Developing metacompetence in future primary school teachers

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Abstract

The general aim of this study is to determine the development of meta-competences of future primary school teachers. The research was carried out in the fall semester of 2021-2022. The research consisted of 362 volunteer primary school teachers who continue to work in various schools in Kazakhstan. The data collected for the quantitative method in the research through an online questionnaire were analyzed using the SPSS program. Thanks to this wide participation, the meta-competence status of distance education and primary school teachers were emphasized and described. The results demonstrated that the use of innovative education with the blended learning method provides a better understanding of the lesson and that thanks to the meta-competence model of education, a bond is formed between the students who take the course. Finally, it is thought that the repetition of these studies with different methods for primary school teachers will benefit both the field, the educator, and the future primary school teacher candidates.

Keywords: Corona Virus (COVID 19); Distance Education; Meta Competence; Pandemic; Technology.

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1. Introduction

It is known that the global social economy is based on innovative and competitive innovation, and the developments in information-communication technologies, education systems, and teachers, need to adapt to the processes (Oz et al., 2021). In today's age, which is also expressed as being able to continue life, primary school students have the skill to develop the world. They need to have an added advantage (Zárate-Moedano et al., 2021). Today, it is known that education is necessary to acquire globally recognized "skills" starting from an early age so that countries do not fail in the global race. In this context, schools in primary schools should also prepare themselves for these skills (Uzunboylu et al., 2021). It is known that the first step of the change that will take place in primary schools in today's years will be implemented in the curricula.

At the time of education, the various dimensions in teaching should be handled simultaneously and intertwined with technology (Abilgaziyeva et al., 2021). These features expected in individuals are related to meta-learning, which is a dimension of the 21st-century education structure (Williams et al., 2021). Meta-competence or learning to learn, meta-learning together with the science of learning with the help of technology systematically, covers metacognitive skills but is thought to express a broader feature. Meta-competence has a two-dimensional structure: metacognition and mind development (Ozcinar et al., 2021). Ozcinar et al., (2021) developed the definition of meta-competence as the individual's knowledge of his cognitive processes and using this knowledge to control his cognitive processes. It has a variable structure and can change with several efforts and activities (Silva Pacheco, 2020). Therefore, mind-enhancing approaches and activities in primary schools should be integrated into the teaching activities process.

Behavior management strategies used by teachers in classroom methods in primary schools are classified as a reactive, precautionary, developmental, holistic, and reactive strategies. This includes the reactions developed by the teacher against student behaviors. The precautionary strategy includes measures to prevent the occurrence of undesirable student behaviors. The developmental strategy includes the behaviors developed by the teacher according to the biological, psychological, social, and moral development characteristics of the student (Law, 2021). Holistic strategies, on the other hand, include multifaceted behaviors that include the combination of reactive, precautionary, and developmental strategies. It is seen that there are many studies on the effect of technology on learning. However, considering that every scientific research has a limitation (from the sample, researcher, possible errors in data analysis, or research method), new studies are needed to support the results obtained (Yildiz et al., 2020).

Each scientific result is expected to fill a gap in the literature and also to shed light on future research. In this context, with the increase in computer technologies and gamification databases in recent years, it is seen that the number of scientific research has increased and this research has become more accessible (Elsayed et al., 2020). This situation has directed the attention of researchers to meta-analysis studies. Meta-analysis is a statistical process that provides inferences by combining the quantitative findings of various studies focusing on a common problem or issue.

Today, technology and industry are inseparable elements of contemporary social culture (Hammoudi et al., 2021). This contemporary formation affects education theoretically, functionally, and structurally. The economic dimension gains importance in the contemporary understanding of education, which is in the process of differentiation with its individual, social and economic dimensions (Sacramento et al., 2021). This situation is the natural result of the modernization attempts of societies, the need to develop the industrialization process and use advanced technology. The role of teachers is at the forefront in

schools that transform according to their expectations with today's technology. In addition, the concept of metacognition, which is closely related to the problem-solving process, is an important point in mathematics education (Klasnic et al., 2021). Therefore, examining the meta-efficacy and technology levels of primary school teacher candidates emerges as a subject that needs to be investigated.

1.1. Related Studies

Zhanadilova and Zhumabaeva (2021), in their study, aimed to address the ways of forming the upper competencies of future primary school teachers, and as a result, thinking culture, synthesis, information analysis, application of cognitive methods and tools, intellectual development, education and self-management, and professional development students' interest. In this context, meeting the educational needs of future teachers in acquiring some additional knowledge and skills is considered a real vocational education problem in the University.

Vershinina et al. (2020) aimed to identify the basic competencies that foreign language teachers should develop to manage simultaneous online teaching. In the research, they concluded that communicative competence is seen as a universal interprofessional meta-competence that presents specific tasks aimed at developing practical communication skills, which should be developed first and foremost through philologically oriented subject areas.

Nadolinskaya et al. (2021), carried out a study aiming to reveal the basic features of teachers' professional competencies as the highest level of competence by scanning the literature, and as a result, they concluded that there are courses that state that technology serves this purpose. It is thought that the above-mentioned high-level and meta-competence elements will contribute to future research and this research.

In the study of Komkova et al. (2021), university teachers, interpreted as supra-subject foundations, aimed at the effectiveness of a university graduate's greater self-actualization in a particular field of professional activity, and as a result, the Experiment aimed to examine the effect of research work in a foreign language on science. They concluded that the formation of teachers' upper competencies is high.

1.2. Purpose of the study:

This study was aimed to determine the development of future primary school teachers' meta-competencies, and the answers to the following questions were sought for the determined general purpose.

1. What is the technology usage situation of primary school teachers?

2. How are primary school teachers' time for distance education?

3. What is the purpose of primary school teachers' computer and internet use?

4. What are primary school teachers' meta-efficacy views according to gender variables?

5. What are primary school teachers' views on meta-efficacy and distance, before and after study?

2. Method

2.1 Research Model

The descriptive method was used in the research. This method is used in studies to describe and explain events, objects, entities, ideas, major groups, and various fields. They are also used to illuminate a situation, evaluate and define the relationship between events (Uzunboylu et al., 2020).

2.2 Working Group/Participants

The research was carried out in the fall academic year of 2021-2022. The data of the research consisted of 362 primary school teachers who continue their studies in Kazakhstan. All primary school teachers continue their lessons with distance education.

2.3 Data Collection Tools

When the data collection tool part is considered, it is seen that it is a measurement tool developed by the people who created the problem situation of the research within the research. The measurement tool, on the other hand, was examined by experts in the field of primary school teaching and technology, and the unsuitable items were removed from the research and corrected. A personal information form called the "Meta Competence" measurement tool was applied to primary school teachers and developed by the researchers was used. The content validity of the developed measurement tool was examined by experts with the title of 5 professors working on meta-efficacy and distance education, and unnecessary items were removed from the measurement tool and rearranged.

1. Personal Information Form (Demographic Data): In the personal information form; Information such as age, gender, technology use, and the use environments of daily distance education are included.

2. Meta Sufficiency Measurement Tool: A 5-point Likert-type questionnaire was prepared to get information about meta proficiency and Distance Education views. 18 items of the measurement tool consisting of 20 items in total were used and 2 items were removed from the measurement tool thanks to expert opinion. Primary school teachers' opinions were sought from two factorial dimensions, namely "Meta Competence" and "Distance Education". The Cronbach Alpha reliability coefficient of the measurement tool as a whole was calculated as 0.92. Measuring tool; "strongly disagree" (1), "disagree" (2), "undecided" (3), "agree" (4), and "strongly agree" (5). The measurement tool was also collected from primary school teachers in the form of an online environment.

2.4. Procedure

In the application part of the research study, 362 volunteer primary school teachers who continue to work in various schools in the Kazakhstan region were selected by the researchers and it was planned to prepare live events with the help of Microsoft teams video conferencing program. It was prepared with a conference application program and this activity was organized by showing the education environment to experts in the field. When the activity part of the research is finished, it is planned to show meta-competence, videos, and content for primary school teachers for distance education. Within 4 weeks of training, primary school teachers will be able to offer life lessons on field courses "use of distance education", "meta competence" etc. during the pandemic process. Information such as distance education was given to primary school teachers in the form of distance education and primary school teachers were expected to participate every week on this subject. After the 4-week training, the

online measurement tool and information form were applied to the primary school teachers, and the data were given in tables in the findings section. Education at most universities

Distributed as 3 sections over the Microsoft Teams video conferencing application program used by the students, and each determined section has been arranged to be distributed over weeks to be limited to a maximum of 125 primary school teachers, each training program has been processed in a total of 60 minutes, 45 minutes of which are training and 15 minutes of which are questions and answers, In the case of online education, primary school teachers were expected to participate in the education by using devices such as tablets, phones, and computers with video and microphone. The measurement tool applied to primary school teachers was collected using an online questionnaire and transferred to the spss program by coding in the computing software environment.

2.5 Analysis of Data

In the analysis part of the data, statistical data obtained from primary school teachers were analyzed in the Statistics program by using frequency (f), percentage (%), mean (M), standard deviation (SD), t-test, respectively. The numerical values of the data obtained from the program are given in tables, accompanied by comments in the findings section.

3. Results

In this section, the findings regarding the meta-competence and technology use of primary school teachers are included, each data of the research is given in tables and presented in this section with comments.

3.1. Demographic Information

3.1.1. Gender

In this section, the distinctions of primary school teachers by gender are given in Table 1.

Table 1: *Distribution of Primary School Teachers by Gender Variable*

Gender	Male		Female	
	F	%	F	%
Variable	184	50.83	178	49.17

As can be seen in Table 1, the distribution of the primary school teachers participating in the research according to the gender variable was determined and the information was examined and added to table 1, in this context, 50.83% (184 people) of primary school teachers were male primary school teachers, while 49.17% (178 people) are female primary school teachers. In the gender section, the findings reflect the actual gender distribution.

3.1.2. *Technology Usage Times of Primary School Teachers*

In this section, the situations according to the daily technology usage periods of primary school teachers regarding distance education environments during the pandemic were investigated and examined. Detailed information is given in Table 2.

Table 2: *Distribution of Primary School Teachers' Time to Use Technology*

Technology Usage	1-2 Time		3-4 Time		5 or more hours	
	F	%	F	%	F	%
Variable	32	8.84	242	66.85	88	24.31

When Table 2 is examined, the use cases of primary school teachers regarding their daily use of technology during the distance education process are examined and detailed information is given in Table 2, it is also known that it is important for them to continue to know this time meta-competence level, in this context, table 2 is examined. time, 8.84% (32 people) stated that they use technology for 1-2 hours, 66.85% (242 people) stated that they use technology between 3-4 hours and finally 24.31% (88 people) 5 In this context, it is seen that primary school teachers prefer 2-4 hours or more of daily technology use during the pandemic process.

3.1.3. *Time for Primary School Teachers to Spend Time on Distance Education*

In this section, the situations regarding the time spent by primary school teachers for distance education during the pandemic were investigated and examined according to the daily usage periods. Detailed information is given in Table 3.

Table 3: *Time of Primary School Teachers Allocating Time to Distance Education*

Distance Education Spending Time	1-2 Time		3-4 Time		5 or more hours	
	F	%	F	%	F	%
Variable	27	7.46	125	34.53	210	58.01

When Table 3 is examined, the usage situations that primary school teachers use daily during their time for distance education are examined and detailed information is given in Table 3. While expressing that they allocate time for distance education, 34.53% (125 people) stated that they spare time for distance education in the range of 3-4 hours, and finally, 58.01% (210 people) stated that they spare time for distance education for 5 hours or more. During the pandemic process, it is seen that primary school teachers prefer the most daily distance education usage amount of 5 hours and above.

3.1.4. *Age Status*

In this section, the age information of the primary school teachers in the study group was examined and detailed information is given in Table 4.

Table 4: *Distribution of Primary School Teachers by Age*

Age	24-26		27-31		32 and above	
	F	%	F	%	F	%
Variable	295	81.49	52	14.36	15	4.15

When Table 4 is examined, the distribution of primary school teachers in the study group according to their age has been taken into consideration, and the relevant information according to the age scale has been added to the table. In this context, when table 4 is considered, 81.49% (295 people) are between the ages of 24-26, 14.36% (52 people) are between the ages of 27-31 and finally, 4.15% (15 people) are 32. and above age range. In the age status section, the findings reflect the actual distribution.

3.2. *Primary School Teachers' Computer and Internet Usage Purposes*

Computer and internet usage purposes of primary school teachers were investigated, and detailed information is given in Table 5.

Table 5: *Demographic information of primary school teachers on innovative education*

Variable		F	%
Computer and Internet Usage Purpose	Distance Education	177	48.89
	Meta Competence	150	41.44
	Other	35	9.67
	Total	**362**	**100**

When Table 5 is examined, primary school teachers' computer and internet usage purposes were researched according to the research problem, and it was seen that the relevant information was added to the table. In this context, 48.89% (177 people) chose distance education, 41.44% chose Meta competence. 9.67% (35 people) chose the other field. In this context, it can be said based on table 5 that most of the segments tend to the problem situation according to the problem situation of the research.

3.3. *Meta Sufficiency Status of Primary School Teachers by Gender Variable*

In this section, the comparison of the data obtained from the research with the meta-competence status of primary school teachers was made according to the gender variable and detailed information is given in Table 6.

Table 6: *Meta Sufficiency Status of Primary School Teachers by Gender Variable*

Meta Competence States	Gender	N	*M*	SD	Df	t	p
	Male	184	4.52	0.17	362	-480	.422
	Female	178	4.48	0.19			

When Table 6 is examined, primary school teachers' meta-competence status according to gender variable was examined and it was seen that there was no significant difference according to gender criteria. [t480]= -422, p<.05]. When the meta-competence status of primary school teachers is examined, it is seen that male primary school teachers have an average score of this area (M=4.52), while female teachers have an average score of meta-competence (M=4.48). In this context, it can be said in the findings part of the research that there is no difference between male primary school teachers' meta proficiency scores compared to female teachers in this study, and that they are higher.

3.4. *Primary school teachers' views of meta-efficacy and technology education before and after study*

Table 7: *Primary school teachers' views on meta-efficacy and technology education before and after the study (Pretest – Posttest)*

No	Variable	Pre-Test-1		Post-Test-2				
		M	SS	M	SS	df	t	p

1	I can generate new ideas with meta-competence training	3.52	0.91	4.52	0.55	362	-4.845	.000
2	When I generate ideas with meta competence, my interest in the field increases.	3.48	0.81	4.55	0.63	362	-5.485	.000
3	I would be happy to combine it with Meta proficiency training in my lessons.	3.39	0.81	4.43	0.59	362	-3.889	.000
4	I can better understand meta-competence education through technology	3.52	0.82	4.61	0.63	362	-4.392	.000
5	I work harder to be successful in class thanks to meta-competence training	3.55	1.00	4.48	0.61	362	-4.005	.000
6	I have the opportunity to learn about meta-competence concepts.	3.53	0.87	4.52	0.63	362	-5.669	.000
7	I can express my ideas very easily with the help of technology in meta-competence education.	3.69	0.85	4.55	0.63	362	-4.292	.000
8	I watch meta proficiency and tech videos over and over	3.68	0.91	4.58	0.69	362	-3.821	.000
9	I would like to see meta proficiency training classes in different courses	3.78	0.69	4.52	0.60	362	-3.710	.000
10	I can connect to the meta proficiency training from any smart device	3.73	0.83	4.55	0.73	362	-3.648	.000
11	Meta proficiency and technology training allows me to do it again	3.65	0.79	4.65	0.74	362	-3.593	.001
12	Meta proficiency education allows me to improve myself.	3.69	0.91	4.54	0.66	362	-4.028	.000
13	With meta proficiency training, my old habits against the field became different.	3.51	0.81	4.59	0.59	362	-5.787	.000
14	Meta proficiency training takes more responsibility to be more successful in classrooms	3.77	1.02	4.60	0.54	362	-4.597	.000
15	The use of meta-competence education with the blended learning method allows me to better understand the lesson.	3.77	0.76	4.43	0.63	362	-4.249	.000
16	I have a positive bond with my students, thanks to meta-competence and technology education.	3.47	0.93	4.53	0.55	362	-6.248	.000
17	With technology education, I can easily get used to any idea.	3.72	0.80	4.41	0.59	362	-4.260	.000
18	It is fun to study in the classes I attended with technology education.	3.60	0.95	4.56	0.50	362	-5.685	.000
	Overall Average	3.58	0.85	4.42	0.65	362	-4.611	.000

As seen in Table 7, it is seen that the pretest-posttest results about meta-competence and technology are included. It is seen that the posttest and posttest scores are higher than the pretest and there is a significant difference (p<0.005). Although there is a significant difference in all expressions, according to the post-test results, one of the most prominent expressions of primary school teachers is "I take more responsibility to be more successful in meta-competence education classes", while the mean score of M=4.60 is M=3.77 in the pre-test. Secondly, in the post-test, one of the most prominent expressions of primary school teachers, "Meta-competence and technology education gives me the opportunity to do it again" was M=4.60, while the pre-test evaluation result was M= 3.65. In addition, among the statements "I understand meta-competence education better

thanks to technology", it is seen that the post-test score average is M=4.61, while the pre-test score average is M=3.52.

Although positive results were seen in each item of the research, among the opinions of primary school teachers, "I watch meta-proficiency and technology videos over and over" post-test mean score was M=4.58, while pre-test M=3.68. appears to be. In addition, among the opinions of primary school teachers, "My interest in the field increases when I generate ideas with meta-competence", while the post-test mean score is M=4.55, while the pre-test means the score is M=3.48. In addition, it is seen that the post-test scores of "I find the opportunity to learn the opportunities to learn the concepts of meta-competence" among the opinions of primary school teachers are M = 4.52, while the average of the pre-test score is M = 3.53. Finally, primary school teachers' post-test averages are M=4.42, while pre-test averages are M=3.58. Table 7 shows that primary school teachers' meta-competence and technology education and their ideas have improved positively.

4. Discussion

In their study, Amirova et al. (2020) aimed to provide a comprehensive examination of creative and research competence as a factor of vocational training of future teachers from the perspective of learning technology, and as a result, for the future profession and teachers of the future, besides mastering specialized knowledge, various pedagogical It is necessary to be creative in solving technological problems. They concluded that the creative competencies of future teachers play a very important role in their future professional lives, it was concluded that primary school teachers' meta-efficacy findings are high, among the results of the research, the high level of information and meta-competence of future teachers and now primary school teachers will always increase their education one step higher. is considered.

In the study of Beloglazova et al. (2020), they aimed to focus on ICT-based competence development issues as a basic component in the vocational education system of their teachers, and as a result, they concluded that they specified professional meta-competence and skill development programs implemented in the distance teaching-learning format, among others. In addition, it is thought that, in addition to theoretical analysis, synthesis, classification and generalization, pedagogical planning method, our determination and updating of the curriculum, and reporting changes in the curriculum structure will always benefit primary school teacher candidates and teachers. It is known that distance education, which combines with education technologically, adds innovation to its field day by day, and in this context, it is thought that such studies will always benefit the literature and researchers.

In their study, Zhao et al. (2021) aimed to store and analyze existing research on digital competence in higher education environments by systematically scanning the literature. As a result, higher education institutions have achieved positive results such as encouraging students and teachers to focus on developing their digital competence, creating appropriate learning strategies, and using appropriate tools to improve the quality of education. It was also found that primary school teachers enjoyed the distance education system and followed it during the 4-week education period. In this context, the findings in the discussion part of the research are important for the study because it is seen that there are not many studies in the literature about meta-competence and technology education. The fact that primary school teachers have to receive their education online during the pandemic period is not a disadvantage for education, but an advantage for meta-competence education and technology. It is thought that more studies on meta-competence education will strengthen these concepts.

5. Conclusion

It is seen that education is being replaced by new models with each passing day. The new models benefit both primary school teachers and students. The concept of education everywhere is increasing day by day and it is aimed to make education more understandable. According to the results of the research, it was found that the primary school teachers participated as 184 men and 178 women. The use of technology is always developing day by day and it is seen that its use is widespread. In this context, another result of the research is the use of technology by teachers during the distance education process daily, and as a result, it has been concluded that primary school teachers use it for 2-4 hours or more. The concept of distance education and technology has always adopted its place in education, and it is seen in every study that it gains meaning, primary school teachers need to give positive results with distance education, in this context, the results of the research include the use cases that primary school teachers use daily during their time for distance education. In this context, it can be said that the high level of technology and distance education is directly proportional to the problem of the research.

Age is particularly important for primary school teachers to provide education and support to the new generation, the fact that the age scale is small to provide education to the new generation, called the z generation, means that education can be given well. Relevant information was searched, and it was concluded that the most 295 people were in the 24-26 age range. Another result of the research is that primary school teachers' computer and internet usage purposes were investigated according to the research problem, and it was concluded that they preferred distance education and meta-competence in the light of relevant information. It is known that there is always a disagreement between the concepts of gender and that it differs according to the geographical section. It was concluded that primary school teachers' meta-competence status was high.

Knowledge and opinion always take research one step ahead, expressing an opinion, which helps the next generation in terms of thinking while determining how correct the problem situation is. Among the post-test scores, it is seen that the post-test is higher than the pre-test and it is concluded that there is a significant difference. It is seen that thanks to technology, they understand better, they can watch meta-competence and technology videos again and again, and finally, when they generate ideas with meta-competence, their interest in the field increases, and positive results are achieved.

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