

The Investigation of Mathematics Teachers' Perceptions of Lifelong Learning Competencies

Murtaza AYKAÇ¹

Niğde Ömer Halisdemir University, Niğde, Turkey

Davut KÖĞCE²

Niğde Ömer Halisdemir University, Niğde, Turkey

Buket ASLANDAĞ³

Niğde Ömer Halisdemir University, Niğde, Turkey

Abstract

The purpose of this study is to examine the mathematics teachers' perceptions of lifelong learning competencies. The study group of the research consisted of secondary school mathematics teachers working in the Ministry of National Education. This study was carried out to examine the perceptions of secondary school mathematics teachers on lifelong learning competencies depending on some variables and a correlational survey model within the scope of the descriptive method was used. In the research, "Key Competencies Scale in Lifelong Learning" developed by Şahin, Akbaşlı and Yanpar Yelken (2010) was used. Independent samples t-test, one-way analysis of variance and Tukey test were used to compare the mean scores obtained from the scale by variables. The results obtained from the research indicated that the secondary school mathematics teachers participated in the research have high level of life-long learning competencies. There was found to be no significant difference between the scores of life-long learning competencies as regards their genders, the high schools they graduated from, the faculty they graduated from, the geographical region where they have been working and professional seniority. However, significant differences were found in participants' scores of lifelong learning competencies related to their professional satisfaction status and the frequency of the activities they participate for personal and professional development.

Keywords: Lifelong Learning, Mathematics Teachers, Perception of Lifelong Learning

DOI: 10.29329/epasr.2020.270.6

¹ Assist. Prof. Dr., Niğde Ömer Halisdemir University, Faculty of Education, Department of Preschool Education, Niğde, Turkey. ORCID: 0000-0001-7204-0835

Correspondence: murtazaaykac@gmail.com

² Assoc. Prof. Dr., Niğde Ömer Halisdemir University, Faculty of Education, Department of Elementary Mathematics Education, Niğde, Turkey, ORCID: 0000-0002-3475-2740, Email: kogced@gmail.com

³ Assist. Prof. Dr., Niğde Ömer Halisdemir University, Faculty of Education, Education Programs and Teaching, Niğde, Turkey. ORCID: 0000-0002-2935-2320, Email: buket.aslandag@gmail.com

Introduction

In today's information age, it is challenging for individuals to continue their professions and daily lives with only the information they learn at school. That's because, with the rapid development and spread of knowledge, if individuals cannot update their knowledge about their profession, they will not always be able to solve the problems they encounter in daily life with their current knowledge. Therefore, as a result of this need in today's society, the general view of the society and individuals, in particular, has changed. So, in today's society, individuals have to constantly improve themselves in order to meet the requirements of the profession, regardless of their profession. Ensuring continuity of education to be given to individuals for this development is important for social progress. Therefore, lifelong education has gained importance in order for education to reach everyone regardless of the individual's age and to raise more qualified individuals.

Lifelong education has become a concept of solution point to meet the new needs of developing technology in human life. That's because education provided in schools is far from meeting the needs of individuals in solving their real life problems (Bağcı, 2011). MEB (2014) defines lifelong learning as all kinds of learning activities that an individual participates throughout their life in order to develop their knowledge, skills, interests and competencies. While Demirel (2009) defines lifelong learning as a continuous process that improves the individual's potential and competencies throughout their life, Jarvis (2004) defines it as a whole of individual and institutional learning. European Commission (2018) defines lifelong learning as an educational process that covers all learning activities of the individual by making a definition similar to that of Demirel (2009). Güleç, Çelik, Demirhan (2012) define lifelong education as a broad concept that covers all formal and non-formal education activities aiming at restructuring the education system and developing all educational potential outside the education system provided in schools. In the "World Bank Report" published in 2003, lifelong learning is defined as a new education-teaching model to meet the demands of individuals in a changing world order and it is stated that it covers learning within the life cycle from childhood to retirement (The World Bank, 2003).

Considering these definitions as a whole, lifelong learning can be defined as a learning process within the life cycle starting from childhood to retirement to be able to produce solutions to the problems faced by individuals in their real life, to increase their willingness and desire to learn and to improve their entire life skills. When considered in light of these definitions, lifelong learning should continue at every moment and in all areas of life. This is due to the fact that individuals must be trained to learn on their own and apply their knowledge and skills to their lives in order to fulfill the requirements of the age. In recent years, the rate of access, acquisition and change in the content and development of information has led to the loss of validity and usefulness of information for individuals. This, in turn, has given rise to discussions about whether it is sufficient to relay

information to new generations only at the level of knowledge (Akbaş & Özdemir, 2002). Studies carried out in the field of lifelong learning (Doğan & Çalışkan Toyoğlu, 2019) revealed that the learning culture in Turkey is not strong. In order to increase the awareness and participation of individuals regarding lifelong learning, the teachers responsible for the education of individuals should realize some important tasks.

In order to reach lifelong learning goals, teachers should take on a role that teaches ways to reach information instead of just transferring the information required by the age (Yıldırım, Genc & Eryaman, 2016; Yaman, 2014; Özden, 2013). In order for teachers to fulfill this role, they must first be willing and inclined to learn and continue this throughout their professional life (Yaman & Yazar, 2015). Lifelong learning is not possible for a teacher whose skills have not developed to adapt to the age we are in, to prepare effective learning/teaching activities and to practice these. Therefore, teachers have an important role in making lifelong learning possible. It is important that teachers have the need and desire to develop themselves in order to fulfill these roles. In other words, teachers should constantly rejuvenate themselves at every stage of their professional lives, cope with problems, be encouraging, energetic, lively, active and productive, think critically, communicate, have aesthetic consciousness, and have the ability to develop these characteristics (MEB, 2008).

In today's educational system, teachers are expected to guide their students to gain lifelong learning competencies during the education and training process. From this point of view, it is possible for teachers to fulfill these roles only if they view lifelong learning from a certain perspective and have the necessary competencies. That's because, in addition to the training they receive during their undergraduate periods, teachers need to make up for their deficiencies in order to maintain their profession in a dynamic and responsive way to meet the needs of the society and to train their students in a more qualified way in this direction. Only in this way can they take the leading role in shaping society. From this point of view, it is important to reveal what teachers' views on lifelong learning are.

When the studies on lifelong learning with teachers are examined in the literature the following research are found with the corresponding authors: Doğan and Zeren (2019), the classroom teachers' tendencies of lifelong learning with learned strength; Kabataş and Yılmaz (2018), teachers' lifelong learning tendencies; Erdamar et al. (2017), lifelong learning tendencies of teachers working in high schools and the level of self-efficacy beliefs of educational internet use; Doğan and Çalışkan Toyoğlu (2019), the lifelong learning competences of teachers working in public schools; Yıldırım (2015), the level of classroom teachers' perception of competence related to lifelong learning; Ayaz and Ünal (2016), teachers' lifelong learning tendencies; Kılıç (2014), lifelong learning tendencies of primary education teachers; Ayra and Kösterelioğlu (2015) teachers' lifelong learning tendencies. Apart from these, it is seen that there are many studies on lifelong learning with prospective teachers studying in different departments of the faculty of education (Coşkun & Demirel, 2012). However, no

studies on the perceptions and tendencies of secondary school mathematics teachers in the field of literature studies have been found. Although studies on other teaching areas and professions have been carried out, considering that mathematics teaching is neglected and mathematics is an important tool used in solving many problems encountered in daily life, the lack of research on the perceptions of mathematics teachers towards lifelong learning competencies may be considered as a major deficiency. Therefore, investigating the perceptions of secondary school mathematics teachers towards lifelong learning with a large sample group, will provide an important perspective on the junior high school mathematics teacher in estimating the overall perception towards lifelong learning in Turkey. In this context, this study aims to investigate the perceptions of secondary school mathematics teachers on lifelong learning competencies. For this purpose, answers to the following problems were sought.

1. How is the perception of mathematics teachers towards lifelong learning competencies?
2. How do the perceptions of mathematics teachers towards lifelong learning competencies change by gender?
3. How do mathematics teachers' perceptions of lifelong learning competencies change regarding geographical regions?
4. How do the perceptions of mathematics teachers towards lifelong learning competencies change regarding the type of high school they graduate from?
5. How do the perceptions of mathematics teachers towards lifelong learning competencies change regarding the type of faculty they graduate from?
6. How do the perceptions of mathematics teachers towards lifelong learning competencies change regarding their professional seniority?
7. How do lifelong learning perceptions of mathematics teachers change regarding their professional satisfaction status?
8. How do lifelong learning perceptions change regarding the activities that mathematics teachers participate for their personal and professional development?

Method

Research Model

In this study, which was carried out to examine the perceptions of secondary school mathematics teachers on lifelong learning competencies according to some variables, a correlational survey model was used within the scope of the descriptive method. Correlational survey model is a research approach that aims to describe a situation in the past or present as it exists (Karasar, 2016).

Study Group

In the study, purposeful sampling method aiming to reflect the different characteristics and diversity of individuals in order to illuminate the subject of the study was used (Yıldırım & Şimşek, 2018). The participants of the research consist of secondary school mathematics teachers working in the Ministry of National Education. The variables of gender, high school and faculty, vocational seniority, geographic region where he / she worked, satisfaction status about the teaching profession, personal and professional development of the teachers participating in the study were taken as criteria and maximum diversity was tried to be provided regarding the variables. Information on the distribution of participants taking part in in the research is given in the Table 1 below.

Table 1. Demographic Features of Participants

Participants' Demographic Features		f	%
Gender	Female	206	58.7
	Male	145	41.3
Professional Seniority	1-5 years	104	29.6
	6-10 years	82	23.4
	11-15 years	95	27.1
	16 & above years	70	19.9
Type of High School They Graduate From	Anatolian High School	185	52.7
	Anatolian Teacher Training High School	84	23.9
	High School of Science	4	1.1
	Vocational School	14	4
	Other (Private School)	64	18.2
Faculty They Graduate From	Education	308	87.7
	Art and Science	39	11.1
	Other	3	0.9
Geographical Region	Marmara	43	12.3
	Aegean	35	10
	Mediterranean	49	14
	Middle Anatolia	88	25.1
	Black Sea	39	11.1
	South-East Anatolia	59	16.8
	East Anatolia	37	10.5
Total		351	100

Data Collection Instrument

In the research, "Key Competencies for Lifelong Learning Scale" developed by Şahin, Akbaşlı and Yanpar-Yelken (2010) was used. Cronbach's Alpha reliability coefficient was determined as .77. The scale is a 5-point Likert type scale. It is a scale consisting of 23 items, including eight sub-dimensions which are as following:

1. Communicative Competence at Native Language: Strengthening literacy as a basis for further learning and communication in different societal and cultural contexts, expressing and interpreting thoughts, feelings and facts,

2. Communicative Competence at a Foreign Language: Enhancing the ability to use a variety of languages to be active and better cope with the challenges of today's multilingual and diverse societies,

3. Mathematical Basis Competence at Science and Technology: Focusing on improving acquisition of these competences to nurture scientific understanding,

4. Digital Competence: Strengthening the confident and critical use of digital technology, including coding and programming, safety and citizenship related aspects,

5. The Competence of Learning to Learn: Pursuing and persisting learning in various contexts of life,

6. The Competence of Social Citizenship Awareness: Stressing the importance of democratic participation, European values, sustainable development and media literacy,

7. The Competence of the Sense of Initiative and Entrepreneurship: Enhancing entrepreneurial attitudes to unlock personal potential, creativity and self-initiative,

8. The Competence of Cultural Awareness and Expression: Increasing intercultural skills and the ability to express ideas in a variety of ways and contexts.

Data Collection and Analysis

The analysis of the present study was carried out with the statistical program IBM SPSS Statistics 22. In order to determine whether the dataset was modelled for normal distribution, Kolmogorov-Smirnov normality values were used (.681, .357, etc). As the skewness and kurtosis values were between +1 and -1, the dataset was accepted as normally distributed. Three parametric statistical procedures, which ran on the data collected by means of the scale, were used in data analysis:

1. Descriptive analysis was undergone in order to identify the lifelong learning competency levels of mathematics teachers,

2. Independent-samples t-test was used to find out if there is a difference between the scores of mathematics teachers depending on their genders,

3. One-way analysis of variance (one-way ANOVA) was used to identify the difference of participants depending on the geographical region, the high school and the faculty they graduate from,

professional seniority, professional satisfaction status and the activities the participants take part in for personal and professional development.

4. Tukey test was undergone to compare the results related to the difference among participants depending on professional satisfaction status and the activities the participants take part in for personal and professional development.

Findings

In this section, the results obtained by the analysis of the gathered data were given respectively. Table 2 presenting the minimum and maximum scores, means and standard deviations of mathematics teachers is given below.

Table 2. Minimum and Maximum Scores, Means and Standard Deviations

	N	Min.	Max	\bar{x}	Sd
Total Score of the Scale	350	31	115	93.4	12.58
1st Sub-dimension	350	4	20	18.6	2.38
2nd Sub-dimension	350	4	20	10.5	4.69
3rd Sub-dimension	350	3	15	13.4	1.96
4th Sub-dimension	350	2	10	8.17	1.7
5th Sub-dimension	350	2	10	8.7	1.44
6th Sub-dimension	350	3	15	12.5	2.18
7th Sub-dimension	350	4	20	17.6	2.84
8th Sub-dimension	350	1	5	3.77	.98

As it can be seen in Table 2, the minimum score is 31 and the maximum score is 115. The mean of mathematics teachers' scores is 93.24, which means that mathematics teachers have high levels of the scale "Key Competencies for Lifelong Learning" as their mean is higher than the scale's mid-point. Table 3 shows the independent samples t-test results showing the difference of mathematics teachers' scores regarding their genders.

Table 3. Independent Samples t-Test Results Showing the Gender Difference

Gender	N	\bar{x}	Sd	t	p
Female	206	92.99	12.76	- .443	.657
Male	144	93.59	12.37	- .446	

As regards independent samples t-test results which can be seen in Table 3 no significant difference was observed in participants' scores respected to their gender variables. While the mean of female mathematics teachers' scores is 92.99, the mean of male mathematics teachers' scores is 93.59.

Table 4 presents the total score variance analysis of total score of participants depending on the geographical region they have been working.

Table 4. ANOVA Results Showing the Difference among Mathematics Teachers' Regarding the Geographical Region They Work

	Sum of Squares	Mean Square	df	f	p
Between Groups	1586.80	264.467	6	1.689	.123
Within Groups	53715.04	156.604	343		
Total	55301.84		349		

As shown in Table 4. ANOVA results showed that no significant difference was found in participants' lifelong learning key competence levels respected to the geographical region they have been working. Table 5 shows the total score variance analysis of total score of participants depending on the high school they graduate from.

Table 5. ANOVA Results Showing the Difference among Mathematics Teachers' Scores depending on the High School They Graduate From

	Sum of Squares	Mean Square	df	f	p
Between Groups	136.225	34.056	4	.213	.931
Within Groups	55165.615	159.9	345		
Total	55301.840		349		

In the analysis of the related data, there was found no significant difference between the total score of mathematics teachers depending on the high school they graduate from ($p < 0.05$). Table 6 shows the total score variance analysis of total score of participants depending on the faculty they graduate from.

Table 6. ANOVA Results Showing the Difference among Mathematics Teachers' Scores depending on the Faculty They Graduate From

	Sum of Squares	Mean Square	df	f	p
Between Groups	313.668	156.834	2	.99	.373
Within Groups	54988.172	158.467	347		
Total	55301.804		349		

In the analysis of the related data, there was found a significant difference between the total score of mathematics teachers depending on the faculty they graduate from ($p < 0.05$). Table 7 shows the total score variance analysis of total score of participants depending on mathematics teachers' professional seniority.

Table 7. ANOVA Results Showing the Difference among Mathematics Teachers' Scores depending on the Professional Seniority

	Sum of Squares	Mean Square	df	f	p
Between Groups	40.013	13.338	3		
Within Groups	55261.827	159.716	346	.084	.969
Total	55301.840		349		

As it can be seen on Table 7, there was found no significant difference between the total score of mathematics teachers depending on the faculty they graduate from ($p < 0.05$). Table 8 shows the total score variance analysis of total score of participants depending on mathematics teachers' professional satisfaction status.

Table 8. ANOVA Results Showing the Difference among Mathematics Teachers' Scores depending on the Professional Satisfaction Status

	Sum of Squares	Mean Square	df	f	p
Between Groups	2001.16	667.053	3		
Within Groups	53300.68	154.048	346	4.33	.005
Total	55301.84		349		

In the analysis of the related data, there was found a significant difference between the total score of mathematics teachers depending on their professional satisfaction status ($p < 0.05$). Table 9 indicates the total score variance analysis of sub-dimension scores of participants depending on their professional satisfaction status.

Table 9. ANOVA Results Showing the Difference among Mathematics Teachers' Scores on Sub-Dimensions of the Scale depending on The Professional Satisfaction Status

Sub-Dimension		Sum of Squares	Mean Square	df	f	p
1st	Between Groups	26.393	8.798	3		
	Within Groups	1951.161	5.639	346	1.560	.199
	Total	1977.554		349		
2nd	Between Groups	87.2	29.067	3		
	Within Groups	7609.475	21.993	346	1.322	.267
	Total	7696.674		349		
3rd	Between Groups	70.026	23.342	3		
	Within Groups	1282.331	3.706	346	6.298	.000
	Total	1352.357		349		
4th	Between Groups	35.122	11.707	3		
	Within Groups	984.592	2.846	346	4.114	.007
	Total	1019.714		349		
5th	Between Groups	22.389	7.463	3		
	Within Groups	709.885	2.052	346	3.637	.013
	Total	732.274		349		
6th	Between Groups	56.722	18.907	3		
	Within Groups	1606.547	4.643	346	4.072	.007
	Total	1663.269		349		
7th	Between Groups	139.038	46.346	3		
	Within Groups	2691.316	7.778	346	5.958	.001
	Total					

	Total	2830.354		349		
8th	Between Groups	1.158	.386	3		
	Within Groups	338.011	.977	346	.395	.757
	Total	339.169		349		

As a consequence of the analysis of the related data, there were found significant differences between the scores of mathematics teachers depending on professional satisfaction status in the third and the seventh sub-dimensions ($p < 0.05$). Tukey test was applied to reveal in favour of which group the significant difference occurred depending on key competencies. Table 10 indicates Tukey comparison results related to the difference of groups depending on professional satisfaction status.

Table 10. Tukey Comparison Results Related to Sub-Dimensions Concerning Professional Satisfaction Status

Satisfaction Level		Satisfaction Level	Mean Difference	p
Mathematical Basis Competence at Science and Technology	Highly Satisfied	Satisfied	.89128	.000*
		Partly Satisfied	.50647	.528
		Not Satisfied	-1.00321	.659
	Satisfied	Highly Satisfied	-.89128	.000*
		Partly Satisfied	-.38481	.751
		Not Satisfied	-1.89449	.137
	Partly Satisfied	Highly Satisfied	-.50647	.528
		Satisfied	.38481	.751
		Not Satisfied	-1.50968	.365
	Not Satisfied	Highly Satisfied	1.00321	.659
		Satisfied	1.89449	.137
		Partly Satisfied	1.50968	.365
The Competence of the Sense of Initiative and Entrepreneurship	Highly Satisfied	Satisfied	1.12249	.003*
		Partly Satisfied	.91116	.333
		Not Satisfied	-2.27594	.275
	Satisfied	Highly Satisfied	-1.12249	.003*
		Partly Satisfied	-.21133	.982
		Not Satisfied	-3.39843	.039
	Partly Satisfied	Highly Satisfied	-.91116	.333
		Satisfied	.21133	.982
		Not Satisfied	-3.18710	.085
	Not Satisfied	Highly Satisfied	2.27594	.275
		Satisfied	3.39843	.039
		Partly Satisfied	3.18710	.085

As it has been given in Table 10, significant differences were found among mathematics teachers' scores depending on their professional satisfaction status. Tukey test indicated that these differences were available for the third and the seventh sub-dimensions of the "Key Competencies for Lifelong Learning" ($p < 0.05$). For the third sub-dimension "Mathematical Basis Competence at Science and Technology", significant differences were found among the participants who are satisfied

and highly satisfied of their professions. As it comes to the seventh sub-dimension “The Competence of Sense of Initiative and Entrepreneurship”, significant differences were found among the participants who are satisfied and highly satisfied of their professions. Table 11 shows the total score variance analysis of total score of participants depending on the frequency of the activities they participate for personal and professional development.

Table 11. ANOVA Results Showing the Difference among Mathematics Teachers’ Scores depending on the Frequency of the Activities They Participate For Personal and Professional Development.

	Sum of Squares	Mean Square	df	f	p
Between Groups	4476.232	2238.116	2	15.28	.000
Within Groups	50825.608	146.471	347		
Total	55301.840		349		

As it can be seen on Table 11, there was found a significant difference between the total score of mathematics teachers depending on the frequency of the activities they participate for personal and professional development ($p < 0.05$). Table 12 indicates the total score variance analysis of sub-dimension scores of participants depending on the frequency of the activities they participate for personal and professional development.

Table 12. ANOVA Results Showing the Difference among Mathematics Teachers’ Scores on Sub-Dimensions of the Scale depending on the Frequency of the Activities They Participate for Personal and Professional Development.

Sub-Dimension		Sum of Squares	Mean Square	df	f	p
1st	Between Groups	30.210	15.105	2	2.692	.069
	Within Groups	1947.344	5.612	347		
	Total	1977.554		349		
2nd	Between Groups	205.763	102.881	2	4.766	.009
	Within Groups	7490.911	21.588	347		
	Total	7696.674		349		
3rd	Between Groups	33.502	16.751	2	4.407	.013
	Within Groups	1318.855	3.801	347		
	Total	1352.357		349		
4th	Between Groups	73.655	36.828	2	13.508	.000
	Within Groups	946.059	2.726	347		
	Total	1019.714		349		
5th	Between Groups	44.893	22.447	2	11.331	.000
	Within Groups	687.381	1.981	347		
	Total	732.274		349		
6th	Between Groups	83.982	41.991	2	9.226	.000
	Within Groups	1579.286	4.551	347		
	Total	1663.269		349		
7th	Between Groups	270.329	135.165	2	18.321	.000
	Within Groups	2560.025	7.378	347		
	Total	2830.354		3049		
8th	Between Groups	16.190	8.095	2	8.697	.000
	Within Groups	322.979	.931	347		
	Total	339.169		349		

As a consequence of the analysis of the related data, there were found significant differences between the scores of mathematics teachers depending on the frequency of the activities they participate for personal and professional development in the fourth, the fifth, the sixth, the seventh and the eighth sub-dimensions ($p < 0.05$). Tukey test was applied to reveal in favour of which group the significant difference occurred depending on key competencies. Table 13 indicates Tukey comparison results related to the difference of groups depending on the frequency of the activities they participate for personal and professional development.

Table 13. Tukey Comparison Results Related to Sub-Dimensions Concerning the Frequency of the Activities They Participate for Personal and Professional Development

Satisfaction Level	Satisfaction Level	Mean Difference	p	
Digital Competence	Always	Sometimes	.95471	.000*
		Never	1.07604	.215
	Sometimes	Always	-.95471	.000*
		Never	.12133	.980
	Never	Always	-1.07604	.215
		Sometimes	-.12133	.980
The Competence of Learning to Learn	Always	Sometimes	.75169	.000*
		Never	.32834	.820
	Sometimes	Always	-.75169	.000*
		Never	-.42335	.713
	Never	Always	-.32834	.820
		Sometimes	.42335	.713
The Competence of Social Citizenship Awareness	Always	Sometimes	1.01016	.000*
		Never	1.32719	.246
	Sometimes	Always	-1.01016	.000*
		Never	.31703	.921
	Never	Always	-1.32719	.246
		Sometimes	-.31703	.921
The Competence of the Sense of Initiative and Entrepreneurship	Always	Sometimes	1.81164	.000*
		Never	2.39286	.062
	Sometimes	Always	-1.81164	.000*
		Never	.58121	.843
	Never	Always	-2.39286	.062
		Sometimes	-.58121	.843
The Competence of Cultural Awareness and Expression	Always	Sometimes	.44808	.000*
		Never	.49309	.387
	Sometimes	Always	-.44808	.000*
		Never	.04501	.992
	Never	Always	-.49309	.387
		Sometimes	-.04501	.992

As it has been given in Table 13, significant differences were found among mathematics teachers' scores depending on the frequency of the activities they participate for personal and

professional development in the fourth, the fifth, the sixth, the seventh and the eighth sub-dimensions. In the fourth sub-dimension “Digital Competence”, significant differences were found among the participants who sometimes take part in the activities for personal and professional development and those who always do so. The results related to the fifth sub-dimension “The Competence of Learning to Learn” indicated that significant differences were found among the participants who sometimes take part in the activities for personal and professional development and those who always do so. In the way of the sixth sub-dimension “The Competence of Social Citizenship Awareness”, significant differences were found among the participants who sometimes take part in the activities for personal and professional development and those who always do so. For the seventh sub-dimension “The Competence of Sense of Initiative and Entrepreneurship”, significant differences were found among the participants who sometimes take part in the activities e for personal and professional development and those who always do so. The results regarding the eighth sub-dimension “The Competence of Cultural Awareness and Expression” showed that significant differences were found among the participants who sometimes take part in the activities for personal and professional development and those who always do so.

Results and Discussion

The results obtained from the research can be summarized as following:

- The mathematics teachers participated in the research had high level of lifelong learning competencies.

- No significant difference was found in mathematics teachers’ scores of lifelong learning competencies as regards their genders, the high schools they graduated from, the faculty they graduated from, the geographical region where they have been working and professional seniority.

- A significant difference was found in mathematics teachers’ scores of lifelong learning competencies as regarding their professional satisfaction status. Significant differences were found among the participants who were satisfied and highly satisfied of their professions in the sub-dimensions titled “Mathematical Basis Competence at Science and Technology” and “The Competence of Sense of Initiative and Entrepreneurship”.

- A significant difference was found in mathematics teachers’ scores of lifelong learning competencies related to the frequency of the activities they participate for personal and professional development. Significant differences were found among the participants who sometimes take part in the activities for personal and professional development and those who always do so in the sub-dimensions titled “Digital Competence”, “The Competence of Learning to Learn”, “The Competence of Social Citizenship Awareness”, “The Competence of Sense of Initiative and Entrepreneurship” and “The Competence of Cultural Awareness and Expression”.

In order to fulfil present and future needs of the ever-changing world, societies require globally competent teachers capable of applying knowledge and deploying skills. As such, teachers are supposed to have effective lifelong learning skills and abilities to self-regulate and adapt to changing ideas and settings. This may require making curricular opportunities for generic skills development more transparent and explicit. Teachers sometimes have difficulty to recognise opportunities to develop generic skills during their work life. The present study has revealed that the secondary school mathematics teachers participated in the research have high level of life-long learning competencies, which has been a desired objective for future societies. Similarly, Kurt, Cevher ve Arslan (2019) found out that Turkish teacher candidates had a high average in all sub-dimensions. In the study undergone by Doğan ve Çalışkan Toyoğlu (2019), the lifelong learning competencies of teachers working in state schools were tried to be found out. They stated that teachers had positive views on communicative competence at native language, communicative competence at a foreign language, mathematical basis competence at science and technology, digital competence, the competence of learning to learn and competence of sense of initiative and entrepreneurship. However, they had negative views as a result of the physical inadequacies of schools, the lack of interest of school stakeholders, and the complex notion of lifelong learning. Lifelong learning holds the potential to change the public's entire understanding of education. It will provide an awareness that education and training are continuing processes, without, however, being diverted from the need to make special efforts for younger people (European Commission Study Group, 1997).

Similar to the results of the present study, Yıldırım (2015) found out that teachers' perceptions of competence are at a high level in the study aiming at determining the level of perceptions of classroom teachers' competence pertaining to lifelong learning and getting their views on lifelong learning. In his study with primary school teachers, Kılıç (2014) stated that teachers had high levels of lifelong learning tendencies. Moreover, Ayra and Kösterelioğlu (2015) found that teachers had high levels of lifelong learning tendencies. When the related literature has been reviewed, it can be reliazed that there are a lot of studies supporting this result of the study (Demiralay, 2008, Gencil, 2013, Oral and Yazar, 2013, Konakman and Yelken, 2014, Doğan and Kavtelek, 2015). However, Tunca, Şahin ve Aydın (2015) stated that teachers had low levels of lifelong learning tendencies.

As the whole development of teachers is an undeniable principle for educational institutions to train others as active citizens, they should be presented opportunities in all domains of life. The study has also tried to highlight the significance of empirically investigating the effects of various variables on lifelong learning competencies of mathematics teachers. The results of the analysis presented in the current study provide support to the hypothesis gender do not have significant and positive impact on lifelong learning competencies of secondary school mathematics teachers. Similarly, in the study carried out by Kabataş ve Yılmaz (2018), it was emphasized that teachers' lifelong learning attitudes do not differ significantly by gender. There are also a lot of studies supporting the view that gender

does not constitute a significant role in lifelong learning competencies (Oral ve Yazar, 2015; Savuran, 2014; Tunca, Alkın-Şahin ve Aydın, 2015; Yaman ve Yazar, 2015). This may also be inconsistent with the results of study done by Özçiftçi ve Çakır (2015) finding out that female teachers have a higher level of lifelong learning tendencies than male teachers. Moreover, Gencil (2013) stated that the pre-service teachers' perceptions of lifelong learning competencies are higher than the male teacher candidates. On the other hand, Coşkun and Demirel (2012) found that male pre-service teacher higher levels of lifelong learning tendencies than female pre-service teachers.

In the study, there was found to be no significant difference among the lifelong learning competency levels of mathematics teachers regarding the high schools they graduated from, the faculty they graduated from, the geographical region where they have been working and professional seniority. In her study with undergraduates, Scheuch (2007) stated that the effects of classification (seniors versus juniors) are evident in the increased likelihood of overall participation of seniors and the types of activities in which they participated. She also claimed that students studying in the upper classes participated in research activities more than the students in lower grades. Coşkun (2009) found out no significant difference among the lifelong learning tendencies of pre-service teachers depending on their grades. It is perhaps not surprising that there is no significant difference among the participants in line with their lifelong learning competencies, since the concept of lifelong learning consists various competencies in its all sub-dimensions.

An important finding of the study was that mathematics teachers' lifelong learning competencies differed depending their professional satisfaction status and the frequency of the activities they participate for personal and professional development. With this in mind, it can be said that lifelong learners find the best resources they need, therefore they can learn. A setting that provides, stimulates, brings into their insights may be realized easily and used by them, since they find every experience worthwhile. Accordingly, lifelong learning competencies have been indispensable principles for teachers as well as all learners.

Recommendations

All these findings signal the need for further empirical research that seeks to investigate the casual relationships among the multiple dimensions of lifelong learning, since learning is a dynamic and continuous process. Research that can be fulfilled with teachers from different branches can be suggested in order to get ahold of an overview on teachers' lifelong learning competencies. With respect to the results of the present study, it can be recommended that both formal, informal and non-formal applications at different levels of schools where teachers work are necessary for developing lifelong learning competencies in order to enhance sustainable development.

References

- Akbaş, O. and Özdemir, S.M. (2002). Lifelong learning in the European Union. *Journal National Education*, (156), 112- 126.
- Ayaz, C. and Ünal, F. (2016). The analysis of lifelong learning tendencies of teachers in terms of some variables. *The Journal of International Social Research*, 9(44), 847-856.
- Ayra, M. and Kösterelioğlu, İ. (2015). The relationship between teachers' lifelong learning tendencies and their perceptions of professional self-efficacy. *NWSA: Education Sciences*, 10(1), 17-28.
- Bağcı, E. (2011). Lifelong education policies in Turkey in the process of Evropean Union Membership. *Ondokuz Mayıs University Journal of Faculty of Education*, 30(2), 139-173.
- Coşkun, Y. D. (2009). *Investigation of lifelong learning tendency of undergraduate students? In terms of some variable*. (Unpublished Doctoral Thesis). Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.
- Coşkun, Y. D. and Demirel, M. (2012). Lifelong learning tendencies of üiversity students. *Hacettepe University Journal of Education*, 42, 108-120.
- Demiralay, R. (2008). *An evaluation of student teachers' information literacy self-efficacy in point of usage of information and communication technologies* (Unpublished Master Thesis). Gazi University Institute of Educational Sciences, Ankara.
- Demirel, M. (2009). Lifelong learning and technology. *9th International Educational Technology Conference*, Ankara.
- Demirel, M. and Yağcı, E. (2012). Perceptions of primary school teacher candidates about lifelong learning *Hacettepe University Journal of Education*, 1, 100-111.
- Dogan, E. and Zeren, Ş.G. (2019). Classroom teachers' learned difficulties and lifelong learning trends. *Yıldız Journal of Educational Research*, 4(1), 22-37.
- Doğan, S. and Çalışkan Toyoğlu, A. (2019). Lifelong learning competencies in schools: a case study. *Electronic Journal of Social Sciences*, 18(71), 1325-1348.
- Doğan, S. and Kavtelek, C. (2015). Perceptions of lifelong learning İnstitution administrators about lifelong learning. *Abant İzzet Baysal Üniversity Journal of Faculty of Education* 15(1), 82-104.
- Erdamar, G. & Demirkan, Ö. & Saraçoğlu, G. and Alpan, G. (2017). The relationship between high school teachers' life-long learning tendencies and their educational internet use self-efficacy beliefs. *Abant İzzet Baysal Üniversity Journal of Faculty of Education*, 17(2), 636-657.
- European Commission Study Group on Education and Training. (1997). *Accomplishing Europe through education and training*, Brussels.

- European Commission (2018). Proposal for a council recommendation on key competences for lifelong learning, retrieved April 30, 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018SC0014&from=EN>
- Gencil, İ. E. (2013). Prospective teachers' perceptions towards lifelong learning competencies. *Education and Science*, 38(170), 237-252.
- Güleç, İ.& Çelik, S. and Demirhan, B. (2012). What is lifelong learning? An evaluation on definition and scope. *Sakarya University Journal of Education*, 2(3), 34-48.
- Jarvis, P. (2004). *Adult education and lifelong learning: Theory and practice*. Routledge.
- Kabataş, S. and Yılmaz, F. G. K. (2018). Evaluation of teachers' lifelong learning attitudes in terms of self-efficacy towards the standards of educational technology. *Bartın University Journal of Faculty of Education*, 7(2), 588-606
- Karasar, N. (2016). *Scientific research method*. Ankara: Nobel Academic Publishing.
- Kılıç, Ç. (2014). Pre-service teachers' perceptions towards lifelong learning. *Journal of Research in Education and Teaching*, 3(4), 79-87.
- Konokman, G.Y. and Yelken, T.Y. (2014). The perceptions of academicians in education faculties on their lifelong learning competencies. *Hacettepe University Journal of Education*, 29(2), 267-281.
- Kurt, E. & Cevher, T.Y. and Arslan, N. (2019). Pre-service Turkish teachers' tendencies towards lifelong learning. *Trakya Journal of Education*, 9(1), 152-160.
- Ministry of Education (2008) *General competences of the teaching profession*. http://otmg.meb.gov.tr/belgeler/ogretmen_yeterlikleri_kitabi/%C3%96%C4%9Fretmen_Yeterlikleri_Kitab%C4%B1_genel_yeterlikler_par%C3%A7a_2.pdf
- Ministry of Education (2014). Turkey lifelong learning strategy document for 2014-2018. <http://abdigm.meb.gov.tr/projeler/ois/013.pdf>
- Oral, B. and Yazar, T. (2015). Examining the perception of prospective teachers about life-long learning in terms of various variables. *Electronic Journal of Social Sciences*, 14(52), 1-11.
- Özçiftçi, M. and Çakır, R. (2015). Teachers' lifelong learning trends and self-efficiencies about the educational technology standards. *Educational Technology Theory and Practice*, 5(1), 1-19.
- Özden, Y. (2013). *New values in education: Transformation in education*. Ankara: Pegem Academy.
- Savuran, Y. (2014). *Life-long learning competencies of prospective English language teachers in comparison with their mentors* (Unpublished Master Thesis). Hacettepe University Graduate School of Educational Sciences, Ankara.
- Scheuch, K.L. (2007). *Faculty research orientation, undergraduate research activities and student outcomes* (Unpublished Doctoral Dissertation). Florida State University, Florida.

- Şahin, M. & Akbaşlı, S. & Yanpar, T.Y. (2010). Key competences for lifelong learning: the case of prospective teachers. *Educational Research and Review*, 5(10), 545-556.
- The World Bank. (2003). *Lifelong learning in the global knowledge economy: Challenges for developing countries*. A World Bank Report, The World Bank, Washington, D.C.
- Tunca, N. & Alkin Ş. S. and Aydın, Ö. (2015). Lifelong learning tendencies of pre-service teachers. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 11 (2). 432-446.
- Yaman, F. (2014). *Investigating of lifelong learning tendency of teachers (The example of Diyarbakır)* (Unpublished Master Thesis), Dicle University Institute of Educational Sciences, Diyarbakır.
- Yaman, F. and Yazar, T. (2015). Investigating of lifelong learning tendency of teachers (The example of Diyarbakır). *Kastamonu University Kastamonu Education Journal*, 23(4), 1553-1566.
- Yıldırım, Z. (2015). *Classroom teachers' perceptions and opinions about competence for lifelong learning* (Unpublished Master Thesis). Çanakkale Onsekiz Mart University Institute of Educational Sciences, Çanakkale.
- Yıldırım, A. and Şimşek, H. (2018). *Qualitative research methods in the social sciences*. Ankara: Seçkin Publishing
- Yıldırım, Z.; Genc, S. Z. & Eryaman, M. Y. (2016). The Views of Primary School Teachers Towards Lifelong Learning. *Route Educational and Social Science Journal*. 3(1), 337-350
- Yıldız Durak, H. and Şahin, Z. (2018). Investigation of the contribution of coding training in teaching candidates to the development of lifelong learning competencies. *Journal of Ege Education Technologies*, 2(2), 55-67.