The use of dual training technology in the formation of professional competencies of teachers

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Abstract

This study aimed to use dual education technology in the formation of professional competencies of teachers working in primary schools and was patterned according to this purpose. In this context, it was aimed to conduct a study in the primary school environment. The research was created and implemented in the spring academic period of 2021–2022. 176 primary schoolteachers who are experts in their field voluntarily participated in the research. In the research, the group participating in the study was provided with dual educational technologies training in the form of a 4-week online training. In order to collect data, the 'dual education technology' data collection tool developed by the researchers and validated was used in the study. The data collection tool used in the study was delivered to and collected from the people participating in the study by the online method. The analysis of the data was carried out using the SPSS programme; frequency analysis was carried out using *t*-test; and the results obtained were added to the study accompanied by tables. As a result of the research, it is seen that the professional skills of the people participating in the research have been strengthened and they have reached the results that dual educational technologies have brought about success in their educational lives.

Keywords: Primary schoolteachers, dual educational technology, professional competence;

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1. Introduction

Changes in education are aimed at increasing and improving social requirements. The changes in information and communication technology in teaching and learning impact the changes in the student profile; teaching and learning paradigms are shifting and are known to provide the basis for teachers' professional development needs (Yesengazyevna, Niyetbayeva, Tassuov, Kalima, & Bekbulatovna, 2022). It is seen that those who are educated, who constitute the power source of the educational hierarchy of those who receive education, have important roles and responsibilities in realising the teaching profession and educating individuals in accordance with changing social requirements (Karim, Sandu, & Kayastha, 2021). Therefore, in addition to pre-service training in teacher training, one of the important stages is the professional development of teachers, i.e., their in-service training (Tapalova, Zhiyenbayeva, & Kamysbayeva, 2021). Innovations and developments in the field of education of teachers with the necessary knowledge, skills and behaviours to acquire professional competence in terms of pre-service training to complete the deficiencies aim to provide professional development and is an important part of teacher education (Al-Wattar, 2021). The use of information and communication technologies in educational settings and the diversification and change of learning resources are changing the roles of teachers in both the learning and teaching process and the methods of professional development activities (Britwum, Obed Amoah, Acheampong, & Adjei, 2022). The purpose of this study is to bilaterally explain the use of primary schoolteachers' educational technology information and communication technology and professional development. Accordingly, it is anticipated that both as regards the situation will continue.

How to use information and communication technologies in order to create effective professional development activity is necessary and important if the use of information and communication technologies for teaching and learning professional development is so important in the learning process integration (Ismoilov, 2022). It is known that bilateral development in technology should be looked at and evaluated from the point of view of educational technologies, not from the individual's point of view (Antonietti, Cattaneo, & Amenduni, 2022). In other words, the purpose of using information and communication technologies in the professional development of teachers is not just to ensure that teachers use the latest technologies. The main purpose here is to ensure that teachers can use technologies that meet their needs and objectives (Puthaprasert, Supising, Boonchai, Kosanpipat, & Poungkaew, 2022). The main goal of the programme of professional qualification development is that the behaviour of the teacher changes in accordance with the new knowledge provided. However, the first step of professional development should be to investigate whether teachers' attitudes towards technology are positive (Bi & Yan, 2022). The next stage of professional development should be the determination of the technological competence of teachers and the development of the programme in this direction. The use of technology by teachers consists of four stages. These stages are, respectively, the holding stage, the grasping stage, the influencing stage and the renewal stage (Han, Tian, Han, Sun, Jin, & Yang, 2022). The first stage, the retention stage, is the stage where teachers experience adaptation problems related to the application of technology in their use in the teaching–learning process for their field. At the comprehension stage, which is the next stage after this stage, teachers begin to adapt to this new situation by developing coping strategies for the problems they experience in using technology (Zhang, 2022). In the influencing stage, which is the third stage, they share their experiences about the use of technology in the teaching–learning process with their colleagues. This model for education also influences students and their colleagues with their experiences by creating an effective and efficient learning environment (Simons, Pulliam, & Hunt, 2022). In the fourth stage, which is the renewal stage, it will be possible that teachers will be able to add

different innovations with technology to their activities in the learning–teaching process and progress towards specialisation by renewing themselves (Uzunboylu & Altay, 2021).

1.1. Related studies

Radkevych, Kravets, Herliand, Radkevych, and Kozak (2021), in their study carried out on vocational education teachers' professional competence as teachers, intended to explain the features of innovative development based on the principles of continuing professional development to develop vocational competence. As a result, they expressed the need for remote and project-based learning and pedagogical technologies. But production technologies were used in the current gorulmekle results achieved.

Shatunova, Merzon, Shaimardanova, and Shabalin (2018), in their study carried out on the technology used the future teacher in the process of training, sought the creation of an effective management tool to simulate the results and allow one to play. Education, business and technology create a methodical foundation for educating teachers that provide benefits to the teachers. They also noted that the recently presented techniques are considered a universal means of improving the quality of technological education.

Sadullayevich's (2021) study on how to prepare the work of educators in their profession and how to develop professional and psychological reflections mirroring technology, intended to include their information on how to develop. As a result, it was seen that they reached a level of professional competence regarding the adaptation to study the training objective and subjective conditions in the future being dominated by the requirements of the professional activity of future specialist and to adapt to the process of the activity.

In this context, it can be said that the same effect is expected from this research because it is important that the studies transferred in the related studies and the binary technologies interpreted at the same time are at the forefront of teaching and that these studies are applied internally to the primary schoolteachers and students in their education.

1.2. Purpose of the study

In the research, it was aimed to use dual educational technology in the formation of professional competencies of teachers working in primary schools and the answers to the following questions were sought for the general purpose of the study:

1. What is the level of knowledge about dual education technology of the participants included in the study?

2. What is the use of educational technologies of the participants included in the study?

3. What is the purpose of using dual educational technologies in everyday life of the participants included in the study?

4. Is there a significant difference between dual technologies according to the gender variable of the participants included in the study?

5. What are the views of the participants included in the study on pre- and post-study education?

2. Method

In this section, information such as the method used in the research, data collection tool findings, gender, age and how the application was formed are included and the data are interpreted and given

in tables. However, the methods section of the study is known to replace the main source of existence in related research as the main source.

2.1. Research model

As a research model within the study, it is seen that the quantitative research method, which is widely known to be used in studies, was used. An in-depth analysis is not carried out in quantitative research, but it deals with statements made as a result of numerical data. Some methods are used when conducting quantitative research. Let us examine these methods (Caliskan, Guney, Sakhieva, Vasbieva, & Zaitseva, 2019). In this sense, it is patterned on the creation of a suitable environment for the use of dual educational technology in the formation of the professional competence of participant teachers working in primary schools in the study.

2.2. Working group/participants

When the working group is considered, it is seen that it is applied in the spring academic semester of 2021–2022. The total number of participants and data part of the study consisted of 176 primary schoolteachers who continue their studies in Kazakhstan. The participants participating in the research took part in the created workshops through a live course.

2.2.1. Gender

In this section, it is aimed to provide information about the gender criterion of the participants included in the study and it was patterned accordingly. The participants in the study currently work in the Kazakhstan region.

Table 1. The Distribution of the participants participating in the study according to the gender variable

Gender	Male		Female	
	F	%	F	%
Variable	90	51.14	86	48.86

When Table 1 is examined, it is seen that the numerical values of the gender criterion are primarily included. In this context, 51.14% (90 people) are male and 48.86% (86 people) are female. The findings reflect the actual gender distribution.

2.2.2. Mobile Technology Usage Situations of the Participants Participating in the Study

Since each stage of the study will be via mobile technology, in this part, the frequency of mobile technology situations of the participants participating in the study was investigated on a daily basis and the relevant information is given in Table 2.

Table 2. Mobile technology use cases of the participants participating in the study

Use of mobile technology technologies during the day	1 hour		2 hours		3 hours and more	
	F	%	F	%	F	%
Variable	18	10.23	62	35.23	96	54.54

In Table 2, the mobile technology usage status of the participants during the day is examined. In this context, 10.23% (18 people) used mobile technology for 1 hour, 35.23% (62 people) used mobile technology for 2 hours and 54.54% (96 people) stated that they used mobile technology for more than 3 hours. In this context, it is seen that most of the participants preferred using mobile technology for 3 hours and above.

2.2.3. *The level of knowledge of the participants included in the study about dual education technology*

In this section, the information status of the participants included in the study about dual educational technologies was investigated and examined. Detailed information is given in Table 3.

Table 3. The level of knowledge of the participants included in the study about dual education technology

Dual training technology	I have information		I have no information		I have partial knowledge	
	F	%	F	%	F	%
Variable	27	15.34	141	80.11	8	4.55

When Table 3 is examined, the level of knowledge about dual educational technologies of the participants included in the study was investigated and it is seen that the relevant information was digitised and added to the table. In this context, 15.34% (27 people) responded to the 'I have information' option, 80.11% (141 people) responded to the 'I have no information' option and 4.55% (8 people) responded to the 'I have partial information' option. In this context, it is thought that the information that will be given in the bilateral educational technology workshop will benefit primary schoolteachers in the research.

2.2.4. *Age Status*

In this section, it is seen that the data were examined according to the age scale of the participants included in the study and the information is given in Table 3.

Table 4. The distribution of the participants included in the study according to their age status

Age	22–24		25–27		28 and above	
	F	%	F	%	F	%
Variable	57	32.39	108	61.36	11	6.25

When Table 4 is examined, it is seen that the data related to this section are added to the table by considering the numerical distribution of the participants participating in the study according to their age status. In this context, 32.39% (57 people) were in the age range of 22–24, 61.36% (108 people) were in the age range of 25–27 and 6.25% (11 people) were aged 28 and above. The findings reflect the actual distribution.

2.3. Data collection tools

It is known that the study has taken its place in the literature as a data collection tool used to address an event, a thought, an existence and to reveal all the information there in. In this section, it is seen that information about the data collection tool is included and provided. The data collection tool was created specifically for this study by the researchers who conceptualised the study, and the items that could not be suitable were examined by experts and simplified by removing them from the study. It is seen that the personal information form created by the researchers, which is applied to the participants included in the study, and the 'dual educational technology' measurement tool were used. The validity of the scope of the developed data collection tool was examined by four experts with the title of Professor who conducted research on professional competence and dual educational technologies, and unnecessary items were removed from the measurement tool and simplified and rearrangements were made.

1.   Personal information form (demographic data): In the personal information form, information such as gender, age, mobile technology usage and dual educational technology information situations are provided.

2.   Binary education technology data collection tool: A 5-point Likert-type data collection tool was prepared to create some values for the participant. 18 items of the measurement tool consisting of a total of 22 items were used and 4 items were removed from the measurement tool, thanks to the experts' opinions. The opinions of the participants were categorised into two factorial dimensions, such as 'professional competence' and 'dual educational technology'. The Cronbach alpha reliability coefficient of the data collection tool as a whole was calculated as 0.94. The measuring tool was rated as 'I strongly disagree' (1), 'I disagree' (2), 'I am undecided' (3), 'I agree' (4) and 'I definitely agree' (5). The data collection tool was also collected from participants in the form of an online environment.

2.4. Application

In this section, it was aimed to provide some information about the application and it was planned to explain the information in depth in this dimension. 176 elementary schoolteachers were selected by the researchers who work in various primary schools in the Kazakhstan region. Microsoft Teams' live events and distance education video programme through recreational, educational technology vocational qualifications and bilateral dimensions of the environment were used. This activity was prepared by the application programme live event organised by experts in the field environment. When the part of the research as a workshop was completed, professional competence was created for the groups included in the research and activities were created for the groups on technology. During the 4-week workshop, the participants of the research were given the following topics: 'professional competence' and 'dual education technology'. Such information was transferred to the participants in the form of live environments and they were expected to participate every week. After 4 weeks of training, an information form and a data collection tool were collected for the participants participating in the study using the online application method, and the data are given in the form of tables in the findings section. The training was distributed as four sections through the Microsoft Teams application programme used by most schools and each designated section was distributed and adjusted to be limited to a maximum of 50 elementary schoolteachers for weeks; each event workshop took 45 minutes; question and answer were processed for 15 minutes, making a total of 60 minutes. In the live events, participants in the study were expected to participate in training with images and microphones using smart devices. The measurement tool applied to the people participating in the

research was collected, thanks to the Microsoft Teams online survey tool, and then transferred to the SPSS programme by coding it in the environment of calculation programmes.

2.5. Analysis of the data

The analysis of the research of the numerical values is given in the tables in this section. One will be given information about the part and, at the same time, the statistical data obtained from research participants, respectively. Frequency (*F*), percentage (%), average (*M*), standard deviation (SD) and *t*-test were analysed using the statistical programme. The data obtained from the programme are given in tables accompanied by numerical values, findings and comments.

3. Findings

In this section, the findings related to the dual educational technology situations of the participants participating in the research are given, and each finding of the research is added to the tables, accompanied by comments.

3.1 Purpose of using dual educational technologies in everyday life of the participants included in the study

The purpose of using dual educational technologies in everyday life of the participants participating in the research was investigated and detailed information is given in Table 5.

Table 5. Purpose of using dual educational technologies in everyday life of the participants included in the study

Variable		F	%
The purpose of using dual educational technologies	Used by elementary school students in their education	72	40.91
	Used by elementary school students in preparing course materials	98	55.68
	Other	6	3.41
	Total	176	100

When Table 5 is examined, the dual educational technology use of the participants participating in the study was investigated according to the problem situation of the study and the relevant information was added to the table. In this context, 40.91% (72 people) of the primary school students use it in their education, 55.68% (98 people) of the primary school students use it in the preparation of course materials and 3.41% (6 people) of the primary school students use it for other reasons. In this context, it can be said, based on Table 5, that the research uses binary education technologies where most of the segments turn to the problem situation by combining the professional competence situations.

3.2 Dual educational technology situations according to the gender variable of the participants included in the study

The data obtained from the study and the dual educational technology situations and detailed information according to the gender variable of the participants participating in the study are given in Table 6.

Table 6.   Dual educational technology situations according to the gender variable of the participants included in the study

	Gender	*N*	*M*	SD	Df	*T*	*p*
Dual education technology cases	Male	90	4.27	0.24			
	Female	86	4.22	0.32	176	0.327	0.368

When Table 6 is examined, the dual education technology status of the participants included in the study regarding the gender criterion was examined and it was seen that there was no significant difference according to the gender criterion [Df (176)= 0.368, *p*<0.05]. When the dual educational technologies status of the participants included in the research is examined, it is seen that the male participants have an average score of *M* = 4.27, while the female participants have an average score of *M* = 4.22. In this context, it can be said in the findings part of the research that the mean score of the male participants is higher than the female participants, i.e., it is higher by a value of 2.

3.3 Pre- and post-study dual education technology views of the participants included in the study

In this section, the pre- and post-study trainings of the participants included in the study are examined and the analysed values are presented in Table 7.

Table 7. Dual education technology views of the participant group included in the study before and after the study (pre-test–post-test)

No	Variable	Pre-Test-1		Post-Test-2				
		M	SS	*M*	SS	df	*T*	*p*
1	I recognise and know the materials I use when using dual education technologies.	3.11	0.52	4.21	0.27	176	-4.21	0
2	I have always used information technologies while using dual education technologies.	3.12	0.62	4.32	0.32	176	-5.32	0
3	I was happy to use dual education technologies while preparing course materials.	3.17	0.57	4.18	0.28	176	-4.23	0
4	I was happy to be in contact with my students while using dual education technologies.	3.13	0.72	4.21	0.29	176	-4.38	0
5	I saw that dual education technologies benefited my professional competence.	3.15	0.51	4.38	0.32	176	-4.01	0
6	I saw that I was more successful in cognitive areas with dual education technology.	3.21	0.79	4.34	0.27	176	-5.67	0

7	I can express my ideas very easily with the help of technology while teaching.	3.19	0.52	4.31	0.25	176	-4.31	0
8	It made me happy to use dual education technologies for my students in every sense with the help of technology.	3.17	0.62	4.28	0.38	176	-3.52	0
9	I did not experience any difficulties in the size of the education I received	3.21	0.69	4.22	0.37	176	-3.51	0
10	I knew who to contact when there was a problem in the training I received.	3.18	0.83	4.26	0.34	176	-3.62	0
11	Technology and educational technologies give me the opportunity to do it again in my primary school area during the day, and thanks to this opportunity, I can prepare stronger course materials.	3.09	0.79	4.48	0.36	176	-3.59	0
12	The education I receive in online education classes of dual education technologies allows me to improve myself.	3.15	0.52	4.58	0.62	176	-4.08	0
13	Thanks to dual education technology, my old habits differed from the course I taught to my students.	3.22	0.52	4.46	0.51	176	-5.74	0
14	I take more responsibility to succeed in primary school teaching with technology	3.11	0.59	4.21	0.54	176	-4.57	0
15	Using this training with the live event method allows me to better understand the distance education studies.	3.08	0.72	4.47	0.63	176	-4.51	0
16	I believe that with the positive reflection of professional competence, I have a positive connection with dual education.	3.02	0.58	4.62	0.28	176	-6.42	0
17	I can easily get used to any idea given to me with dual education technologies.	3.07	0.55	4.43	0.39	176	-4.22	0
18	I easily state that I find these activities useful and that I would like to participate in another activity.	3.13	0.65	4.32	0.41	176	-5.71	0
	Overall Average	3.13	0.62	4.34	0.37	176	-4.53	0

As shown in Table 7, findings of pre-test and post-test scores of primary schoolteachers on bilateral education technology are given. Between the test scores it was observed that there was a significant difference ($p<0.005$). Although it seems that there are a significant values in all statements, according to the preliminary test results, the most obvious statements of the participants participating in the study was 'Online education of dual educational technologies allows me to improve myself in the education I receive in classrooms', with a pre-test value of $M = 3.15$ and a post-test value of $M = 4.58$. In addition, one of the most obvious statements of the participants included in the study was 'Using this training I received using a live event method allows me to better understand distance learning studies', with a pre-test value of $M = 4.47$ and a post-test value of $M = 3.08$. In addition, the statement 'Technology and educational technologies give me the opportunity to do it again in my primary school field during the day and thanks to this opportunity I prepare stronger course materials' had a pre-test value of $M = 3.09$ and a post-test value of $M = 4.48$.

Although positive results are seen in each item of the survey, the obvious opinion of the students was 'My Benefits of educational technology professional competence and Bilateral I saw' had a pre-test score of $M = 3.15$ and a post-test score of $M = 4.38$; our research participants also stated 'I'll take more responsibility for teaching elementary school with being successful in the', with a pre-test score of $M = 3.11$ and a post-test score of $M = 4.21$. Finally, it is seen that the pre-test average of the people participating in the study was $M = 3.13$ and the post-test average was $M = 4.34$. In this context, it is seen in Table 7 that the dual educational technologies professional competence status and ideas of the people participating in the study have developed positively.

4. Discussion

Sánchez Prieto, Trujillo Torres, Gómez García, and Gómez García (2020) carried out a study on the lack of digital skills that are affected by the gender of teachers, e.g., the instruction bits in the application, especially in the growing space of the dual vocational education and teacher training was undertaken to determine whether there are gender differences in resources between the results. In this context, when this value is combined with the results of the study, it can be concluded that there is no difference between the dual educational technology values of primary schoolteachers within the study, and it is also seen that the scores are high in both groups. In this context, it can be said that it has benefited both the field and the participants in the studies.

Kuzmina, Protas, Fartushok, Raievska, and Ivanova (2020), in their study on practical training and the formation of competencies of students in higher education institutions, aimed at studying the properties and examining, with the help of practical training, comparing, grouping and concretising methods and analysis. As a result, students and educators could build their proficiency in the learning process, learn and innovate in an academic programme and introduce modular. According to the results of the research, it is seen that the opinions of primary schoolteachers after the study have been positively developed against educational technologies, with this value. It can be said that these technologies will benefit teachers and students first of all within the scope of the studies.

Antera (2021) carried out a study on the proficiency in various reviews related to the concept of vocational teachers. As a result, the concept of professional competence, with how a space is perceived and configured, leaving very little for the qualification, is defined by focusing on how professionals focused on the professional qualifications of the teachers. In this context, when this value is combined with the results of the study, it is seen that the values of primary schoolteachers' professional competence knowledge improved and increased after the study. It can be said that the

values of these two studies are close to each other and will benefit the field even if the problem situation in the study seems to have a positive result.

In this context, it is among the expectations that the research results obtained from these studies will benefit the field, educators, researchers and students who will be our future. In addition, it may vary depending on the audience and model applied to the research, and in this context, conducting this research at another time and place is among the expectations of the research.

5. Conclusion

In conclusion, the partial results of the research made carefully review of the study which included in the numerical values of primary schoolteachers' results. 176 participants joined the study. It is seen that, the value of mobile technology research problem also occur with our participants about the status of the research for the day it would be given that the information given and the time of use of mobile technology. In this context, it is seen that the results of the study indicate that the preferred results of the group of participants with the maximum amount of mobile technology use of 3 hours and more were reached, and it is seen that the results of the study respond to the no information option included in the study, which is another value of the study.

Another value of research is that the research problem and objectives of the participants according to the use state of bilateral educational technologies are researched. As a result, elementary school students the option to use while achieving the results that they use in the education of other value if it is to prepare course materials for elementary school students, it is noted that the option of using their preferred conclusion. Research is another value if the criteria to be included in the study examined the gender of the audience on the status of significant bilateral educational technology according to criteria that is not a result, and also achieves high results in each group of scores is observed. When the final result of the study was considered, it was seen that the pre-test and post-test findings of the primary schoolteachers who were included in the study about the dual educational technologies were investigated; as a result, it was seen that they reached a significant difference. Online education I have received in the bilateral training of educational technology classes they had developed themselves, they receive the training method to be used with the live event with a better understanding of the work of educational technology distance education technologies in the area during the day elementary school them again given the opportunity, bilateral benefit they provide professional qualifications of educational technology, research, educational technology professional qualification and status of our participants and their bilateral ideas that have evolved in a positive direction were observed.

As a result of the research, it is seen that the professional skills of the people participating in the research have been strengthened and they have reached the results that dual educational technologies have brought success in their educational lives.

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