Technological Pedagogical Content Knowledge (TPACK) Proficiency of Preservice Teachers Who will Teach a Foreign Language

Yabancı Bir Dil Öğretecek Öğretmen Adaylarının Teknolojik Pedagojik İçerik Bilgisi (TPİB) Çerçevesinde Yeterlikleri

Pınar Erten¹

Abstract

In this study, it was attempted to determine the technological pedagogical content knowledge proficiency (TPACK) perceptions of preservice teachers who will teach a foreign language. This study, which was designed as a general survey model, included preservice teachers who will carry out language education. The proficiency and efficiency levels of preservice teachers were determined concerning certain variables such as gender, department, receiving technology education, having access to internet, ability to use computer, searching for new technologies particular to the field, and ability to use these new technologies in the teaching activities. It was detected that they had the proficiency for TPACK. It was also determined that there was statistically no significant difference between the general TPACK proficiency levels of the students and the gender variable. It was determined that gender had no impact on the TPACK general proficiency levels of the students. It was determined that there were statistically significant differences among the TPACK general proficiency levels concerning department, receiving technology education, having access to internet, ability to use computer, searching for new technologies particular to the field, and ability to use these new technologies in the teaching activities. It was also found that these variables had impacts on the preservice teachers to have the TPACK proficiency concerning the selected languages, which were included in the study.

Keywords: Technological pedagogical content knowledge, language teaching, technology integration, proficiency, preservice teacher.

Öz


Anahtar Kelimeler: Teknolojik pedagojik içerik bilgisi, dil öğretimi, teknoloji entegrasyonu, yeterlik, öğretmen adayı.

Araştırma Makalesi [Research Paper]

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Introduction

Information and technological innovation is of vital importance in the 21st century educational institutions as in many institutions. Various models are being created to support mediums to build and apply 21st century skills. Since information and communication technologies have become a part of the daily studies of schools and institutions, a wide range of models have been created (Scardamalia, Bransford, Kozma, & Quellmalz, 2012).

Since the internet, social networks, and technologies have become indispensable for the daily life of students (Szeto, Cheng, & Hong, 2016) and because of the rapid integration of technology, a need emerged for a structure, which supports the use of appropriate technologies in the learning-teaching processes of teachers (Baser, Kopcha, & Ozden, 2016). To ensure this, Mishra and Koehler (2006) developed the technological pedagogical content knowledge (TPACK) framework. It focuses on the ability of teachers to combine educational technologies with their own pedagogical knowledge in education and to transfer them into the learning environment.

Emphasizing the connections, interactions, and limitations among the content (the subject learned and the subject taught), pedagogy (methods of learning and teaching) and technology, the TPACK framework consists of seven components (Mishra & Koehler, 2006): Pedagogical Knowledge (PK), Content Knowledge (CK), Technology Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and Technological Pedagogical Content Knowledge (TPACK).

**PK:** The knowledge about processes and practices or methods of teaching and learning (Mishra & Koehler, 2006).

**CK:** The knowledge about the subject area that is learned or taught (Mishra & Koehler, 2006).

**TK:** The knowledge and ability to use the standard and advanced technologies (Mishra & Koehler, 2006).

**PCK:** The knowledge about teaching the content, which teaching approaches fit the content, and how to design the elements of the content for a better teaching (Mishra & Koehler, 2006). It is a mixture of content and pedagogy, which contains information about how to organize, represent, and adapt certain problems and subjects to the different interests and abilities of the students and how they are prepared for teaching (Shulman, 1987).

**TPK:** The knowledge about various technologies that can be used in teaching and learning environments and how education can change as a result of the use of these technologies. Includes teachers’ knowledge of the benefits and limitations of technological tools in pedagogical terms (Mishra & Koehler, 2006).

**TCK:** The knowledge about the relationship between technology and content. It is the knowledge about the subject that the teachers teach, and how this subject can be changed by the implementation of technology (Koehler, Mishra & Yahya, 2007; Mishra & Koehler, 2006).

**TPACK** is understanding the representation of concepts by using technologies; the pedagogical techniques that use technologies in constructive methods in teaching content; the knowledge about the things that complicate or facilitate learning concepts and about how technology can help solve some problems faced by students; the knowledge about how to use technology in building students’ existing knowledge upon their preliminary information, and how technologies can be used to develop new epistemologies or strengthen the old ones. It is emphasized that a good education can be implemented through technology (Mishra & Koehler, 2006).

Teaching is a complex cognitive ability (Leinhardt & Greeno, 1986). Teacher education is important, which is relevant to the teaching that is the focal point of all education and educational renovations (Shulman, 1987). The first condition of effective and good language teaching is that teachers, instructors, and preservice teachers, who will achieve this, should have the necessary knowledge and skills. Foreign language learning is associated with applied teaching methods and approaches. Being aware of previous language experiences, qualifications, and skills of students, a creative learning environment should be created with more knowledge and providing more meaningful inputs (Ondrakova & Tauchmanova, 2019). The TPACK increases the creativity of students in teaching a second language (Paneru, 2018). Since language teaching ability of teachers is influenced from learning the language (Lin, 2010), they use technologies, which they used for their own language developments, to improve their students’ language learning (Başer, 2015). The use of technology in classrooms where language teaching is performed contributes to the effectiveness of teachers (Sharp, 2017).

Integration of technology in learning and teaching language;

- makes the learning process more vivid and attracts students' attention,
- increases motivation, interest, and recalling,
- allows students to be eager to learn a language,
- increases participation in class activities,
can appeal to students with different learning styles and intellect,
- saves time and energy,
- helps direct access to authentic and intercultural materials and real life experiences,
- provides faster feedback for students,
- develops individual study and autonomous learning skills,
- provides freedom to teachers and students,
- gives a chance to new ideas and suggestions (Kayacan Köse, 2016).

The integration of technology to the learning-teaching process is based on the tendency to work effectively with information and communication technologies and to develop the ability to use a second language (Zukerstein & Novotný, 2009, as cited in Maněnová & Žembová, 2012). This integration has caused changes in the roles of teachers. In addition, teachers' use of more effective and more appropriate technology has paved the way for them to be more successful (Sarı & Bostancıoğlu, 2018).

Various studies have been conducted about TPACK proficiency with stakeholders in various fields of education (Balcin & Ergun, 2017; Can, Erkoten & Bahtiyar, 2017; Chai, Koh & Teo, 2019; Mouza, Nandakumar, Ozden & Karchmer-Klein, 2017; Njiku, Mutarunyia, & Francois Maniraho, 2020; Yanış & Yürük, 2021). It was attempted to create an awareness and consciousness required in this field. The studies were conducted particularly in science (Aktaş & Özmen, 2020, 2022; Canbazoğlu Bilici & Baran, 2015; Irmak & Yılmaz Tüzün, 2019; Karakaya & Yazıcı, 2017; Srisawasdi, 2014), mathematics (Akkoç, 2011; Morales-López, Chacón-Camacho, & Vargas-Delgado, 2021; Niess et al., 2009; Ozudogru & Ozudogru, 2019; Özgen, Narlı & Alkan, 2013), social sciences (Adalar, 2021; Aşau, 2017; Gómez-Trigueros, 2020; Knapp, 2017), and English language teaching (Arslan, 2020; Furkan, 2020; Kayacan Köse, 2016; Na, Zhang, Wang, Wang, Yoneda & Li, 2017; Nazari, Nafissi, Estaji, Marandi, & Wang, 2019; Paneru, 2018; Ramanair, Rethinsamy & Misieng, 2017). However, no analysis was made on the proficiency perceptions of the preservice teachers, who teach foreign languages. With this research, it is considered to create an awareness and to help preservice teachers, who will perform language teaching to individuals from different walks of life, to evaluate their own potentials for integration with technology in language teaching and learning and to evaluate their knowledge and skills for the future.

1. Purpose

The potential for foreign students is increasing in many countries owing to the removal of borders. Countries, in parallel with their education policies, are in an attempt to teach both their own languages and other languages. In their own educational policies, they strive to teach both the native language of their country as well as other languages. Instructors, who will work for this purpose, from various fields are trained in universities. In this respect, the study attempted to determine the perceptions of preservice teachers, who will perform language teaching, about proficiency in TPACK. In this context, the proficiency and efficiency levels of preservice teachers were determined concerning gender, department, receiving technology education, having access to the internet, ability to use computer, searching for new technologies particular to the field, and ability to use these new technologies in the teaching activities.

2. Method

2.1. Research model

This study, which was designed as a general survey model, attempted to reach a judgment through a group taken from the population or through all the population (Karasar, 2003). Thus, proficiency levels of students were depicted through various variables.

2.2. Population and Sample

The population of this study was the final year students attending the departments of English Language and Literature, Turkish Language and Literature, and Oriental Language and Literature (Kurdish Language and Literature, and Zaza Language and Literature) at Bingöl University, Faculty of Arts and Sciences in 2017-2018 academic year. Since it was attempted to reach the entire population in this study, no sample was taken. In addition, the students studying in these departments were also receiving pedagogical formation training.
Table 1. Demographical Properties of the Participants

<table>
<thead>
<tr>
<th>Gender</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>139</td>
<td>61.5</td>
</tr>
<tr>
<td>Male</td>
<td>87</td>
<td>38.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Language and Literature</td>
<td>96</td>
<td>42.5</td>
</tr>
<tr>
<td>Turkish Language and Literature</td>
<td>77</td>
<td>34.1</td>
</tr>
<tr>
<td>Oriental Language and Literature (Kurdish Language and Literature)</td>
<td>32</td>
<td>14.2</td>
</tr>
<tr>
<td>Oriental Language and Literature (Zaza Language and Literature)</td>
<td>21</td>
<td>9.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Having previous technology training</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>107</td>
<td>47.3</td>
</tr>
<tr>
<td>No</td>
<td>119</td>
<td>52.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Having internet access</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>212</td>
<td>93.8</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>6.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Having a smartphone</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>222</td>
<td>98.2</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>1.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ability to use computer</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sufficient</td>
<td>149</td>
<td>65.9</td>
</tr>
<tr>
<td>Insufficient</td>
<td>77</td>
<td>34.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research for new technologies particular to the field</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>143</td>
<td>63.3</td>
</tr>
<tr>
<td>No</td>
<td>83</td>
<td>36.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ability to use new technologies of the field in teaching activities</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>183</td>
<td>81.0</td>
</tr>
<tr>
<td>No</td>
<td>43</td>
<td>19.0</td>
</tr>
<tr>
<td>Total</td>
<td>226</td>
<td>100.0</td>
</tr>
</tbody>
</table>

226 students were reached for the study. In the research, 61.5% of the participant students were female, while 38.5% of them were male. 42.5% of these students were from the department of English Language and Literature, 34.1% from the department of Turkish Language and Literature, 14.2% were from the department of Oriental Language and Literatures Kurdish Language and Literature, and 9.3% were from the department of Zaza Language and Literature. Among the students, 47.3% mentioned that they participated in technology training before, while 52.7% stated that they did not participate in any training about technology. The rate of the students with access to the internet is 93.8% while 6.2% did not have any access to the internet. Almost all (98.2%) of the students reported that they have smartphones. It is observed in the table that more than half (65.9%) of the students can sufficiently use computer. Of the students, 63.3% mentioned that they do research on the technology in their fields, while 81.0% reported that they used these new technologies for educational purposes.

2.3. Data Collection Tool

“TPACK assessment for preservice teachers learning to teach English as a foreign language” scale which was developed by Baser, Kopcha and Ozden (2016) was used to determine the proficiency perceptions of preservice teachers. It is comprised of 39 items and 7 factors (Technological Knowledge (TK)-9 items, Content Knowledge (CK)-5 items, Pedagogical Knowledge (PK)-6 items, Pedagogical Content Knowledge (PCK)-5 items, Technological Pedagogical Knowledge (TPK)-7 items, Technological Content Knowledge (TCK)-3 items, and TPACK-4 items). The value of the reliability coefficient of this scale varied between 0.81 and 0.92 for the factors. The highest variance value reported was 70.42%. A nine-point rating scale was employed ranging from “nothing/none” (1) to “very little” (3) to “some” (5) to “quite a bit” (7) to “a great deal” (9). The authors of this scale, whose reliability and validity were proved, were contacted, permissions were gained, and it was implemented. Since the scale focuses on teaching English as a foreign language, necessary regulations for its adaptation to other languages were employed in line with the consent of the authors. This adaptation was limited to the change of the word “English” in the content. No other changes were made regarding the structure or the context. In this study, the Kaiser-Meyer-Olkin (KMO) value was determined as 0.926, and the Bartlett’s test was determined as 6459.896 and significant (p=0.000). As per the Cronbach Alpha values, they were determined as...
TK-0.905, CK-0.909, PK-0.905, PCK-0.876, TCK-0.722, TPK-0.855, TPACK-0.908, and for the complete scale, it was 0.958. The explained total variance was 67.022%. It was observed that these results were fit (Can, 2016).

2.4. Data Collection and Analysis

The data collected from the preservice teachers, who study language, were subjected to descriptive statistical analysis and normality tests. The parametric tests were employed since the assumption suggesting that there was a normal distribution and the variances were homogeneous was verified according to the mean, median, peak value, skewness, kurtosis, and Kolmogrov-Smirnov tests (Can, 2016; George & Mallery, 2010; Pallant, 2005; Tekin, 2009). Independent samples t-tests and one-way variance analysis were used. In order to determine the groups with significant differences in the one-way variance analysis, the Scheffe test was used among the multiple comparison tests. Cohen's d value was used to calculate the magnitude of the impact in the t-test, and eta-squared ($\eta^2$) was employed to calculate the magnitude of the impact in the one-way variance analysis. When interpreting the values of $\eta^2$, 0.01 is interpreted as small, 0.06 as moderate, and 0.14 as large impact; as per the Cohen's d value, it is interpreted as 0-equal, 0.2-small, 0.5-moderate, 0.8-large impact regardless of the signs (Büyüköztürk, 2013; Can, 2016; Cohen, 1998; Foul, Erdfelder, Lang & Buchner, 2007). In addition, the Levene test was also employed to control the equality among the variances of the groups. The significance level is considered as 0.05.

3. Findings and Interpretation

The students were asked about the technology tools they use for educational purposes. A multiple-choice response was obtained. The results are as follows:

![Figure 1. The Distribution of The Technological Tools That The Students Used for Education](image_url)

The students stated that they mostly used smartphones ($n=194$). Second-most used device was the computer (laptop and desktop), tablet, interactive whiteboard, MP3 player, and overhead projector (Figure 1). Based on this finding, it can be mentioned that the students excessively benefit from technology in education activities. However, there were students, as well, who mentioned that they did not use technological devices for education activities.

It was also determined through which devices the students had access to the internet. These findings are given in Figure 2.
The majority of students are known to have internet access (Table 1). Figure 2 also shows that the most access was made over the smartphones (n = 210). Besides the smartphone, it is observed that they also use the computer and tablet for access to the internet. A very small number of students (n = 9) stated that they do not have access to the internet. Based on these results, it can be said that the majority of the students have access to the internet through their smartphones. It can be considered that the smartphone, which is an indispensable component of our modern day providing convenience, is preferred more because of its widespread use and since it provides convenience for access to anything desired anywhere and anytime.

The analysis results concerning the proficiency perceptions of the students about the general scale and its sub-dimensions are given in the following table.

Table 2. Arithmetic Mean and Standard Deviation Values of the Students Concerning the TPACK General Scale and Sub-dimensions

<table>
<thead>
<tr>
<th>TPACK-General and Sub-Dimensions</th>
<th>n</th>
<th>( \bar{X} )</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>TK</td>
<td>226</td>
<td>5.10</td>
<td>1.83</td>
</tr>
<tr>
<td>CK</td>
<td>226</td>
<td>7.02</td>
<td>1.68</td>
</tr>
<tr>
<td>PK</td>
<td>226</td>
<td>6.53</td>
<td>1.57</td>
</tr>
<tr>
<td>PCK</td>
<td>226</td>
<td>6.67</td>
<td>1.50</td>
</tr>
<tr>
<td>TCK</td>
<td>226</td>
<td>5.68</td>
<td>1.73</td>
</tr>
<tr>
<td>TPK</td>
<td>226</td>
<td>6.25</td>
<td>1.66</td>
</tr>
<tr>
<td>TPACK</td>
<td>226</td>
<td>6.08</td>
<td>1.82</td>
</tr>
<tr>
<td>General of Scale</td>
<td></td>
<td>6.12</td>
<td>1.31</td>
</tr>
</tbody>
</table>

The proficiency levels of the students according to Table 2 were determined to be between “some” and “quite a bit” (\( \bar{X} =6.12 \)). The lowest proficiency was at the “some” level in TK dimension (\( \bar{X} =5.10 \)), subsequently, in the TCK (\( \bar{X} =5.68 \)) dimension, while the highest proficiency level was as the “quite a bit” (\( \bar{X} =7.02 \)) level in the CK dimension. According to these results, it can be mentioned that the students consider that they have sufficient level of proficiency in the general TPACK scale, while they consider to have the least proficiency level in the TK and TCK, and the highest level in the CK proficiency level. However, although it is known that the students are prone to technology for learning and improving a
second language, this kind of low knowledge level demonstrate that the students have limited experience and they cannot use advanced technologies.

It was examined whether there were differences among the TPACK general proficiency levels of the students based on the gender variable. In this purpose, the independent samples t-test was employed, which is among the parametric tests. The obtained results are given in Table 3.

### Table 3. The t-test Results of the Students Concerning their TPACK General Proficiency Levels in terms of Gender Variable

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>( \bar{X} )</th>
<th>sd</th>
<th>Levene’s Test</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>139</td>
<td>6.00</td>
<td>1.26</td>
<td>1.412</td>
<td>-1.707</td>
<td>0.089</td>
</tr>
<tr>
<td>Male</td>
<td>87</td>
<td>6.31</td>
<td>1.37</td>
<td>1.412</td>
<td>-1.707</td>
<td>0.089</td>
</tr>
</tbody>
</table>

As the conclusion of the independent samples t-test, which was employed to determine whether there were significant differences among the TPACK general proficiency levels based on the gender variable, no significant difference was detected between the arithmetic mean of the female (\( \bar{X} = 6.00 \)) and male (\( \bar{X} = 6.31 \)) students (\( t(224)=1.707, \ p>0.05 \)). Thus, it can be mentioned that the gender differences of the preservice teachers, who are studying language education, have no impact on their TPACK general proficiency levels. It can be stated that both male and female students considered their TPACK proficiency levels as sufficient.

It was examined through the one-way variance analysis whether there were differences among the TPACK general proficiency levels of the students based on the department variable, and the results are given in Table 4.

### Table 4. The Variance Analysis Results of the Students Concerning their TPACK General Proficiency Levels in terms of Department Variable

<table>
<thead>
<tr>
<th>Department</th>
<th>n</th>
<th>( \bar{X} )</th>
<th>sd</th>
<th>Source of variance</th>
<th>Sum of squares</th>
<th>sd</th>
<th>Mean square</th>
<th>F</th>
<th>p</th>
<th>Scheffe</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. English Language and Literature</td>
<td>96</td>
<td>6.41</td>
<td>1.32</td>
<td>Between groups</td>
<td>33.390</td>
<td>2</td>
<td>16.695</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Turkish Language and Literature</td>
<td>77</td>
<td>5.58</td>
<td>1.22</td>
<td>Within groups</td>
<td>350.328</td>
<td>223</td>
<td>1.571</td>
<td>10.627*</td>
<td>0.000</td>
<td>2-1,3</td>
</tr>
<tr>
<td>3. Oriental Language and Literature</td>
<td>53</td>
<td>6.37</td>
<td>1.17</td>
<td>Total</td>
<td>383.718</td>
<td>225</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levene:</td>
<td>0.289</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The TPACK general proficiency levels of the students studying different languages were compared based on their departments and significant differences were observed (\( F(2,223)=10.627, \ p<0.05 \)). The magnitude of the impact calculated after the test (\( \eta^2=0.09 \)) demonstrates that this difference is moderate. As a result of the Scheffe multiple comparisons test, it was observed that the significant difference was between the students of Turkish Language and Literature, those of the English Language and Literature, and the Oriental Language and Literature departments. It is observed that the TPACK general proficiency test results of the students attending the Turkish Language and Literature department were lower compared to the other departments; it can be mentioned that they consider their proficiency as the “some” level. It can be mentioned that the department variable has a moderate impact on the TPACK general proficiency levels.

It was attempted to determine the general TPACK proficiency levels based on whether the participants previously had a technology training. For this purpose, the independent samples t-test was applied and the results are given in the following table.
As is seen in Table 5, there are significant differences among the TPACK general proficiency levels of the students about having a previous technology training (t(224)=2.740, p<0.05). It was determined that this difference was in favor of the ones with previous technology training. Considering the magnitude of the impact, it was determined to be at a low-impact level (Cohen’s d=0.37). In line with these results, it can be mentioned that having a previous technology training experience is influential in the TPACK general proficiency levels.

According to having internet access variable, the t-test results of the students concerning their TPACK general proficiency levels are given in Table 6.

As is seen in Table 6, TPACK general proficiency levels of the students were determined to be statistically significant concerning having internet access (t(224)=2.223, p<0.05, Cohen’s d=0.62). This difference is in favor of the students with internet access. Another result is that this variable has a moderate impact on the general proficiency levels. It can be concluded that TPACK proficiency levels of the students with internet access are higher, and this variable is efficient in having these high proficiency levels.

TPACK general proficiency levels of the participants were examined concerning their abilities to use computers. The obtained findings are in the following table.

As is seen in Table 7, a significant difference was determined between students’ ability to use computer and their TPACK general proficiency levels (t(224)=6.257, p<0.05). This difference is in favor of the ones with sufficient ability to use computer. Besides its statistical significance, the magnitude of impact was determined as “high impact” (Cohen’s d=0.88). It can be thought that the students considering their ability to use computer as sufficient have high proficiency. Moreover, it can be mentioned that the ability to use computer is an efficient factor in having the TPACK general proficiency.

The results of the analysis examining the TPACK general proficiency levels of the students and their research for new technologies particular to the field variable are as follows.
Table 8. The t-test Results of The Students Concerning Their TPACK General Proficiency Levels Based on Research for New Technologies Particular to The Field Variable

<table>
<thead>
<tr>
<th>Research for new technologies particular to the field</th>
<th>n</th>
<th>( \bar{X} )</th>
<th>sd</th>
<th>Levene's Test</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>143</td>
<td>6.39</td>
<td>1.28</td>
<td>0.630</td>
<td>4.171*</td>
<td>0.000</td>
</tr>
<tr>
<td>No</td>
<td>83</td>
<td>5.66</td>
<td>1.23</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05

As is seen in Table 8, there was significant difference concerning the research for new technologies particular to the field variable among the TPACK general proficiency levels (t(224)=4.171, p<0.05). The magnitude of the impact, which reveals the magnitude of the difference as well, was found as moderate (Cohen’s d=0.58). It is observed that the students (\( \bar{X} \)=6.39), who make research for the new technologies particular to the field, have higher proficiency levels compared to other students (\( \bar{X} \)=5.66). It can be mentioned that making research for the new technologies particular to the field variable has an influence on the TPACK general proficiency level.

The results of the analysis examining the TPACK general proficiency levels of the students and their ability to use the new technologies in teaching activities variable are as follows.

Table 9. The t-test Results of The Students Concerning Their TPACK General Proficiency Levels Based on Ability to Use New Technologies of The Field in Teaching Activities Variable

<table>
<thead>
<tr>
<th>Ability to use new technologies of the field in teaching activities</th>
<th>n</th>
<th>( \bar{X} )</th>
<th>sd</th>
<th>Levene's Test</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>183</td>
<td>6.27</td>
<td>1.23</td>
<td>0.219</td>
<td>3.737*</td>
<td>0.000</td>
</tr>
<tr>
<td>No</td>
<td>43</td>
<td>5.47</td>
<td>1.43</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05

A significant difference was determined as a result of the analysis, and this difference is in favor of the students who use these new technologies of the field in teaching activities (t(224)=3.737, p<0.05). This variable has a medium level impact (Cohen’s d=0.60). It is emphasized that using new technologies of the field in teaching activities is influential in the TPACK general proficiency levels.

Conclusion and Discussion

In teacher education, it was initially concentrated on the content knowledge of teachers, and subsequently, their pedagogical knowledge and their relationships. Afterwards, with the emergence of digitalization and the advance of technology into all domains of our lives, the integration of technology in teacher education and its reflections started to be discussed (Mishra & Koehler, 2006). Therefore, in this study, the proficiency levels of the preservice teachers, who will teach a second language, was examined through the TPACK framework, which was developed as the reflection of the changes digital technologies made in the teaching-learning processes (Mishra & Koehler, 2006). The integration of technologies as a collaborative tool for in-class training for the teachers, who are in a quest for alternative learning interactions, leads to positive transformations in terms of the TPACK (Paneru, 2018).

Technology is subtly used in teaching and learning through TPACK (Koehler, Mishra, & Yahya, 2007). In this study it was determined that almost all of the preservice teachers have smartphones and they have internet access through these devices. It was also detected in the study that since the students have internet access in such an easy and simple way, they prefer these devices before computers for education. It was determined that they used additionally tablet, interactive whiteboard, MP3 player, and overhead projector for educational purposes. As is in all fields, having a smartphone has advantages in language learning, particularly in education field (Başoğlu, 2010; Çavuş & İbrahim, 2009; Göçer and Karadağ, 2020; Saran, 2009; Tuncay, 2016; Yang, Li & Lu, 2015; Yıldırım, Yaşar & Duru, 2016). In language teaching, basic technological devices are also used: Such as computer, tablet, cell phones, projector, recorder, and textbook.
Almost all individuals living in this digital age are searching for new technological devices and learning their usages. They also have the knowledge and proficiency in using these technological devices in all fields. They are the members of the generation which has grown up with these technologies and they always carry their smartphones (Dumanlı Kürkçü, 2015; Yelikikalan, Akatay and Altın, 2010). It can also be mentioned that the students implemented the integration of technology successfully, and they have the proficiency in terms of TPACK general framework. In line with their own evaluations, it can be stated that they have the highest level of proficiency in TK and TCK dimensions, and the lowest in CK dimension. The most important factor for the students to have low levels of knowledge can be explained by limited experience and being unable to use advanced technologies for educational purposes, resulting in low level of motivation or negative attitudes (Başer, 2015). In a study conducted on English instructors, the dimension with the highest proficiency was the CK dimension, the TPACK dimension had the lowest proficiency level (Kayacan Köse, 2016). In another study conducted on preservice English teachers, a high level of TPACK proficiency was determined (İşler & Yıldırım, 2018). In another study, it was determined that the teachers teaching language had the TPACK knowledge; however, it was reported that their confidence levels were low in terms of using relevant technology (Ramanair, Rethinsamy & Misieng, 2017). In a study conducted on English teachers the TK average score was low, and the TCK, TPK, and TPACK average scores were determined to be high (Debbagh & Jones, 2018).

It was determined that there was no significant difference between the TPACK general proficiency levels of the students and the gender variable. Knowing how to use technological tools, pedagogical strategies and the subject area to teach a certain subject is actually equal to having the TPACK proficiency (Jang & Chen, 2010).

It was determined that there were statistically significant differences among the TPACK general proficiency levels concerning department, receiving technology education, having access to internet, ability to use computer, searching for new technologies particular to the field, and ability to use these new technologies in the teaching activities. It was also determined that these variables are influential in the TPACK proficiency levels of preservice teachers, who are attending language teaching education concerning the languages included in this research. The pedagogical decisions of teachers concerning the TPACK technology integration are influenced from the individual technological preferences and subject area properties. The TPACK development, which is a pedagogical guide for the professional preparation and development of technology integration, contributes to these decisions of teachers in education (Szeto & Cheng, 2017). It was observed that the computer, internet, and technology knowledge levels of individuals increased, who have taken the responsibility and control of learning process and the activities within this process, and who have all the opportunities of communication technologies (Tercan, Horzum & Uysal, 2014); additionally, it was beneficial for both their writing skills and education processes (Akdağ, Şahan Yılmaz, Özhan & Şan, 2014). In line with the findings of this study and the data of Turkish Statistical Institute (2019), it is normal for these students, who are known to have a good command of computer and easy access to internet, to have high TPACK proficiency levels. Some language instructors stated that they used technologies such as Learning Management Tools, Social Networking and Bookmarking Sites, Blogs and Wikis, Presentation preparing tools, Resource Sharing tools and Web Exercise/ Activity Creation tools (Kayacan Köse, 2016). The TPACK proficiency in language teaching is highly related to the integration of technology (Bostancıoğlu & Handley, 2018; İşler & Yıldırım, 2018; Paneru, 2018). The use of technology in teaching learning process is a factor which is expected to have an impact on the quality of the learning experience (Aldunate & Nussbaum, 2013). The support of technologies in the development of language skills is undeniable (Golonka, Bowles, Frank, Richardson, & Freynik, 2012).

**Suggestions**

It is observed that, in the individuals studying language, the command of content is at high levels, however, there is an insufficiency and deficiency in integration with technology. Time should be allocated and efforts should be made for the technology integration that will provide the needed professional development. Various programs should be prepared that will inform the teachers about new technologies in language teaching during the higher education and in the initial years of the professional life; these programs should also demonstrate how to integrate these tools with the educational purposes. Technological infrastructure should be renewed within the schools to encourage teachers and preservice teachers to use their knowledge and skills in a way that can provide a good and effective learning environment. Both the academic and physical infrastructures should be revised so as to support the institutions raising teachers to ensure the TPACK proficiency. It should also be ensured that there is an applied education that will focus on the use of technology in the teaching of the courses. Memberships should be provided to various platforms where technology and educational developments can be followed.
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