mostly for enhancing rather than transforming teaching and learning process. For instance, Turkish participants explained, "during a course in practicum I used smartboard to do some activities about Simple Present Tense to attract students' attention" and "in my microteaching lessons, I tried to use technology because I know that teaching English is going to be easy thanks to computer, projector and so on". Unlike Turkish participants' examples, Danish episodes reflected technology use for transforming teaching and learning process; for instance, "In my last teaching practice I used a wiki space to collect pupils answers on Forest Gump and presentations of different historical episodes. I guided them through." and "at practicum school: we used IAW, where we carried out different "tests" to obtain knowledge of the pupils' pre-understanding. This included questions concerning the author and genre of a certain book. The tests were discrete/ wrapped up as being a game". So, different from Turkish PTs, Danish participants' use of technology is mostly for transforming teaching and learning process rather than enhancing it.

4. Discussion

Findings of quantitative data analysis in this study revealed that except TPK, Turkish PTs generally expressed higher levels of TPACK, Modelling of Faculty, and Models of TPACK than Danish participants. CK was not significantly different in both groups. This implies that similar to previous studies (Koçoğlu, 2009; Kabakçı-Yurdakul, 2011; Kurt et al., 2014; Solak and Çakır, 2014; Oz, 2015; Ersanlı, 2016), ELT program in Turkey has been proved to be successful in training teachers with highly developed TPACK knowledge which in turn provides them with necessary skills and knowledge of technology to be implemented in their practical teaching.

On the other hand, the qualitative data analysis showed that, the opposite case is true. Each individual TPACK assessment has its limitations. For example, self-report surveys may be prone to student under- or over-reporting (Hofer and Grandgenett, 2012); and therefore, may not provide enough detail to examine TPACK. As a result, it is advised that TPACK should be examined in a variety of ways to be truly useful for program refinement (Koehler and Mishra, 2008; Harris et al., 2010; Abbitt, 2011; Kwangsawad, 2016). In parallel to this, in this present study the open-ended questions of the survey and classroom observations showed that, Danish PTs' TPACK knowledge and applications were mode advanced than Turkish ones contrary to the quantitative findings.

Firstly, when the participants' descriptions about the use of technology at practicum schools were examined, it was clear that, practicum teachers' TPACK modelling was very limited according to both Turkish and Danish PTs. Therefore, unfortunately practicum school experiences might not have provided enough modelling for TPACK integration into ELT for all participants; in that, it is similar to the previous

studies (Abera, 2014; Oz, 2015). However, for Turkish participants, these findings are inconsistent with the results of Quantitative Data Analysis in which Turkish PTs marked higher for school teachers' TPACK modelling in practicum schools than Danish PTs. In qualitative descriptions, Turkish PTs reported that, practicum schools and teachers were very limited to provide an example of technology integration in English lessons at schools. Moreover, some teachers use DynEd software as it was mandatory in English lessons at schools and the rest of the teachers use technology as efficiency aids rather than as a way of transforming learning and teaching practice. On the other hand, in Denmark even though participants reported that, Danish schools were lack of technological facilities, the application of technology in schools was more TPACK integrated compared to Turkish ones. This can be inferred that through the examples provided by the participants. Danish examples of use of technology in practicum schools included more comprehensive TPACK integration compared to the Turkish ones.

Secondly, regarding to TPACK models used by department professors to effectively demonstrate or model combining content, technologies, and teaching approaches in lessons, Turkish PTs rated high, similar to Oz's (2015) study. Based on the quantitative analysis, there is a significant difference between Turkish and Danish participants, in favour of Turkish PTs. However, according to the participants, how Faculty members integrate technology differs between Turkish and Danish participants. Eventhough the quantitative findings on faculty modelling of TPACK integration into lessons show that, there is a significant difference between Turkish and Danish participants in favour of Turkish ones, the qualitative findings indicate that in practice, Danish TEI include more comprehensive TPACK integration modelling in the lessons of pre-service ELT curriculum in terms of faculty modelling. According to the participants' descriptions of faculty modelling episodes, Turkish faculty modelling is considered mostly on TK level unlike previous studies (Oz, 2015; Kwangsawad, 2016) and a lower level on TPK compared to Danish ones.

Finally, Turkish participants listed technological hardware and their purpose of using technology was to spice up their classrooms and as for the purpose, they could only mention very limited and superficial uses (Doering et al., 2009) such as improving listening, pronunciation, and vocabulary. They failed to explain how learning objectives could be achieved. Similarly, although Turkish PTs were aware of the individual differences of students and learning styles, they could not provide the procedures about how to cater for different students integrating technology, content knowledge, and appropriate pedagogy. Therefore, they used technology to enhance rather than transform the teaching process. These results are in general agreement with previous research that, technology is often used for information transmission rather than facilitating and transform learning and teaching practice (Harris, Mishra, and Koehler, 2009; Yan and Yuhong, 2012; Abera, 2014). Different from Turkish PTs, Danish participants' use of technology is for transforming teaching. Their descriptions of episodes could clearly specify how technologies could be used in the classroom to achieve intended learning outcomes including the skills, grammar, vocabulary, and pronunciation as well as assessment, student-centeredness, and materials development.

Conclusion

The key contribution of this study is to add a comparison of ELT programs in terms of TPACK understanding the different connotations of technology for different countries. When both Turkish and Danish participants' answers to the open-ended questions in the survey were examined, the coding of the data indicates in both Danish and Turkish contexts the description of 'technology' is different. According to the Turkish PTs, technology means hardware and TK. For Danish participants technology, rather than hardware, is an application/ software enabling interaction both among the students themselves and between the teacher and the students. Therefore, eventhough the Turkish participants claimed that, they were more knowledgeable in TPACK domains except TPK, and faculty and school-teacher model them more on the technology integration in the survey, as their definition of technology does not go beyond the hardware and one-way teaching in which teacher use technology to fill the empty vase, the Turkish PTs' self-rated scale may not be an indicator of TPACK compared to Danish PTs' examples provided in the

qualitative part.

Overall, this study suggests that, a research methodology combining several data sources is promising for glimpsing the picture of TPACK development as it evolves within students from different countries and backgrounds that have been thus far under-explored.

Implications and Suggestions for Future Research

Firstly, as shown in the Danish context, using technology should go beyond knowing operational use of equipment and it should focus on how specific content should be delivered with a proper pedagogical and technological knowledge. In Turkey, similar to the case in Denmark at TEI, technology specialists who have expertise in different teaching areas should be hired. Foulger et al. (2015) report the positive outcomes of their study through hiring technology infusion specialists to work full-time with the instructors of the methods courses in ELT program. Also, in Denmark as reported in this present study, TEIs already have technology expert instructors in their departments working collaboratively with content instructors.

Secondly, this present study also highlighted that more collaboration should be established among practicum teachers, faculty members, technology specialists, and PTs. In this study practicum teachers provided insufficient modelling of technology integration in their lessons for the participants. In Turkey through Project, MoNE has organized several in-service training for teachers in the preschool, the primary and the secondary education for the project (MoNE, 2010). Despite these efforts, technology integration in schools was not at expected level as the participants reported. There might be several reasons for this result, which is beyond the scope of this study. However, what emerged from the data was that in-service teachers' perception of technology should be changed from using ICT as a facilitating tool to using them to transform teaching and learning process. This change might be achieved through collaboration among school-teachers, faculty members, technology specialists, and PTs. Similar projects have been conducted in Australia 'Teaching Teachers for the Future' (TTF) (see Parr, Bellis, and Bulfin, 2013) and Preparing Tomorrow's Teachers for Technology (PT3) project in the US (see Polly et al., 2010). One of the limitations of FATIH project is that in-service trainings are conducted often as seminars, short term and off-site, rather than as a continuous process of experiential learning. Instead, continuous in-service training should be designed among faculty members, school-teachers, technology specialists, and PTs. During four-year education program pre-service teachers might spend more time at schools with their practicum teachers who might learn about technology from student teachers. Faculty members might also facilitate the TPACK integration process for both the pre-service and in-service teachers.

Thirdly, it is necessary that curriculum planners, especially those involved in planning teacher education programs, should provide technologically-rich environment for prospective teachers and involve them in activities that help them to develop technopedagogical teaching materials that will ultimately result in enhanced learning outcomes (Oz, 2015). However, in Turkey the curriculum of teacher education programs has not been revised since 2007. In line with new technological developments and the FATIH project, there should have been a revision in the curriculum of ELT programs. Compared to the Danish program, the number of TPACK integrated courses is few and they have broad scopes. Technology courses should have more specific focus and content/ method courses should be redesigned enabling more TPACK integration into the specific subject matters. Moreover, by the way of workshops, seminars, and various activities, PTs should be informed about the popular, especially, Web 2.0 programs and should learn how to use these tools and materials during the learning process and to adapt them into the current program (Solak and Çakır, 2014). Additionally, schools and TEIs should provide continuous support for the integration by providing integration-friendly culture and context, such as organizing 'open door' class where teachers can observe how ICT can be integrated or workshops for peer teachers to exchange their ideas, resources and approaches of integrating ICT into teaching-learning process (Yan and Yuhong, 2012). Lastly, as in Denmark, in Turkey PTs should have an opportunity to do practicum abroad with a study visit that has been organized and approved by TEI.

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