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Investigation of Pre-service Teachers' Techno-pedagogical Skills and Lifelong Learning Tendencies

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In this study, it is aimed to investigate the relationship between life-long learning tendencies and Technological Pedagogical Content Knowledge of the teacher candidates. The design of the study is based on the correlational survey model. The participants of the study are 271 senior teacher candidates studying at Ondokuz Mayıs University Education Faculty in 2018-2019 academic period. Purposeful sampling method was used in the study. Our first result indicates that there is no significant difference in terms of gender for Techno-pedagogical Education Competency of the teacher candidates and regarding its sub-dimensions yet there is a significant difference for Lifelong Learning Tendency of teacher candidates in favor of females in the context of Independent Samples T- Tests. Furthermore, One-Way ANOVA tests show that there are significant differences for all the sub-dimensions of "Techno-pedagogical Education Competency" as well as for its whole structure and along with that, "Lifelong Learning Tendency" of teacher candidates display differences at least between two groups as regards to their departments. In this study, it is found out that there is a moderate correlation between Techno-pedagogical Education Competency and Lifelong Learning Tendency levels of teacher candidates. There are also moderate correlations with the sub-dimensions of Techno-pedagogical Education Competency and Lifelong Learning Tendency given as Exertion, Ethics, Proficiency and Design with Lifelong Learning Tendency of teacher candidates.

Introduction

The developments in science and technology have introduced major innovations and perspectives to education and to many other disciplines. Technological support for education is increasing, and thus technology-based learning and teaching systems have emerged in a quick fashion. To that end it would be fair to state that many new competencies as well as novel skills are required for teachers and educators in order to adapt themselves into this ever-changing system (Murat and Erten, 2018: 62). Bearing in mind the significant position that science and technology have in the education process, educators should incorporate technology in their lessons to better teach their learners. It can be indicated that the technological abilities of educators include not only computer and web-based expertise, abilities and behaviors, but also the capacity to add various IT and interaction techniques onto

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the learning system (Horzum, 2011). In this respect, it is not enough for teachers to use technology only by following technological developments; but it becomes necessary to make use of technology fully when organizing learning activities (Akpınar, 2003). Effective incorporation of those skills includes factors such as teaching and curriculum, teaching skills, long-term financing, institutional readiness and life-long learning skills (Tinio 2003). Lifelong learning cannot be considered as an activity that contributes only to the professional careers of individuals and hence it should not be limited only to the framework of childhood and youth education. It indeed is a much wider process encompassing every period of an individual's life (Gündoğan, 2003). Furthermore, the contemporary educational system continues to be strongly frontloaded, with a strong emphasis on the childhood and teenage period of life. Therefore, current educational system often seemingly discourages the involvement of adults in life-long learning activities and it also cannot respond to the requirements for such a long-term education at a desired level. Thus, lifelong learning gains importance in this respect. It is seen as an unavoidable need for individuals and especially for teachers to personally develop so that they can meet the changing quality requirements and adjust themselves to professional life (Bilir, 2006). Here life-long learning tendencies are of significance for every teacher or teacher candidate in order to be able to meet the dynamic changes of technological and social developments.

IT (information technology) is the foundation for the teaching and education setting and helps people to pursue the professional schooling of culture as a whole, develop their understanding and possibilities, acquire fresh skills in their careers and pick up employment possibilities for coastal distant regions (Murat, Erten, 2018: 62). Öztürk (2013) emphasizes that it is the educator's duty to choose suitable equipment for learners in academic organizations to create efficient use of technology. It is evident that educators need the required expertise to incorporate information technologies in school teaching with an emphasis on the promotion of understanding by learners in order for these policies to succeed (Chai, Koh & Tsai 2011: 595). Therefore, one of the important competencies related with the IT and technological skills is Technological Pedagogical Content Knowledge. Before examining the Technological Pedagogical Content Knowledge, it is also important to mention pedagogical knowledge. The main focus has always been on the content knowledge of the teachers until the end of 1980s (Shulman, 1986). In Shulman's 1987 study, pedagogical content knowledge was integrated into the pedagogical knowledge, forming the integrated structure of teacher knowledge. This framework showed a competency that encloses the relationship between the content knowledge of educators and their pedagogical expertise. Technological pedagogical content knowledge developed over the previous years was centred on the notion that technology should also be included in this competency (Horzum, 2011).

Technological Pedagogical Content Knowledge (TPACK) is basically defined as a framework of teacher knowledge for technology integration. The three main components of teacher knowledge in the TPACK framework are Content Knowledge (CK), Pedagogical Knowledge (PK) and Technological Knowledge (TK) as seen in Figure 1. According to Kabakçı Yurdakul et all. (2012), there are four factors for Technological Pedagogical Content Knowledge shared as: Design, Exertion, Ethics and Profession. The design dimension covers the development of courses, teaching and learning environments and the mixture of appropriate technological equipment, tools and learning tools. The exertion element is related to the implementation of designed plans and the facilitation is possible with the use of appropriate technologies through carrying out efficient tests and evaluations. Ethics dimension is related to both technological ethics and personal problems. The proficiency

dimension is linked to improved and efficient use of technical assets by incorporating the technology into the educating and learning system (Kabakçı Yurdakul et all. 2012).

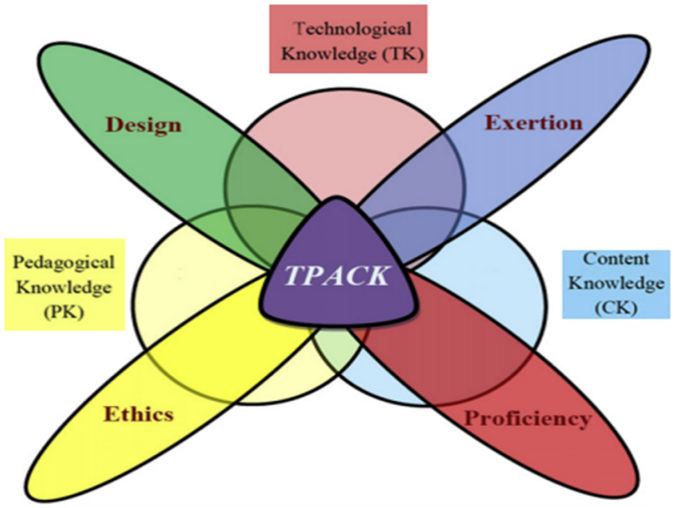

Figure 1. The framework and factors of TPACK-deep scale (Kabakçı Yurdakul et all. 2012).

To summarize, Technological Pedagogical Content Knowledge can be regarded as an important skill for teachers to enhance their readiness for current demands of social and technological requirements. However, it is thought that life-long learning tendencies play a fundamental role in achieving this. Therefore, in this study, it is aimed to investigate the relationship between life-long learning tendencies and Technological Pedagogical Content Knowledge of the teacher candidates. The following questions are sought in this manner for this study:

- Do "Techno Pedagogical Education Competency" and "Lifelong Learning Tendency" of teacher candidates differ in terms of gender?
- Do "Techno Pedagogical Education Competency" and "Lifelong Learning Tendency" of teacher candidates differ in terms of departments?
- Is there any significant correlation among "Techno Pedagogical Education Competency" as well as its sub-dimensions and "Lifelong Learning Tendency" of teacher candidates?

2. METHOD

2.1. Model of the Research

The design of the study is based on the correlational survey model. Survey designs include techniques of studies aimed at describing an existing or previous condition. The correlational survey model is a type of research model for studies which seek to determine whether two or more factors are related to the degree of the connection between these factors. Relationships between factors can be investigated in correlational survey designs in two ways as correlational-type relational survey model and as comparison type relational survey model. Correlation-type relational survey model tries to determine whether the variables change together or not. In the comparison type relational survey model, there are at least two variables and groups are formed according to one of them (independent variable) and it is

examined whether there is a change between them with respect to the other variable (dependent variable) (Johnson and Christensen, 2014; Karasar, 2009).

2.2. Study Group

The participants of the study are 271 senior teacher candidates studying at Ondokuz Mayıs University Education Faculty in 2018-2019 academic year. Purposeful sampling is a method used extensively in qualitative research to identify and select instances which are rich in terms of information for the most efficient spending of restricted funds (Patton, 2002; Palinkas et all. 2015). In other words, purposeful sampling requires access to key informants in the field who can help in identifying information-rich cases (Suri, 2011). Therefore, people or organizations who are particularly aware of or have experiences with an interesting phenomenon are identified and selected accordingly (Cresswell and Plano Clark 2011; Palinkas et all. 2015). Hence, in this study, the sample was chosen based on the criteria for identification and selection.

The first criterion is that the sample should be chosen within education faculty and a second criterion is that the sample should be among 4th grade students. The distribution of the students according to their departments shows that the highest number of students are situated in Special Education Department.

Table 3. 1. The distribution of the students according to the departments of the students.

Department	**N**
Primary School Teaching	26
Pre-school Teaching	12
Foreign Language Teaching	37
Mathematics Teaching	32
Social Sciences Teaching	29
Psychological Guidance and Counselling	13
Turkish Teaching	20
Special Education	102
Total	271

- In relational screening studies the following formula will be used to determine the sample size (Tabachnick and Fidell, 2007):
- N> 50 + 8m
- N: individual number m: number of independent variables

In the study, the independent variables were as follows: two independent gender variables, 7 independent variables for the department, the formula was calculated again for 9 independent variables; 50 + 8.9 = 122 which is considered necessary for the quantitative dimension of this study. It could be articulated that the sample of this study is convenient for survey design.

2.3. Data Collection Tools

Techno-pedagogical Education Competency Scale developed by Kabakçı Yurdakul, I., Odabası, Kılıçer, Çoklar, Birinci and Kurt, (2012) and the *Lifelong Learning Tendency Scale* developed by Yaman (2014) were used to collect the research data.

2.3.1. Techno-pedagogical Education Competency Scale

Techno-pedagogical Education Competency Scale (TPACK-deep) - consists of 33 items and four factors. These factors are; design, exertion, ethics and proficiency. The scale items are 5-point Likert type given as "I can do it easily", "I can", "I can partially", I can't" and "I absolutely can't". The internal consistency coefficient (Cronbach's alpha coefficient) for the whole scale was found to be .95. The internal consistency coefficient (Cronbach's alpha coefficient) of the factors constituting the scale is between .85 and .92. At the same time, a four-factor structure was confirmed by confirmatory factor analysis. In addition, the test-retest coefficient of the scale was found to be .80 (Kabakçı Yurdakul et al., 2012). It can be said that this scale, which is used in the research with these characteristics, is one of the data collection tools that has high validity and reliability among the existing measurement tools found in the literature.

All of the items in the scale are positive expressions and there are no reverse coded items in the scale. The distribution of the items according to the four factors of the scale is as follows:

- Design: Items 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10
- Exertion: Items 11, 12, 13, 14, 15, 16, 17,18, 19, 20, 21 and 22
- Ethics: Items 23, 24, 25, 26, 27 and 28
- Proficiency: Items 29, 30, 31, 32 and 33

2.3.2. Lifelong Learning Tendency Scale

"Lifelong Learning Tendency Scale" was developed by Yaman (2014). Cronbach alpha coefficient of the "Lifelong Learning Tendency Scale" was found to be 0.91. This scale has 5-point Likert type structure having choices as totally agree (5), agree (4), partially agree (3), disagree (2) and totally disagree (1). As a result of the factor analysis, since the items did not form a meaningful integrity and have 12 factors, it was thought that the scale could be evaluated as one-dimensional and it was decided to collect the items under one factor. Therefore, in the analysis the data of this scale was taken as one factor and the sum of all items were taken into consideration.

2.4. Analysis of the Data

For the purposes of the research, descriptive statistics such as frequency, standard deviation and mean values were used to determine Techno-pedagogical Education Competency and Lifelong Learning Tendency levels of the teacher candidates. The significance level was taken as 05 in the analysis of the data. In addition, SPSS 17.0 (Statistical Package for the Social Sciences) was used in statistical analysis.

Before conducting the analysis, it is important to determine whether the data is normally distributed or not. After that, one can decide the parametric or non-parametric tests for the analysis of the data. Therefore, the Kolmogorov-Smirnov test and Shapiro-Wilk test were performed to determine the congruity of the distribution of the data. The results show that all the data are not normally distributed. Therefore, non-parametric tests should be performed for the further analysis or the square root transformations can be used for the normalization of the data. In this article, square root transformations were used for the analysis of the data because non-parametric tests are not favourable for the analysis of the data.

Table 3. 2. Test of normality for all the data

Tests of Normality	Kolmogorov-Smirnov[a]		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
Techno-pedagogical Education Competency	.142	.000	.845	.000
Lifelong Learning Tendency	.144	.000	.877	.000
Design	.143	.000	.837	.000
Exertion	.121	.000	.858	.000
Ethics	.159	.000	.893	.000
Proficiency	.192	.000	.851	.000

Therefore, Independent Samples T- Test and One-Way ANOVA test were used for the analysis of the data after the normalization of the data through square root transformations.

3. Findings

3.1. Findings regarding the first question "Do 'Techno-pedagogical Education Competency' and 'Lifelong Learning Tendency' of teacher candidates differ in terms of gender?"

After the normalization of the data through square root transformations, Independent Samples T- Test was performed as a parametric test in order to reveal whether "Techno Pedagogical Education Competency" and "Lifelong Learning Tendency" of teacher candidates differ in terms of gender. The results of Independent Samples T- Test reveal that there is no significant difference in terms of gender for Techno Pedagogical Education Competency of the teacher candidates and its sub-dimensions but there is a significant difference for Lifelong Learning Tendency of teacher candidates given in Table 3.4 in favor of females where their mean value is 124.86 but the mean ranks of the males is 119.57.

Table 3. 4. Independent Samples T- Test for gender variable at the significance level 0.05

		F	Sig.	t	df	Sig. (2-tailed)
Design	Equal variance assumed	4.651	.032	.290	276	.772
	Equal variances not assumed			.306	272.064	.760
Exertion	Equal variance assumed	1.478	.225	.304	274	.761
	Equal variances not assumed			.316	273.908	.752
Ethics	Equal variance assumed	.663	.416	.927	276	.355
	Equal variances not assumed			.945	271.078	.346
Proficiency	Equal variance assumed	2.392	.123	.104	276	.918
	Equal variances not assumed			.107	274.893	.915
Teytotal	Equal variance assumed	3.349	.068	.435	274	.664
	Equal variances not assumed			.455	273.155	.650
Bit	Equal variance assumed	4.997	.026	2.552	268	.011
	Equal variances not assumed			2.497	226.548	.013

*p<0.05

Table 3.4 indicates that Techno-pedagogical Education Competency of the teacher candidates is independent from their gender implying that gender does not play a role for achieving this perceived competency at all. However, Lifelong Learning Tendency seems to be related with gender and the Lifelong Learning Tendency levels perceived by females are higher than the males implying that females see themselves more inclined to learning and experiencing with

novel things and topics than males. This might be explained with the fact that the opportunities to access lifelong learning for both gender groups were not quite equal (Chang, Wu and Lin, 2012) and; therefore, women are more eager to participate in such kinds of activities.

3.2. Findings regarding the second question "Do 'Techno-pedagogical Education Competency' and 'Lifelong Learning Tendency' of teacher candidates differ in terms of departments?"

After the normalization of the data through square root transformations, One Way ANOVA was performed in order to reveal whether "Techno Pedagogical Education Competency" and "Lifelong Learning Tendency" of teacher candidates differ in terms of departments. One-Way ANOVA tests show in Table 3.5. that there are significant differences for all the sub-dimensions of "Techno pedagogical Education Competency" as well as for its whole structure and along with that, "Lifelong Learning Tendency" of teacher candidates display differences as for at least between two groups as regards to their departments.

Table 3. 5. ANOVA test in terms of teacher candidates' departments at the significance level 0.05

ANOVA		Sum of Squares	df	Mean Square	F	Sig.	Difference Table**
Design	Between Groups	2192.743	7	313.249	5.802	.000	3<5, 3<6, 4<5, 4<6, 4<8, 5>7, 6>7, 7<8.
	Within Groups	14630.999	271	53,989			
	Total	16823.742	278				
Exertion	Between Groups	3026.514	7	432.359	6.000	.000	3<5, 3<6, 4<5, 4<6, 5>7, 6>7.
	Within Groups	19384.966	269	72.063			
	Total	22411.480	276				
Ethics	Between Groups	549.793	7	78.542	3.383	.002	4<5, 5>7
	Within Groups	6291.884	271	23.217			
	Total	6841.677	278				
Proficiency	Between Groups	340.436	7	48.634	3.061	.004	5>7, 7<8
	Within Groups	4306.217	271	15.890			
	Total	4646.652	278				
Teytotal	Between Groups	19895.376	7	2842.197	5.518	.000	3<5, 4<5, 4<6, 5>7, 6>7, 7<8.
	Within Groups	138547.693	269	515.047			
	Total	158443.069	276				
Bit	Between Groups	10405.216	7	1486.459	5.752	.000	1<5, 3>4, 3>7, 4<5, 5>7, 6>7,
	Within Groups	67970.873	263	258.444			
	Total	78376.089	270				

*p<0.05 **Codes; 1= Primary School Teaching, 2= Pre-school Teaching, 3= Foreign Language Teaching, 4= Mathematics Teaching, 5= Social Sciences Teaching, 6= Psychological Guidance and Counselling, 7= Turkish Teaching, 8= Special Education

One-way analysis of variance (Anova) was used to determine whether the mean scores of techno-pedagogical competence and lifelong learning tendencies of the prospective teachers showed a significant difference according to the department (Anova) in terms of Techno-pedagogical competence (F = 5,518; p = 0,000 <0.05) and lifelong learning tendencies (F = 5.752; p = 0.000 <0.05). Complementary post-hoc analysis was performed to determine the sources of differences. In terms of Techno-pedagogical Education Competency, Psychological Guidance and Counseling Department scores (148.385 ± 8.099) and Social Sciences Teaching Department scores (145.897 ± 12.608) were higher than those of the other

departments. In terms of Lifelong Learning Tendency scores, Social Sciences Teaching scores (132.759 ± 7.619) and Psychological Guidance and Counseling section scores (131.231 ± 6.166) were higher than the other branches. The details of the significant differences between the departments are given in Table 3.6.

Table 3. 6. Descriptive results for Techno-pedagogical Education Competency and Lifelong Learning Tendency

		N	Mean	Std. Deviation	Std. Error
Techno-pedagogical Education Competency	1.Primary School Teaching	27	129.926	24.145	4,647
	2.Pre-school Teaching	13	130.308	19.926	5,527
	3.Foreign Language Teaching	37	127.162	36.617	6.020
	4.Mathematics Teaching	35	122.200	20.732	3.504
	5.Social Sciences Teaching	29	145.897	12.608	2.341
	6.Psychological Guidance and Counselling	13	148.385	8.099	2.247
	7.Turkish Teaching	20	118.450	26.578	5.943
	8.Special Education	103	137.485	19.068	1.879
	Total	277	133.119	23.960	1.440
Lifelong Learning Tendency	1.Primary School Teaching	26	117.539	21.632	4.242
	2.Pre-school Teaching	12	112.583	29.543	8.528
	3.Foreign Language Teaching	37	128.243	12.947	2.129
	4.Mathematics Teaching	32	116.344	17.511	3.095
	5.Social Sciences Teaching	29	132.759	7.619	1.415
	6.Psychological Guidance and Counselling	13	131.231	6.166	1.710
	7.Turkish Teaching	20	112.300	19.674	4.399
	8.Special Education	102	123.059	14.656	1.451
	Total	271	122.616	17.038	1.035

Descriptive results for Techno Pedagogical Education Competency indicate that highest score for this competency in general belongs to Psychological Guidance and Counselling and lowest score belongs to Mathematics Teaching Department. As for the Lifelong Learning Tendency, highest score belongs to Psychological Guidance and Counselling and the lowest belongs to Pre-school Teaching and Turkish Teaching (Table 3.6).

Table 3. 7. Descriptive results for the sub-dimensions of the Techno Pedagogical Education Competency at the significance level 0.05

		N	Mean	Std. Deviation	Std. Error
Design	1.Primary School Teaching	27	40.519	7.485	1.441
	2.Pre-school Teaching	13	39.769	7.014	1.945
	3.Foreign Language Teaching	37	38.892	11.942	1.963
	4.Mathematics Teaching	37	38.405	7.045	1.158
	5.Social Sciences Teaching	29	45.966	3.831	.711
	6.Psychological Guidance and Counselling	13	46.923	3.378	.937
	7.Turkish Teaching	20	37.250	8.460	1.892
	8.Special Education	103	42.893	6.068	.5978
	Total	279	41.495	7.779	.466
Exertion	1.Primary School Teaching	27	47.333	8.426	1.621
	2.Pre-school Teaching	13	47.000	7.746	2.148
	3.Foreign Language Teaching	37	45.487	13.420	2.206
	4.Mathematics Teaching	35	43.657	7.859	1.328
	5.Social Sciences Teaching	29	53.414	4.484	.833
	6.Psychological Guidance and Counselling	13	54.692	3.728	1.034
	7.Turkish Teaching	20	43.100	9.662	2.161
	8.Special Education	103	49.379	7.498	.739
	Total	277	48.043	9.011	.541

Ethics	1.Primary School Teaching	27	22.148	5.013	.965
	2.Pre-school Teaching	13	23.692	4.385	1.216
	3.Foreign Language Teaching	37	22.838	6.530	1.074
	4.Mathematics Teaching	37	21.081	4.763	.783
	5.Social Sciences Teaching	29	24.966	3.746	.696
	6.Psychological Guidance and Counselling	13	25.231	3.219	.893
	7.Turkish Teaching	20	20.500	5.587	1.249
	8.Special Education	103	23.942	4.368	.430
	Total	279	23.151	4.961	.297
Proficiency	1.Primary School Teaching	27	19.926	4.358	.839
	2.Pre-school Teaching	13	19.846	4.140	1.148
	3.Foreign Language Teaching	37	19.946	5.995	.986
	4.Mathematics Teaching	37	19.460	3.404	.560
	5.Social Sciences Teaching	29	21.552	2.707	.503
	6.Psychological Guidance and Counselling	13	21.539	2.402	.666
	7.Turkish Teaching	20	17.600	4.394	.982
	8.Special Education	103	21.272	3.507	.346
	Total	279	20.437	4.088	.245

As for the sub-dimensions of the Techno Pedagogical Education Competency, Psychological Guidance and Counselling has the highest score and Turkish Teaching has the lowest score in design dimension. Similarly, Psychological Guidance and Counselling has the highest score and Turkish Teaching has the lowest score in exertion dimension and ethics as well as proficiency dimensions (Table 3.7.).

3.3. Findings regarding the third question "Is there any significant correlation among 'Techno pedagogical Education Competency' as well as its sub-dimensions and 'Lifelong Learning Tendency' of teacher candidates?"

Before the analysis of the correlation results, it would be useful to mention the correspondent levels of different correlation ranges. The correlation constant which is below 0.2 indicates a very weak relationship or the existence of no correlation. The correlation constant which is between 0.2-0.4 indicates poor correlation. The correlation constant between 0.4-0.6 indicates a moderate correlation whereas numbers 0.6-0.8 indicates a high correlation. The correlation constant above 0.8 indicates a very high correlation.

To that end it is visible that there is a moderate correlation between Techno-pedagogical Education Competency and Lifelong Learning Tendency. Lifelong Learning Tendency also has a moderate correlation with the sub-dimensions as Exertion, Ethics and Proficiency as well as Design as given in Table 3.8.

Table 3. 8.Pearson correlation analysis for the variables at the significance level 0,05.

		Teytotal	Design	Exertion	Ethics	Proficiency
BIT	Pearson Correlation	.458**	.477**	.403**	.410**	.389**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	270	271	270	271	271

*p<0.05

It can be seen that the significant correlations among Techno-pedagogical Education Competency and its sub-dimensions with Lifelong Learning Tendency are at the significance level 0.05.

4. Discussion and Conclusion

Our first result indicates that there is no significant difference in terms of gender for Techno Pedagogical Education Competency of the teacher candidates and its sub-dimensions but there is a significant difference for Life-Long Learning Tendency of teacher candidates in favour of females. When the literature is examined, it is witnessed that Sezer (2014) also found out no statistically significant difference between genders in terms of TPCK (Technological Pedagogical Content Knowledge) competencies. The finding that perceived TPCK competencies do not differ in relation to gender is a result that is parallel to a fair number of studies' conducted (Akgun, 2013; Jang and Tsai, 2012; Gömleksiz and Fidan, 2011; Kazu and Erten, 2011; İşigüzel, 2014; Kaya, Özdemir, Emre and Kaya, 2011; Koh and Chai, 2011; Murat, 2013; Polat, 2018; Şimşek, Demir, Bağçeci and Kınay, 2013; Ünal Bozcan, 2010). It can be uttered with ease that Techno-pedagogical Education Competency is independent from gender variable. When the literature regarding the relationship between gender and Life-Long Learning Tendencies is examined, it is observed that there are similar findings showing significant difference in favor of females (Coşkun, 2009; Demirel and Akkoyunlu, 2010, Gregg, 1996; İzci and Koç, 2012). It is obvious that gender has an effective role for perceived life-long learning tendencies. Where the rates of different countries are considered, there is a significant gender gap in terms of this (Chang, Wu, Lin, 2012; Mulenga & Liang, 2008). Similarly, Arulampalam et al. (2004) focused on gender access determinants to life-long learning with respect to differing variables such as fixed term, part-time and full-time work, public and private sector work, education accomplishments, and the distribution of salaries prior to learning. They discover that women are much more likely to participate in Lifelong trainings than the men in four countries (Spain, Italy, Denmark and Finland). This can be attributed to the fact that generally, women have lesser opportunities in their educational career due to social and cultural expectations (Gunawardena, Rasanayagam, Leitan, Bulumulle, and Dort, 2006; World Bank, 2005, 2007). It seems that women are more eager to be engaged in life-long learning activities than men in our sample in Turkey. Seemingly that women are more likely to participate in lifelong learning activities than men was confirmed by the study of Quintini (2011) and Chłoń-Domińczak and Lis (2013) implying that women balance their lack of education by participating in further education, leading to a disappointment in their reduced abilities. This can also reflect the fact that adults from different cultures might view lifelong learning in different ways or might take part in learning activities totally differently and therefore (Chang, Wu and Lin, 2012) gender roles gain significance in such a culture-bound perspective.

One-Way ANOVA tests show that there are significant differences for all the sub-dimensions of "Techno pedagogical Education Competency" as well as for its whole structure and along with that, "Lifelong Learning Tendency" of teacher candidates display differences as for at least between two groups as regards to their departments.

In terms of Techno-pedagogical Education Competency, Psychological Guidance and Counseling Department scores (148.385 ± 8.099) and Social Sciences Teaching Department scores (145.897 ± 12.608) were higher than the other departments. As for Lifelong Learning Tendency scores, Social Sciences Teaching scores (132.759 ± 7.619) and Psychological Guidance and Counseling section scores (131.231 ± 6.166) were higher than the other branches.

For the "Techno-pedagogical Education Competency" some research displayed significant differences in terms of the branch variable (Polat, 2018) while some researchers found

significant differences among departments like Kaya et all. (2011); Gömleksiz, Fidan (2011); Şad, Açıkgül, and Delican (2015) and Yalçın İncik and Akay (2017). Interestingly, the highest score for this competency in general belonged to Psychological Guidance and Counselling and the lowest score to Mathematics Teaching contrary to the expectation that students in numeric departments would have more scores than the ones in social departments. There are findings uncovering similar results and exhibiting significant differences in terms of their departments which are related to life-long learning tendencies of teacher candidates (Ayaz, 2016; Evin Gencel, 2013; Arcagök and Şahin, 2014; Şahin, Akbaşlı and Yanpar Yelken, 2010).

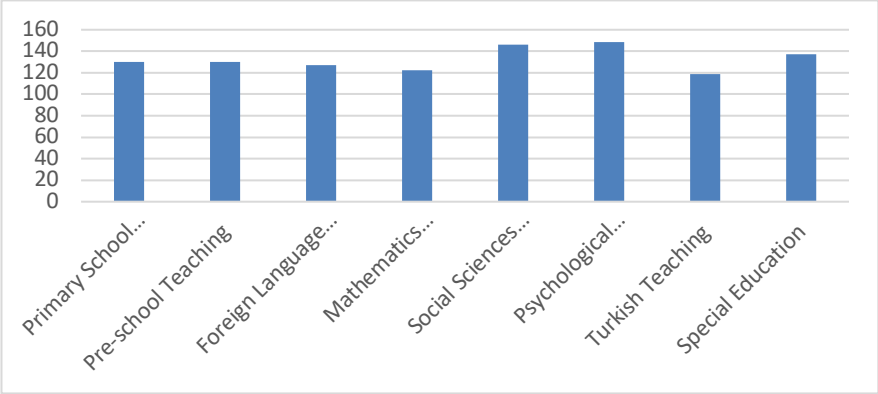

Figure 4.1. Perceived "Techno-pedagogical Education Competency" levels of the teacher candidates.

Perceived "Techno-pedagogical Education Competency" levels of the teacher candidates given in Figure 4.1 and Table 3.6 show that students in some departments such as Mathematics and Turkish Teaching have less perceived "Techno-pedagogical Education Competency" compared to the Psychological Guidance and Counselling students, however most of them are in similar ranges. The reason of this should be enlightened with further qualitative and in-depth research.

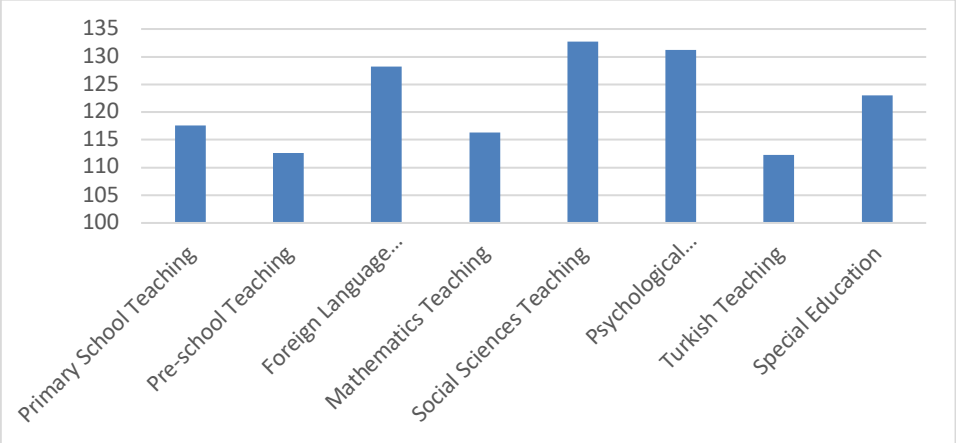

Figure 4.2. Perceived "Lifelong Learning Tendency" of Teacher Candidates

In terms of lifelong learning tendency, the highest score belongs to Psychological Guidance and Counselling and the lowest score belongs to Pre-school Teaching and Turkish Teaching. This can be explained by the fact that Psychological Guidance and Counselling department

learners encounter and deal with concepts related with life-long learning skills more often than those from other disciplines. Perceived "Lifelong Learning Tendency" levels of the teacher candidates given in Figure 4.2 and Table 3.6 show that students in Turkish Teaching department have less perceived "Lifelong Learning Tendency" whereas Foreign Language prospective teachers, Social Sciences teacher candidates, Special Education teacher candidates and Social Sciences teacher candidates, Psychological Guidance and Counselling, Primary School students have higher values. The reason(s) for that should be enlightened with further qualitative and in-depth research in the future.

In this study it is found that there is a moderate correlation between Techno pedagogical Education Competency and Lifelong Learning Tendency. Özdamlı and Özdam (2014) found that there was a relation between the perception competence of life-time learning approach and abilities in using information-communication technologies of the teachers. Lifelong learning tendency also has a moderate correlation with the sub-dimensions as exertion, ethics and proficiency and design dimensions. It then can be concluded that there is a moderate correlation between perceived techno pedagogical education competency and perceived life-long learning tendency of teacher candidates. Due to the fact that a limited number of studies are found in the literature concentrating upon this issue, the findings of this research should be handled with caution. This result allows us to infer that students' life-long teaching tendencies are influenced by techno pedagogical Education Competencies to a certain extent.

Recommendations

In order to grasp the main causes of the significant differences and correlations pertaining to the concepts mentioned above, qualitative studies like in-depth interviews or semi-experimental designs can be referred to in future studies. Furthermore, Techno pedagogical Education Competency and Life-Long Learning Tendency can be investigated with different demographic variables as well as varying competencies and skills. Similar research can be carried out with different samples using different measurement tools to spot any similarities and/or differences with reference to the findings of this research.

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