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Developing the Digital Competencies of Instructors in the Process of Distance Education

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Abstract

The general purpose of this study is to improve the digital competencies of the instructors in distance education through a professional development program. It was also intended to identify the efficiency of the professional development program designed and implemented with regards to this general purpose. An embedded mixed design, one of the mixed research models, was used. The participants in the research are the instructors working in all faculties, colleges and vocational schools in a public university. In the research, a needs analysis was conducted initially to determine the areas in which instructors need the most support in distance education. In this context, a professional development program regarding "Course Design in Distance Education" and "Web 2.0 Tools and Application Samples" was prepared for the instructors. This professional development program was implemented and evaluated. As a result of this process, it was determined that the majority of the instructors needed training on Web 2.0 tools and applications, instructional design in distance education, and methods and techniques appropriate for distance education. It was concluded that the professional development program prepared in line with the needs analysis conducted within the scope of the research had a positive effect on the self-efficacy perceptions of the instructors towards distance education. In the research, suggestions were made to increase the quality of the teaching service during the distance education process.

Key Words

Distance education • Digital competencies • Instructors

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Recent technological advances have led to significant opportunities for the introduction of technological tools to the learning-instruction processes, and these technological applications have become compulsory due to the emergency distance education conducted during the pandemic. The concept of emergency distance education refers to the temporary transition of teaching, which is normally conducted face-to-face, online or blended, to alternative options due to crisis situations (Ferri, et al., 2020). Distance education can also be described as a systematic educational process that increases the equality of opportunity for those who could not attend face-to-face education, and is not limited by time or space, employs technologies and mass media to support education (Moore, & Kearsly, 2005), and allows two-way communications (Clark, & Mayer, 2016). During the pandemic, since all formal education institutions from primary to higher education completely switched to distance education, learning and instruction had to be conducted online (Ahlawat, et al., 2020) and so higher education institutions had to adopt radical changes to introduce distance education systems (Bozkurt et al., 2020). While these applications were adopted to continue education in the early days of the pandemic (Cutri, et al., 2020), it required the revision of instruction and learning environments after this process, too (Henriksen, et al., 2020). Can (2020) also argued that our approach to education evolved into a mixed model where face-to-face and distance education would also be employed after the pandemic, in other words, mixed education practices would be adopted in the following days. Similarly, Karadağ and Yücel (2020) reported that new global educational paradigms would emerge after the pandemic. Thus, distance education has become a significant factor in current educational approaches due to technological advances and pandemic.

The pandemic situation has further accelerated the digital transformation in educational activities (Nebot et al., 2021) and it has forced educators to rapidly develop the digital competencies required for distance education (do Espírito Santo et al., 2022). Not only the pandemic, but also the fact that The 21st century's understanding of education has been shaped by digital communication tools, the changing characteristics, needs and demands of new generation students who want to have an interactive and participatory active learning experience supported by technological tools (McLoughlin, & Lee, 2010). In the standards published by the International Society for Technology in Education (ISTE), which emphasize the characteristics of effective instructors, it is especially emphasized that instructors should support the learning process with technology and it is stated as a necessity for them to use both face-to-face and online environments effectively (ISTE, 2008). Instructors play a key role in distance education courses because they are the initial users of the distance education environment, who instruct the students in this process (Mitchell et al., 2015). Since education is increasingly becoming a digital and online world with a range of new technologies (Goh, & Sandars, 2019), the instructors in distance education are required to design effective instruction for adaptation of face-to-face courses into distance education (Iwai, 2020).

In the distance education process, instructors are expected to clearly determine course objectives, balance synchronous and asynchronous activities in instructional design, encourage students to work in groups, produce different content, provide effective feedback, and employ digital tools and materials at all stages. In other words, success in distance education depends on the awareness of educators about these new roles and the development of their competencies in these roles (Kır, 2020). It is stated that distance education can yield successful results only if instructors conduct good design and implementation (Maurer, & Davidson, 1998; Özonur et al., 2019). However, in

this process the current situation of instructors related to the interest, attitude, perception, motivation and self-efficacy towards technology (Ertmer, 2005; Palak & Walls, 2009), and the properties of instructors regarding technology can affect this process (Kenny, 2003; Wejnert, 2002). When the literature is reviewed, there are some studies reporting that instructors have problems with technology and technology-supported applications (Ashrafzadeh, & Sayadian, 2015; Bingimlas, 2009; Curir et al, 2010; Çalışkan et al., 2012; Ertmer, & Ottenbreit-Leftwich, 2010; Kyei-Blankson et al., 2009; Özüdoğru, & Çakır, 2014; Sadi, et. al, 2008; Venkatesh et al., 2016) and their level of utilizing technology is low (Agyei, & Voogt, 2011; Bate, 2010; Gao et al., 2011). Besides, there are also studies encountered in literature which investigate the digital competencies of instructors working in various universities (Dervenis, et al., 2022; Doğan, 2023; Gökbulut et al., 2021; Jorge-Vázquez et al., 2021; Nebot et al., 2021; Sánchez-Caballé, & Esteve-Mon, 2022; Santos et al., 2021) resulting that the instructors need to develop their digital competencies.

Furthermore, in the related literature, there are some studies concluding that instructors need training on issues such as content development in distance education, use of the system and ensuring interaction (Bilgiç et al., 2011; Bozkurt, 2020; Erkut, 2020; Gürer et al., 2016; Karadağ, & Yücel, 2020). Also, there are studies which identified that instructors were incompetent in distance education requirements and emphasized the importance of training instructors in terms of the adoption and effectiveness of distance education (Can, 2020; Düzakın, & Yalçınkaya, 2008; Hark-Söylemez, 2020; Kayaduman, & Demirel, 2019; Yıldız, 2015). In addition, it was reported that educators were not competent in online education digital technologies, and regular in-service training should be provided for instructors (Ak et al., 2021). Erkut (2020) also emphasizes the need for instructors to undergo serious training and restructure their courses in accordance with online environments in order to provide online education effectively in distance education process. Furthermore, Karadağ and Yücel (2020) studied the satisfaction of undergraduate students with online education in Turkey during the pandemic and reported that the students were not at all satisfied with the preparation and instruction of the digital content and employment of instructional material by the instructors. Bilgiç, Doğan, and Seferoğlu (2011) argued that orientation training should be provided for the instructors for more effective distance education, which in turn could contribute significantly to the effectiveness of the system. Within the light of all the aforementioned studies, it was contemplated that the instructors were not effective enough in digital or technological issues on distance education. Therefore, the general purpose of this study was to improve the digital competencies of the instructors in distance education through a professional development program. It was also intended to identify the efficiency of the professional development program designed and implemented with regards to this general purpose. By means of the impelemented professional development program, it was expected to improve the quality of the instruction in the universities by supporting the instructors to design effective teaching process in distance education. Therefore, the following research questions were searched throughout this study:

- What are the needs of the instructors in distance education learning and instruction processes?
- Is there a significant difference between self-efficacy pre-test and post-test perceptions regarding distance education?

• Are the instructors satisfied with the designed and implemented professional development program?

• What are the views of the instructors regarding the professional development program?

Method

Research Design

The present study was conducted with the embedded mixed design. It was reported that mixed method was superior to approaches that employ a single design approach since it allows series of confirmatory and exploratory questions concurrently due to the employment of both quantitative and qualitative methods, provides stronger inferences and variety of views (Teddlie, & Tashakkori, 2009). The embedded mixed design is a comprehensive mixed method approach where quantitative or qualitative data are analyzed simultaneously (Greene, 2007; Mazlum, & Mazlum, 2017). In the embedded mixed design, the dataset allows for a secondary auxiliary function. Researchers embed a qualitative study into a quantitative experiment to achieve an empirical design (Creswell et al., 2009). The most common form of the embedded design is the incorporation of additional datasets within a larger design to answer different research questions. The most typical example is the embedded experiment format, where the researcher incorporates qualitative data into the experiment. In the embedded design, researchers should incorporate qualitative data when answering the secondary research question in a primarily quantitative study (Creswell, 2014; Creswell, & Plano Clark, 2011). In the present study, the embedded experiment form was preferred, and the quantitative and qualitative data were employed to support each other. Gall, Gall, and Borg (2010) reported that the employment of both quantitative and qualitative methods was effective in confirming the validity of the findings. Thus, the quantitative dimension of the study was designed with the quasi-experimental design, and the qualitative dimension was designed as a case study that supported the quantitative dimension.

Participants

Study participants included the faculty members in all faculties, colleges and vocational schools in a public university. In the needs analysis and the pre-interview stage, the study participants included 102 instructors in Education, Science and Literature, Engineering, Forestry, Theology, Economics and Administrative Sciences, and Health Sciences, the School of Physical Education and Sports, and vocational schools. In the professional development program applied in the study, and the pre- and post-tests applied before and after the program, in other words, in the quantitative dimension of the study, the study participants included 53 instructors employed in the above-mentioned faculties and colleges. The participants demographics for both the experimental and quantitative dimensions of the study are presented in Table 1.

Table 1.

Descriptive Characteristics of the Participants for the Quantitative Dimension of the Study

Variables	Categories	f	%
Gender	1. Female	22	41.51
	2. Male	31	58.49
Working Department	1. Faculty of Education	10	18.87
	2. Faculty of Arts and Sciences	7	13.21
	3. Faculty of Engineering	3	5.66
	4. Faculty of Forestry	6	11.32
	5. Faculty of Religious Studies	4	7.55
	6. Faculty of Economics and Administrative Sciences	5	9.43
	7. Faculty of Health Sciences	6	11.32
	8. School of Physical Education and Sports	4	7.55
	9. Vocational Schools	8	15.09
Title	1. Prof. Dr.	7	13.21
	2. Assoc. Prof.	12	22.64
	3. Asst. Prof.	19	35.85
	4. Lecturer	9	16.98
	5. Research Assistant	6	11.32
	Total	53	100

The maximum variation sampling method was employed to determine the participants in the final interviews conducted after the application. Maximum diversity was preferred to determine whether there were any common or shared phenomena across diverse cases and to determine diverse dimensions of the problem (Yıldırım, & Şimşek, 2013). Thus, 10 volunteering participants employed in various departments were assigned among the instructors who participated in the professional development program, and demographics of these participants are presented in Table 2.

Table 2.

Descriptive Characteristics of the Participants for the Quantitative Dimension of the Study

Participant	Gender	Title
P1	Female	Prof. Dr.
P2	Male	Asst. Prof.
P3	Male	Lecturer
P4	Female	Assoc. Prof.
P5	Male	Prof. Dr.
P6	Male	Research Assistant
P7	Female	Lecturer
P8	Female	Asst. Prof.
P9	Male	Assoc. Prof.
P10	Female	Research Assistant

Application

Initially, a needs analysis was conducted to determine instructor requirements in distance education. The interviews conducted with the instructors were designed both to serve the needs analysis and as preliminary interviews. The preliminary interviews conducted for the needs analysis revealed that the instructors mostly felt incompetent in instructional design in distance education and effective use of digital tools. Thus, a professional development program was developed by the authors. "Course Design in Distance Education" and "Web 2.0 Tools and Applications" courses were developed for the participating instructors. These courses included interactive synchronous and asynchronous applications and examples that would allow the instructors to design effective online courses and conducted on the LMS system. "Distance Education Self-efficacy Scale" and semi-structured interview form were applied as a pre-test before the instruction of the professional development program. After the instruction, the scale, semi-structured interview form and a training satisfaction survey were applied. The professional development program content is presented in Figure 1.

Figure 1.

Content of the Professional Development Program

Data Collection Instruments

During the research, both quantitative and qualitative data collection instruments were employed before and after the experimental application. The quantitative study data were collected with the "Distance Education Self-Efficacy Perception Scale" developed by Yıldız (2015). The scale included 10 five-point Likert-type items in three sub-dimensions: learning management, technology management and virtual classroom management. The reliability coefficients were .83, .78 and .82 for these sub-dimensions, respectively, and .86 for the whole scale (Yıldız, 2015). In the present study, the Cronbach Alpha reliability coefficient was.86 for learning management, .82 for technology management, .85 for virtual classroom management, and .89 for the whole scale. Also, a Satisfaction Survey was applied to determine the satisfaction of the instructors with the professional development program. The 22-item survey included questions on the duration of the program, the time reserved for each content, the adequacy of the content, the instructional quality of the content, the clarity of the content and the instructor-participant interaction sub-dimensions. The Cronbach Alpha reliability coefficient was .88 for the survey items in the study.

A semi-structured interview form was developed by the authors to collect the qualitative study data. The semi-structured interview form developed for preliminary interviews and needs analysis included six questions, and the final interview form included five questions. Draft interview form was submitted for the review of three experts and interview forms were revised based on expert opinion. Also, a pilot scheme was conducted with two instructors with the interview form. Probing questions were added to the interview form based on participant responses in the pilot scheme, and the form was finalized.

Data Analysis

The quantitative study data was analyzed with SPSS 22 software. The pre-test and post-test scores of the instructors in the Distance Education Self-Efficacy Perception Scale were compared with the Wilcoxon signed ranks test. Descriptive statistics (arithmetic mean, standard deviation) were employed to analyze Satisfaction Survey scores. On the other hand, content analysis was employed to analyze the interview data before and after the application. Content analysis aims to categorize similar data based on certain concepts and themes to achieve comprehensible interpretation of the data (Yıldırım, & Şimşek, 2013). Maxqda qualitative data analysis software was used in data analysis. A code was defined for each research question by the authors on the Maxqda software, and participant responses were analyzed word by word and sentence by sentence to determine the codes and themes. The reliability formula (Agreement / Agreement + Disagreement) developed by Miles and Huberman (1994) was employed to determine the reliability of the analyzes. The reliability coefficient was calculated as .91. The themes determined during the analysis and the correlations between the themes are presented in the findings section. Furthermore, the sample participant statements for these themes are included in the findings section.

Results

Needs Analysis and Preliminary Interview Findings

The needs analysis and preliminary interview data collected from 102 instructors are presented in this section. The results of the analysis of the participant participants' responses to the question on whether they have participated in any previous professional development program on distance education are presented in Table 3.

Table 3.

Participation in the Professional Development Program on Distance Education

Categories	**N**	**%**
Yes (I have participated in a professional development program)	37	36
No (I haven't participated in a professional development program)	65	64
Total	102	100

As seen in Table 3, 64% (N=65) of the instructors did not participate in any professional development program on distance education, while 36% (N=37) stated that they have participated in a professional development program on distance education.

In the needs anaylsis part of the study, the instructors were asked about their incompetence and requirements in online instruction and training. The participants were able to chhose more than one option in this question, and the results of their responses are given in Table 4.

Table 4.

Subject Areas Instructors Required Training for Distance Education

Categories	**N**	**%**
Web 2.0 Tools and Applications	55	54
Instructional Design in Distance Education	49	48
Distance Education Methods and Techniques	46	45
Measurement and Evaluation in Distance Education	19	19
Use of Learning Management System (LMS)	11	11
Total	102	100

As seen in Table 4, 54% (N=55) of the instructors reported that they required training on Web 2.0 tools and applications, 48% (N=49) required training on instructional design in distance education, and 45% (N=46) required training on distance education methods and techniques. Furthermore, according to instructors' expressions, 19% (N=19) of them required training on online measurement and evaluation, and 11% (N=11) required training on learning management systems (LMS).

The analysis results on the responses to the question on how the participants instructed distance education courses are presented in Table 5. The instructors were able to choose more than one option in this part of the needs analysis, as well.

Table 5.

Instructional Approach in Distance Education Adopted by Instructors

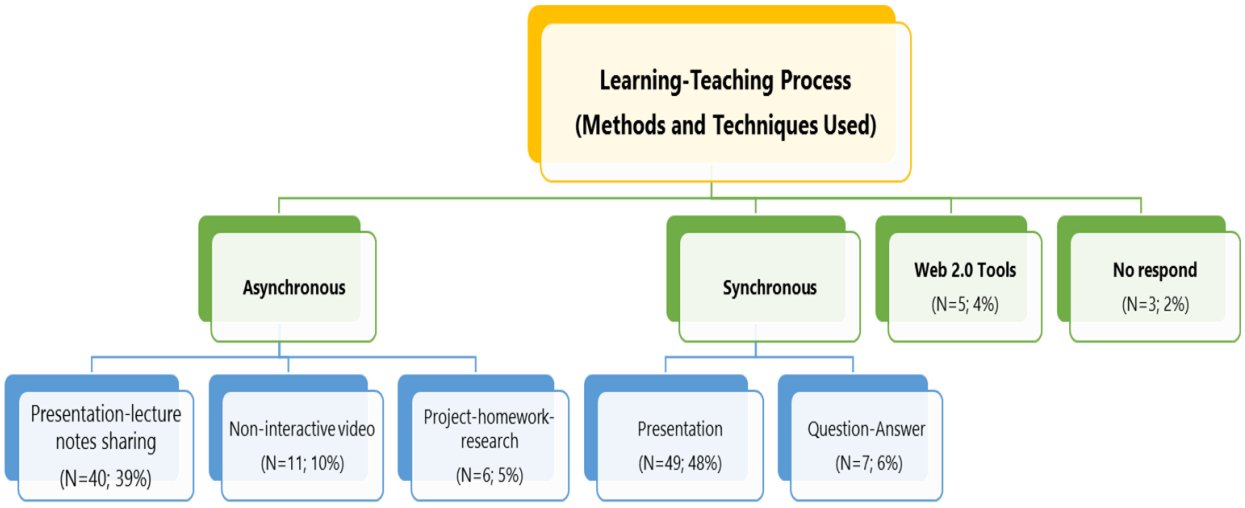
Categories	**N**	**%**
Non-Interactive Synchronous Approach	68	67
Interactive Synchronous Approach	36	35
Non-Interactive Asynchronous Approach	24	24
Interactive Asynchronous Approach	9	8
Total	102	100

As seen in Table 5, 67% (N=68) of the instructors stated that they instructed online courses with the non-interactive synchronous approach, and 35% (N=36) stated that they preferred the interactive synchronous approach. Also, 24% (N=24) stated that they designed their courses with the non-interactive asynchronous approach, while only 8% of the instructors (N=9) reported that they adopted interactive asynchronous approach in their courses.

Furthermore, the instructors were asked two questions on the design of the learning and instruction processes, the instructional methods and digital tools and platforms they utilized for the design of online courses, and the analysis results of their responses are presented in Figures 2 and 3. 2% (N=3) of the instructors were research assistants and did not respond to these practice-based questions since they did not actively instruct any courses.

Figure 2.

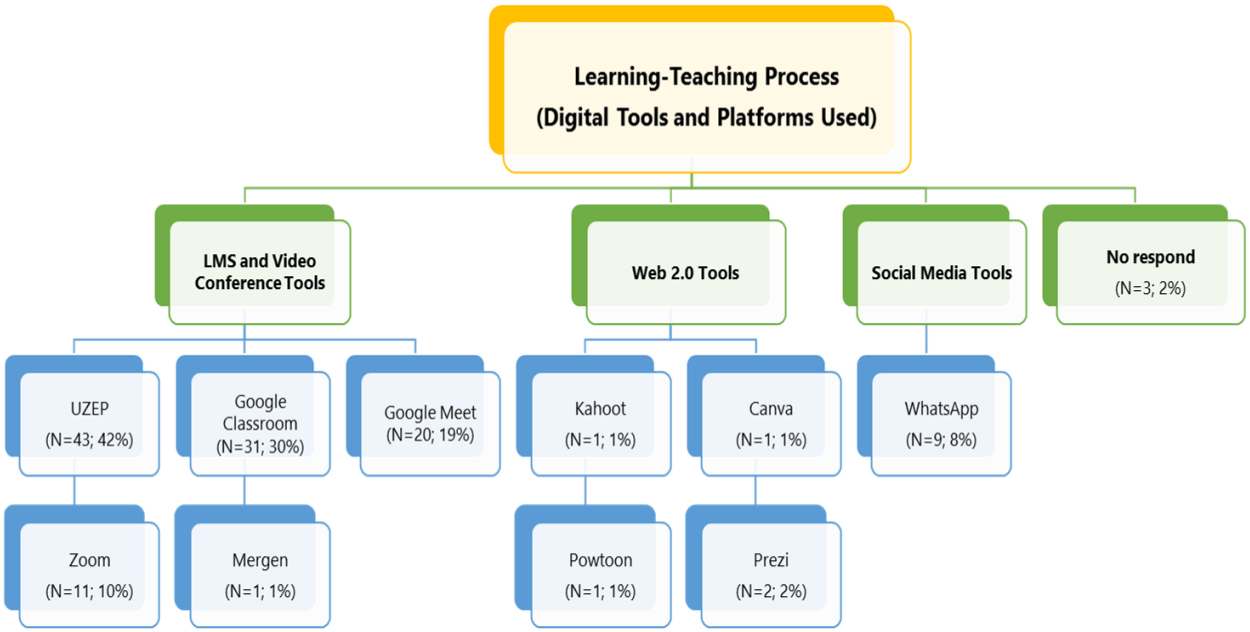
Methods and Techniques Used in Distance Education by Instructors



As seen in Figure 2, the instructors mostly employed synchronous instruction methods in online education. Among the synchronous methods and techniques, 48% of the participants stated that they preferred the presentation method (N=49), and 6% preferred the question-answer method (N=7). Furthermore, 39% (N=40) of them reported that they shared presentations and lecture notes asynchronously on the LMS system, 10% (N=11) used non-interactive videos, and a few of them (5%; N=6) applied projects, homework, and research assignments. Besides, only 4% of the participants (N=5) stated that they employed Web 2.0 tools in distance education.

Figure 3.

Digital Tools and Platforms Used in Distance Education by Instructors



As seen in Figure 3, the instructors frequently employed LMS and video conferencing tools in distance education. Thus, 42% (N=43) of the instructors stated that they employed the UZEP (distance education system) system of their institution, 30% (N=31) used Google Classroom, 19% (N=20) employed Google Meet, 10% (N=11) used Zoom, and 1% (N=1) employed Mergen. Furthermore, 8% (N=9) of them reported that they used WhatsApp as an effective social media tool to communicate and share documents with the students. Also, it was observed that the number of instructors who employed web 2.0 tools in learning-instruction processes was quite low (N=5, 4%). 2% (N=2) of the instructors used Prezi to prepare presentations, 1% (N=1) used Kahoot, 1% (N=1) used Canva to determine course material, and 1% (N). =1) used the Powtoon application to develop video and animations. Certain instructor statements on the methods and techniques, and digital tools and platforms they employed in distance education are presented below.

I6: "In synchronous courses, I delivered lectures during the first half-hour of the class using presentations, and then I used questions and answers. After the synchronous class, I uploaded related links and files to the UZEP system."

I23: "I used conventional tools such as presentations, document sharing. I shared these on Google Classroom."

I28: "I instructed synchronous courses. I shared various materials such as lecture notes, presentations and study questions on the covered topics on the UZEP system, I also developed Google Classroom classes for each course. The materials were also shared there."

I47: " I applied the same method we use in traditional classroom education during one-on-one synchronous classes on Google Meet for presentations, and I asynchronously shared the resources on UZEP ."

I53: " I utilized multimedia sites for various content types, including videos, pictures, and audio. I created engaging animations using Powtoon and converted them into videos."

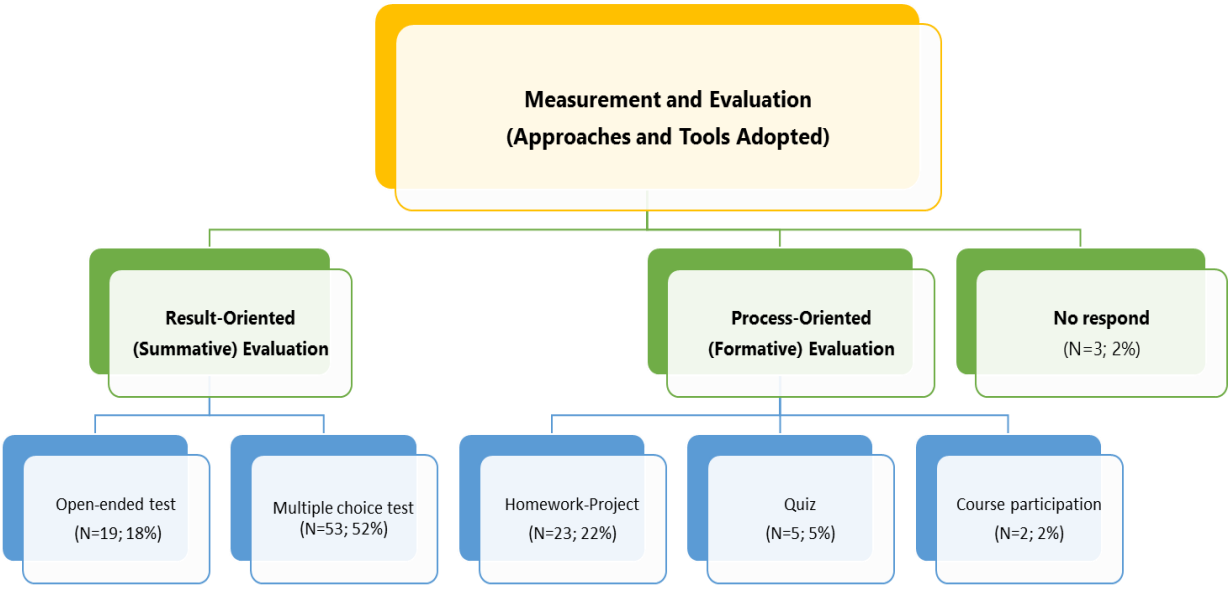
I71: "I downloaded videos for students, sometimes I created videos and shared them on WhatsApp. In synchronous classes, I employed the question-and-answer method based on the videos. Even though I don't think it is an effective asynchronous method, I shared my lecture notes with the students on UZEP."

I96: "Before each class, I uploaded posters and infographics I created using Canva to Google Classroom. During synchronous classes on Zoom to enhance interaction, I conducted instruction using presentations I designed on Prezi. I then shared these presentations with the students after the class. While I followed this procedure, I also wished to incorporate additional digital tools to further enhance the effectiveness of my instruction ."

The analysis results for instructor responses to the question on the measurement and evaluation approaches they adopted to measure the efficacy of online courses and the measurement and evaluation tools and materials they employed are presented in Figure 4.

Figure 4.

Measurement and Evaluation Approaches and Tools Adoped in Distance Education by Instructors



As seen in Figure 4, the instructors mostly adopted the result-oriented (summative) evaluation approach (N=72, 71%) in measurement and evaluation in distance education. It was determined that 52% (N=53) of the instructors who evaluated the results employed multiple-choice tests and 18% (N=19) employed open-ended questions. Moreover, 29% (N=30) of them focused on process-oriented (formative) evaluation. Among these instructors, 22% (N=23) assigned homework and projects, 5% (N=5) conducted quizzes at various intervals, and 2% (N=2) based their evaluation on course participation. Certain instructor statements on the measurement and evaluation methods, the tools and equipment they adopted in distance education are presented below.

I29: "I preferred different types of questions (multiple-choice and open-ended questions) especially during face-to-face education and employed open-ended questions in the exams during distance education. Especially in the quizzes, the same topics or the same questions were asked to the students using different types of questions to allow them better to comprehend the topics. However, the biggest problem was that some of the students did not participate in these applications or talked with each other."

I39: "I preferred the 20-question tests similar to the face-to-face education. But I changed my scale of 2 minutes per question to 1 minute per question. I added 2-3 minutes to the total test period if there were long sentences in the course, especially during the finals and make-up exams. I also collated the questions and the order of the answers. Thus, I reduced the probability of cheating in distance education."

I73: "I used to evaluate both homework and exams in face-to-face classes, but I evaluated only weekly homework assignments in distance education."

I82: "I had to exclude in-class evaluations during distance education. I had to measure and evaluate based on open-ended and interpretation-based questions on UZEP."

Application Findings

The findings collected with the Distance Education Self-Efficacy Perception Scale, applied before and after the professional development program developed based on the needs analysis and preliminary interviews conducted with the instructors are presented in Table 3.

Table 6.

Distance Education Self-Efficacy Perception Scale Pre-Test and Post-Test Scores

Pretest-Posttest	**N**	**Mean Rank (MR)**	**Total Rank**	**Z**	**p**
Negative Rank	0	.00	.00	6.34	.00
Positive Rank	53	27.00	1431.00		
Equal	0				

As seen in Table 6, a significant difference was obtained between the mean ranks of pretest and posttest applications of Distance Education Self-Efficacy Scale scores ($Z=6.34$; $p<.05$). The significant difference was in favor of the positive ranks, in other words, the post-test mean rank (SO=27.00). Thus, it could be suggested that the

professional development program had a positive impact on the self-efficacy perceptions of instructors in distance education.

In addition, the satisfaction survey was applied to instructors at the end of the professional development program in order to determine the satisfaction level of them. The related findings are presented in Table 7.

Table 7.

The Satisfaction of the Instructors with the Professional Development Program

Sub-dimension	**N**	**X**	**S**
Application duration	53	4.51	0.70
Content/duration ratio	53	4.47	0.69
Relevance of the content	53	4.64	0.59
Instructive quality of the content	53	4.66	0.52
Comprehensibility of the content	53	4.62	0.56
Instructor- participant interaction	53	4.77	0.42
General satisfaction	53	4.61	0.45

As seen Table 7, the general satisfaction of the instructors with the professional development program after the application was found to be quite high (X=4.61, S=0.45). Based on the views of the instructors, the sub-dimension with the highest satisfaction was the instructor-participant interaction sub-dimension (X=4.77, S=0.42). This sub-dimension was respectively followed by the instructive quality of the content (X=4.66, S=0.52), relevance of the content (X=4.64, S=0.59), and the comprehensibility of the content (X=4.62, S=0.56). The sub-dimensions that the instructors were less satisfied with were the content-duration ratio (X=4.47, S=0.69), and the application duration (X=4.51, S=0.70) sub-dimensions.

Final Interview Findings

In the final interviews conducted with the instructors, questions about their expectations from the professional development program and whether these expectations were met were asked, and the analysis of the responses is presented in Figures 5 and 6.

Figure 5.

Expectations of Instructors from the Professional Development Program

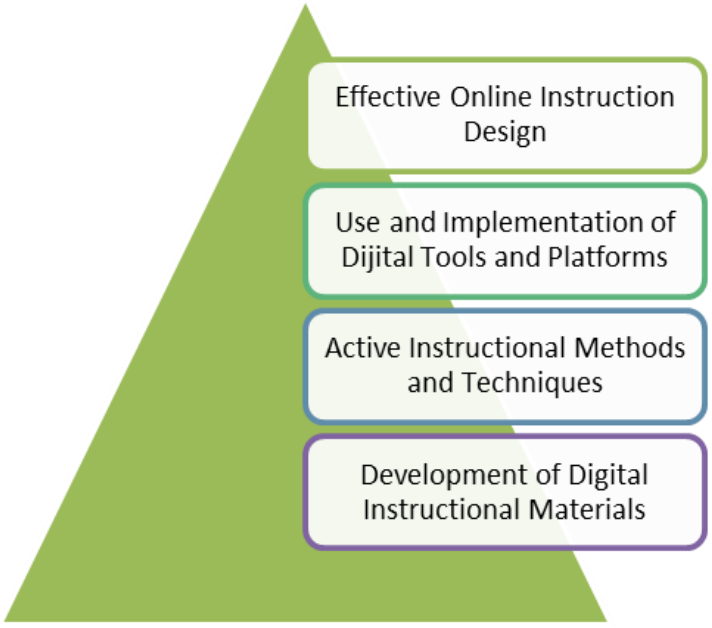
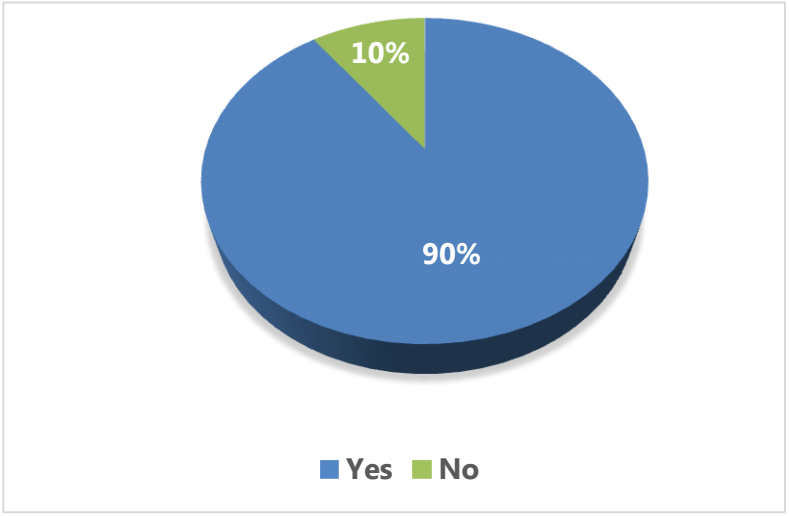


Figure 6.

Status of the Professional Development Program Meeting Expectations



In the final interviews conducted with the instructors, the instructors stated that they had expectations such as instruction on effective online instruction design, implementation of digital tools and platforms, active instructional methods and techniques, and development of digital instructional materials from the professional development program. For the question whether these expectations were met, 90% of the instructors (N=9) stated that the

professional development program significantly met their expectations, while 10% (N=1) responded that it did not fulfill their expectations due to the limited implementation period. Certain instructor views on their expectations from the professional development program and the fulfillment of these expectations are presented below.

P1: "Under current conditions, distance education is more valuable than before. I have been always interested in distance education applications and I tried to follow the developments as much as I can. As soon as I heard that the experts planned such a training, I completed the registration procedures and attended all the courses. During the training, I execrated to improve my knowledge and acquire new knowledge. The training exceeded my expectations. During the training, presentation of the applications for online courses in the form of concrete examples was very valuable."

P5: "In this training, I expected to improve my proficiency in course development and presentations based on course objectives and achievements using digital instruction material in distance education. These expectations were more than met."

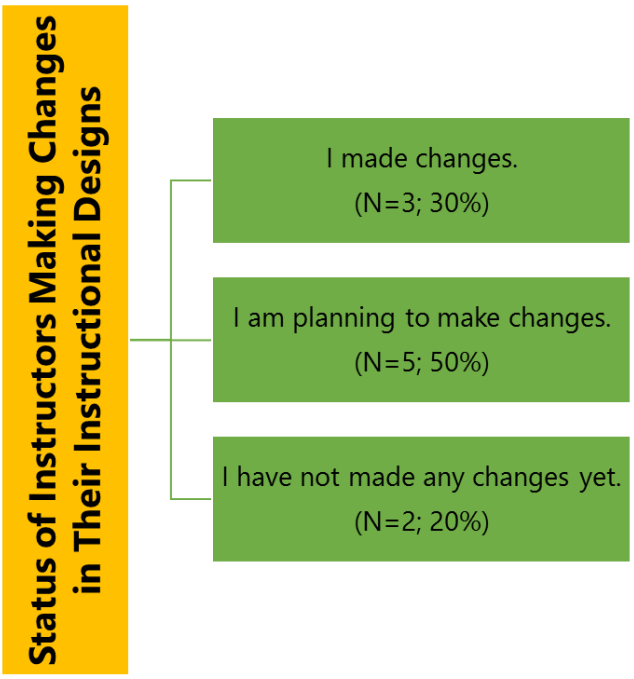
P8: "My expectation from the training was to acquire skills to develop effective instruction materials with various digital tools and design my classes with these materials. In the training, I learned where and how I can use various tools, but it could have been much better if we could have practiced. I know that a much longer training should be organized for achieve this, so my expectations were not met due to the time limit."

P10: "Especially in online classes, my expectation was to acquire the ability to diversify my classes with various Web 2.0 tools to encourage student participation, to improve their interest, motivation, and to instruct permanent knowledge. The training exceeded my expectations."

Furthermore, the instructors were asked whether they implemented any changes in their instructional design and whether they employed these instructional designs after the professional development program, and the analysis results of their responses are presented in Figures 7 and 8.

Figure 7.

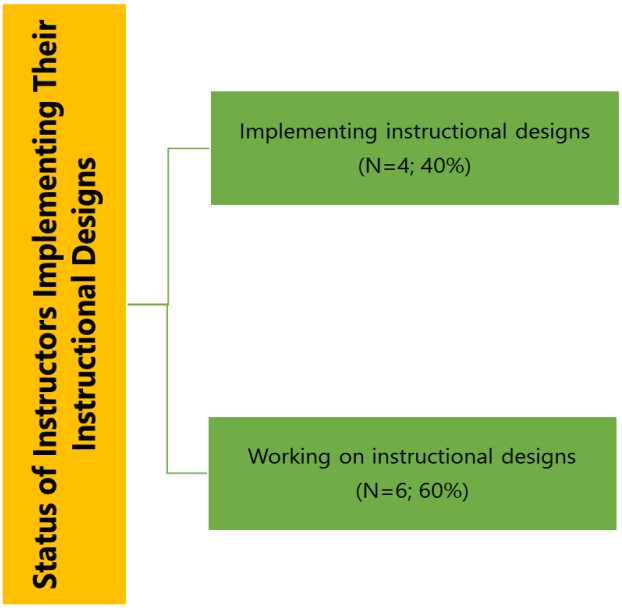
Status of the Instructors Making Changes in Their Instructional Designs



As seen in Figure 7, 30% (N=3) of the instructors stated that they changed their instructional designs after the professional development program, and 50% (N=5) stated that they planned to make changes. On the other hand, 20% of the instructors (N=2) stated that they did not change their instructional design methods.

Figure 8.

Status of the Instructors Implementing Their Instructional Designs



As seen in Figure 8, 40% (N=4) of the instructors reported that developed and started to implement a new instructional design. Besides, 60% (N=6) of them stated that they started to redesign their instructional approach based on the professional development program and they were working on their instructional designs. They stated that they revised their instruction based on what they learned in the program, and they will redesign their courses. Certain instructor statements regarding the implementations and works on their instructional designs are presented below.

P2: "Yes, I did. I revised the content and allowed more interaction in the learning process. I included Web 2.0 tools in the process. I included homework assignments and peer assessment in evaluation."

P4: "I haven't had a chance to make any changes in my courses, but I will redesign my courses."

P6: "After the training, I had the idea to implement changes, but I have not done it yet. But I plan to use different instruction approaches and different tools in my classes, and I will redesign my courses accordingly."

P9: "Yes, I can say that I completely changed the instructional design. I started to use Web 2.0 tools more, and I think that I now design and implement more effective courses."

Finally, the instructors were asked about the digital tools and platforms they used, learned to use, and could use in their classes, and the results of the analysis of their responses are presented in Figure 9.

Figure 9.

Digital Tools and Platforms Used/Learned by Instructors

As seen in Figure 9, 40% (N=4) of the instructors stated that they learned Edmodo, Canva, Padlet, Prezi, Kahoot, Bubbl.us applications during the professional development program applied and employed these in their classes. Also, 30% (N=3) stated that they started using Powtoon, Wordwall, Mentimeter, Edpuzzle, MindMeister applications, and 20% (N=2) stated that they started using Socrative, Nearpod, Flipgrid applications in their classes after the training. Besides, 10% of the instructors (N=1) reported that they learned Perusall, Phet, Thinglink, Quiziz applications during the professional development program and started to use these tools in their instructional designs.

P4: "I knew some of the tools but I never used them. Edmodo, Padlet, Powtoon, Edpuzzle, Bubbl.us, MindMeister and Mentimeter were introduced in the program and I started using these. When I saw what I could do with these tools, I started using them in my classes."

P5: "You introduced dozens of Web 2.0 tools in the program. I noted the tools I intended to use during the program. These were Prezi and Canva to prepare presentations, Kahoot and Quiziz for interactive evaluation, and I started using Edmodo in synchronous and asynchronous lectures. These will increase with future training."

P8: "I learned Web 2.0 tools such as Mentimeter, Nearpod, Padlet, Phet, Powtoon, Socrative, Thinglink, and Wordwall. I started to design my course with these tools."

After the professional development program developed and implemented for the instructors, the participants started to redesign, and others started to design their instructional processes and integrate digital tools and platforms further. Thus, based on instructor views, it could be suggested that the professional development program contributed to the development and implementation of effective instructional designs.

Discussion, Conclusion & Suggestions

The needs analysis and preliminary interviews conducted in the present study, which aimed to improve the digital competencies of the instructors in distance education, revealed that most instructors never participated in any professional development program on distance education. Tuncer and Tanaş (2011) reported that instructors did not participate in any distance education training program in their institutions. When the instructors were asked about their problems in distance education competencies and their training requirements, most instructors stated that they required training on Web 2.0 tools and applications, online instructional design, and distance education methods and techniques. Literature review revealed that since the transition to distance education was sudden during the pandemic, the instructors were not ready for this transition and experienced problems in distance education system and the design of online instruction practices (Durak et al., 2020; Kalloo et al., 2020; Marelli et al., 2021; Telli, & Altun, 2020). Öztürk (2020) reported that the instructors felt inadequate in the instruction of online courses. It was also determined in the present study that the instructors mostly preferred synchronous methods in online course design. In other words, only a few instructors adopted asynchronous approach in distance education, and these did not go beyond sharing lecture notes and presentations. Thus, it was determined that the instructors mostly preferred conventional instructional methods, even in distance education. Also, it was observed that the interactions between students and between students and the instructor were quite limited in both synchronous and asynchronous instruction. This could be due to the problems that instructors experienced in the adoption of interactive digital tools and platforms. The low number of digital platforms and devices that instructors employed before the professional development program was consistent with this finding. Sayan (2020) reported that instructors mostly instructed their courses with synchronous methods. Since today's technologies enable the creation of synchronous or asynchronous learning networks is an important advantage that technology has added to distance education (Beldarrain, 2006) and the employment of both synchronous and asynchronous applications in distance education could lead to a more effective learning environment (Balıkçıoğlu et al., 2019), the fact that instructors preferred synchronous applications could have led to a less active instruction environment. In a previous study, it was determined that instructors adopted both synchronous and asynchronous applications in online courses during the pandemic (Kurnaz & Serçemeli, 2020).

The analysis of the views on distance education and related practices of the lecturers before the professional development program demonstrated that most instructors had negative views and low self-efficacy perceptions about distance education. This could be attributed to a lack of competencies in distance education or the abrupt transition to distance learning during the pandemic. Literature review revealed similar findings. Certain studies concluded that instructor views on distance education were mostly negative, and they preferred face-to-face education (Dolmacı, & Dolmacı, 2020; Sayan, 2020; Telli & Altun, 2020). However, distance education applications are increasingly

prioritized in universities (Duman, 2020), and distance education applications intensified after the pandemic. Thus, distance education process could become more functional with the employment of digital learning and new technologies and systems (Telli, & Altun, 2020).

It was emphasized that in-service training for faculty members and educators, development of effective digital content, adoption of adequate online education methods and techniques, improvement of interaction in the instruction, and expert support are important to improve the efficacy of distance education (Erfidan, 2019) since distance learning requires careful planning and design (Bozkurt & Sharma, 2020). However, based on the present and previous study findings, it was determined that instructors' digital competency levels were low, and they needed to acquire these skills to improve the effectiveness of distance education. Telli and Altun (2020) reported that online educators experienced problems in the employment of technological tools and programs and required improvement. Bozkurt (2020) concluded that certain educators did not have adequate digital skills. Ferri, Grifoni, and Guzzo (2020) found that there were technological, pedagogical, and social problems in distance education in their study on the advantages and disadvantages of distance education during the pandemic. They emphasized that the digital skills of the educators were inadequate, and this was the leading pedagogical problem in distance education. Similarly, Karadağ and Yücel (2020) concluded that technological skills of the instructors were inadequate. Sayan (2020) also reported that the instructors were not proficient in the design and use of digital materials. Also, Kalloo, Mitchell, and Kamalodeen (2020) reported that the readiness of the instructors was inadequate for distance education during the pandemic and the instructors had to focus on different problems such as the development of adequate content for distance education and the employment of digital tools. In this sense, the application of the professional development program developed to improve the low self-efficacy perceptions of the instructors about distance education and to improve their digital skills led to relatively positive results. It was determined that the pre-test mean score and the total self-efficacy perception rank increased significantly after the professional development program. It could be suggested that the program topics such as "Online Course Design" and "Web 2.0 Tools and Applications" had a significant effect on the self-efficacy perceptions of the instructors in distance education. In the study conducted by Ak, Gökdaş, Öksüz and Torun (2021), was determined that the online in service training program had a significant effect on instructors' self-efficacy perceptions and perceptions of benefit for distance education (Ak et al., 2021).

It was considered significant that most instructors changed or planned to change their instruction design after the professional development program. Furthermore, it was determined that the number of digital tools and platforms learned and employed by the instructors increased after the application. Given the necessity of using technology in distance education and learning (Bilgiç & Tüzün, 2015), it can be inferred that the incorporation of digital tools and platforms by instructors will contribute to enhancing the learning environment in distance education, leading to more effective and productive instruction. As reported by Grout and Houlden (2014), technology use is essential in educational environments and technology use would improve learning efficacy.

In the study, it was determined that the instructors were quite satisfied with the program content, duration, comprehensibility, application, interactive and instructive properties. The expectations of the participants before the professional development program were highly met by the program. Barış and Çankaya (2016) emphasized that it

was quite important to support teaching staff with professional development and in-service training programs. Furthermore, they reported that feedback and implementation of the required changes and planning would improve the quality of distance education. Thus, all potential areas of educational improvement should be determined and related in-service training should be provided for the instructors for effective online education. Consistent with scientific and technological advances, instructors' online education skills should be improved. Thus, applied in-service training should be provided based on instructor requirements for effective and productive instruction. This study is limited with the instructors articipating in the research, the scope and activities of the professional development program designed and implemented by the researchers, and the findings and comments reached as a result of the analysis of the quantitative and qualitative data obtained in line with the data collection tools used by the researchers. In this regard, it may be suggested to conduct similar applied research with sample groups of different levels and sizes. In addition, professional development programs can be designed and implemented on this issue or different subjects that instructors need. The effectiveness of these programs should be analyzed to assist the employment of methods, techniques, digital tools and materials that would lead to a more participatory and active learning environment both in face-to-face and distance education.

Ethic

This study was approved by Artvin Çoruh University Ethics Committee (Date: 30/06/2021, Approval Number: E-18457941-050.99-15157)

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This article was written with the joint contributions of two authors.

Conflict of Interest

The authors declare that they have no conflict of interest.

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