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The Comparison of Technology Integration Experiences of Teachers and Faculties: Distance Teaching Context

ABSTRACT

The study aims to compare the technology integration practices of teachers and faculties from their perspectives within the context of distance education. The study's research design is a cross-sectional survey. Technology Integration in Distance Education Questionnaire was prepared by the researchers. The instrument was administered to 189 faculties and 91 teachers with distance teaching experience. Both qualitative and quantitative methods were used to analyze data. The findings suggest that participants perceived themselves as proficient in designing instruction for distance education, but no significant differences were found between teachers and faculties. EFA was conducted to determine questionnaire structure, and results showed three factors; planning the instruction, process, and post instructional process. Comparison of these factors scores showed no significant differences in planning the instruction and post-instructional process but significant differences in process between teachers and faculties. Content analysis results show that material types are divided into six main themes, namely: (i)audio, (ii)visual, (iii)audio-visual, (iv)interactive, (v)textual, and (vi)real objects/models/sources. Instructional methods are divided into three main themes, namely: (i)student-centered, (ii)teacher-centered, and (iii)mixed. In addition, content analysis results also showed that participants perceived themselves as proficient but needed clarification about methods and materials used in distance education. These findings were discussed in detail.

Keywords: Technology integration practices, distance education, ICT competencies, exploratory factor analysis.

Introduction

Technology integration is related to various factors in different contexts. Recently, Mishra (2019) updated the TPACK (Technological Pedagogical Content Knowledge) model by naming the outer circle as “context,” which means that the boundaries of how teachers teach are built upon either the enablers or barriers of the context. In the pandemic, the context differed from traditional settings. Still, it was also much more different than distance education settings in which the premise of anytime-anywhere learning is at the center. During the pandemic, the basic assumptions of distance education were not met. For example, synchronous activities took place longer than a usual distance course. Some institutions had no official learning/course management systems to be used before the pandemic. There were no asynchronous activities included in the instructional design. Some target learners did not have access to the live sessions due to infrastructure issues. Not all institutions could stack the recordings of the live sessions, so learners might not have equal opportunity to access the course materials if they were absent. In addition to the issues about equal access (Tavares et al., 2021) the pandemic showed the gap in technology competence between learners and teachers/faculties (Akram et al., 2021; Pinto et al., 2021).

According to UNESCO’s 2020 report, educators' content and pedagogical skills still need improvement in many countries. Teaching at a distance is not a part of the official Turkish teacher education programs. There is” no prerequisite training for higher education to become a distance educator. The pandemic made a compulsory transition from a face-to-face to a full-online teaching environment. Familiarity with the distance teaching context is an essential factor influencing how people teach (Akram et al., 2021; UNESCO, 2020).

The ICT (Information and Communication Technologies) competency framework offered by UNESCO (2018) consists of three basic levels of ICT usage: knowledge acquisition, knowledge deepening, and knowledge creation. While simple usage of available tools and content

refers to a basic level, teachers may go beyond designing activities as they feel confident with the technology, which refers to knowledge creation. However, recent research studies point out that neither high levels of confidence nor positive beliefs guarantee innovative teaching (Alvarez & Cervera, 2015; Li, 2022; St-Onge et al., 2022; Yang et al., 2022). Having a closer look at the ICT integration practices of EFL teachers, Lestarina et al. (2022) reported that despite the positive beliefs of teachers, their ICT integration was limited to essential practices. Although individual factors affect the integration process, organizational factors influence the overall process (Ertmer et al., 2012; Padayachee & Moodley, 2022; St-Onge et al., 2022). The rich resources of learning management systems, data plans, live session tools, cloud spaces, devices, and equipment may only be available for some. The lack of resources may hinder the learning process of teachers/faculties and teaching (Hordatt-Gentles & Haynes-Brown, 2021). As a result, educators might need more preparation regarding technology integration.

Purpose of the Study

In this study, the technology integration experiences of educators within distance education settings were examined. With the emergence of the pandemic, the number of studies focusing on the transition from traditional settings to online ones has increased. The current study aims to extend the literature by comparing educators' perspectives from K-12 and higher education. This comparison highlights discrepancies between the practice of these two groups because teachers were subject to national platforms, whereas the universities found their solutions regarding technical backgrounds. The national platform EBA provided a live classroom tool to meet online synchronously, but the recordings and their distribution were impossible via the platform. Moreover, the schedule was pre-determined, i.e. it was not flexible. On the other hand, the platform already has a library offering a variety of sources, such as animation. The platforms used by universities generally supported recording and asynchronous distribution of resources. In addition, teachers all have to complete compulsory computer certificate courses held by the Ministry of National Education. At the same time, the National Council of Higher Education does not offer such compulsory certification for faculties. The following research questions will be utilized to understand and compare both groups' experiences:

- RQ1. What is the difference between teachers' and faculties' perceptions of general ICT competencies within the distance education context?
- RQ2. What is the difference between K-12 teachers' and faculties technology integration experiences within the distance education context?
- RQ3. Which methods and materials do teachers and faculties use within the distance education context?

Method

Research Design

The study's research design is a cross-sectional survey in which data collection occurs within a predetermined population (Fraenkel et al., 2012). In this study, teachers and faculties with distance teaching experience were involved. The data of the study was gathered from a single point in time and a specific population, so this study was cross-sectional. In this way, their experiences were focused on with the help of either qualitative or quantitative data. The questionnaire was developed by the researchers and was delivered online via Google Forms. The data collection occurred once, and then the sharing link was deactivated. Collected data was analyzed either qualitatively or quantitatively. The questionnaire items were subjected to quantitative analysis, while the open-ended questions were analyzed using qualitative methods.

Sample of the research

The instrument was administered to a total of 290 volunteer people who have distance teaching experience. 189 faculties and 91 teachers participated in this study. The data for this study were collected from two state universities in the same city and from a select group of teachers employed within the same city. The characteristics of the group are as follows: The average number of students in the faculties is 46, and the weekly course hours are 17. On the other hand, teachers have an average number of 22 students and 22 hours of lessons per week. The average number of students is 38, and the average course hour is 19 per week. Understanding these characteristics helps understand the impact of participants' experiences. In the current study, it is presumed that the participants have no experience with distance education.

Data Collection Instrument

The instrument in this study was constructed based on the instructional design process, having roughly five primary phases: analysis, design, development, implementation, and evaluation (ADDIE) (Reigeluth, 1999), by the researchers. The draft version of the instrument was piloted to determine unclear issues/items. In developing the item pool, expert opinions were solicited. Specifically, feedback was obtained from two experts specializing in measurement and evaluation within the fields of computer and instructional technologies. Based on their insights, modifications were made to the clarity of the items. A pilot

application was conducted through one-on-one interviews with a small group of individuals not participating in the main study. This was done to assess the clarity of the items, and any items that were not clearly understood were subsequently revised. As a result, some items were revised, some were deleted, and the final version of the instrument was composed. The final version of the instrument consists of general ICT demographics, and a Technology Integration in Distance Education Questionnaire (TIDEQ). The general information section includes the number of students, weekly course hours load, number of used materials, and methods with their names. These items were included in the questionnaire as open-ended questions. The ICT demographics section includes four items based on a 4-point Likert scale design (i.e., 4 = Absolutely proficient, 3= Proficient, etc. …). This part also includes two questions about ICT competency and instructional design skills for distance education; these items are based on a 1 (very weak) - 10 (very strong) scale design. The questionnaire was developed to understand how participants perceive their integration practices for distance education and their perceived ICT skills. Although the reference instructional design framework ADDIE includes 5 phases, the "analysis, design, and development" phases were classified as planning the instruction; the "implementation" phase was considered a process; and the "evaluation" phase was classified as a post-instructional process. Therefore, TIDEQ consists of three parts. The first part includes 11 items, the second part includes 15 items, and the last part includes five items based on a 4-point Likert scale design (i.e., 4 = Absolutely proficient, 3= Proficient, etc. …). The instrument was administered to faculties and teachers via Google Forms.

The ethical process in the study was as follows;

- Ethics committee approval was received from Ondokuz Mayis University Ethics Board of Social and Humanity Sciences (Date: 31.05.2024, No: 2024-506).
- All participants voluntarily involved to the study and completed an online consent form.

Data Analysis

The study aims to describe and compare teachers' and faculties' ICT demographics and technology integration practices within the distance teaching context, which was quite different from the literature, and thus sometimes called emergency remote teaching (Tavares et al., 2021). For this purpose, teachers' and faculties' responses were compared by conducting independent sample t-tests about general competencies of ICT in the first step of the data analysis. Before conducting the t-test, the univariate normality assumption was checked. As a result, skewness and kurtosis were between (-1, +1), which satisfies the normality assumption. Next, EFA was conducted to investigate the data's factor structure, and teachers' and faculties' factor scores were compared by conducting an independent sample t-test. In addition, the Cronbach alpha reliability of the TIDEQ questionnaire also was calculated, and the results were .96.

Finally, content analysis was performed to analyze the responses to open-ended questions. The number and names of the materials and methods used were asked as open-ended questions. The researchers used an induction approach to review the participants' responses, generate specific codes to classify the responses, and then determine the appropriate themes to categorize the coded items.

Results

In the data analysis process, general ICT demographics results and a comparison of them between teachers and faculties were made. This part provides an explanation of the findings related to RQ1.Then, EFA was conducted with TIDEQ questionnaire data to investigate factor structure. Then factor score was compared between teachers and faculties. This part also provides an explanation of the findings related to RQ2. Lastly, the responses to the open-ended questions were analyzed using content analysis, and results were presented.

General ICT Competencies

The general results of ICT competencies are summarized in Table 1. Y1, Y2, Y3, and Y4 are based on a 4-point Likert scale. The ICT ability and design ability are based on 1-10 ratings. It was assumed that as they were familiar with the terminology.

Table 1.
ICT Usage Profile

Demographic Item	$\bar{X}$
My ICT literacy level is proficient in designing instruction. (Y1)	3.27
I attend seminars, certification programs, etc. about distance education. (Y2)	2.91
I easily adapt to the distance education process. (Y3)	3.22
I share my experience with people giving instruction in distance education (Y4)	3.19
ICT ability	7.61
Instructional Design ability	7.17

The ICT ability and design ability between faculties and teachers were compared, and the results are presented in Table 2.

Table 2.
Comparison of ICT Ability and Design Ability

Variable		$\bar{X}$	sd	*t*	df	*p*
Y1	Faculty	3.31	.760	1.255	278	.211
	Teacher	3.19	.829			
Y2	Faculty	2.87	.883	-1.257	277	.210
	Teacher	3.01	.925			
Y3	Faculty	3.30	.752	2.478	277	.014
	Teacher	3.05	.848			
Y4	Faculty	3.25	.785	1.764	277	.079
	Teacher	3.07	.879			
ICT	Faculty	7.70	1.533	1.514	277	.131
	Teacher	7.41	1.520			
Design	Faculty	7.25	1.748	1.070	276	.286
	Teacher	7.00	1.972			

Participants generally perceive themselves as proficient in design instruction in distance education. They participate in courses about distance education, besides sharing their experience with their colleagues. A comparison of teachers' and faculties' results shows no significant differences in these items (Y1(t (278) =1.255, $p > .05$; Y2 (t (277) =- -1.257, $p > .05$; Y4 (t (277) = 1.764, $p < .05$). Participants reported that they quickly adapted to the distance education process. However, when comparing teachers and faculties, there are significant differences (Y3 (t (277) = 2.473, $p < .05$), and the faculties' mean score is higher than that of teachers. In addition, participants perceived their ICT ability and instructional design ability for distance education as high. A comparison of faculties' and teachers' results shows no significant difference in ICT ability (t (277) = 1.154, $p > .05$) and design ability (t (276) = 1.070, $p > .05$).

Factor analysis results

EFA defines factors that underlie a construct defined as a set of variables and indicates these factors' correlation level. Therefore, EFA is an essential contribution to the validation of test scores (Stapleton, 1997). This study used factor analysis as a part of construct validity procedures. The first step of this was the TIDEQ questionnaire, including 31 items representing the construct, which was developed according to the referenced ID framework. Then, data were gathered with this questionnaire. Lastly, EFA was conducted to determine the factor structure of the data. Six items were excluded from the data set according to this analysis results, and the final version of the questionnaire had 25 items. Principal component analysis with varimax rotation was conducted, and eigenvalues greater than one were taken cut-off point. Also, the scree plot (see Figure 1) indicated the data had three dimensions, and 62% of the total variance accounted for these three factors' structure. These three factors represent similar structures to the planned model while developing the questionnaire. In other words, empirical data confirms hypothesized model, so, this was taken as valid evidence.

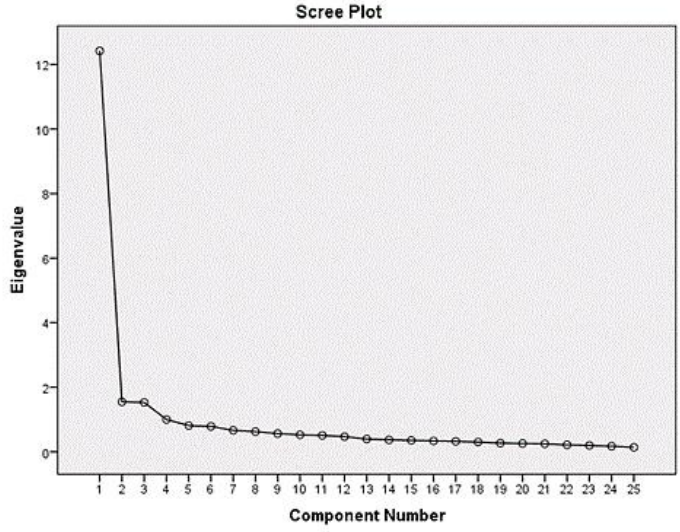

Figure 1.
Scree Plot

Indicating a similar structure to the hypothesized model, factor names were the same. The first factor is named planning the instruction (F1), the second factor has named a process (F2), and the last factor is named a post-instruction process (F3). Table 3 shows factors and factor loadings.

Table 3.
Factor Structures of the Data According to Efa

Items	Factors		
	F1	F2	F3
I can adapt course contents to distance education environment.	.767		
I can arrange instructional materials that are in line with the needs of distance education.	.745		
I can arrange the environment for students-material interaction.	.718		
I use materials, which I use for face-to-face education, same way in distance education.	.695		
I can plan for distance education during the content preparation.	.689		
I can suggest additional resources for pre-lesson preparation.	.687		
I take into account students' needs in designing instruction.	.647		
I can adapt methods and technics used in face-to-face education to distance education.	.628		
I can arrange the environment for student-student interaction.	.616		
I can use Information and Communication Technologies tools in designing instruction.	.568		
I can ensure the active participation of students in lesson.		.764	
I can control the flow of the lesson by monitoring the needs of learners		.752	
I can use methods which improve students' interest.		.745	
I can communicate effectively during synchronous sessions.		.700	
I can determine communication rules and methods during distance education.		.664	
I can give feedback to students during lesson.		.608	
I can use different instructional methods.		.602	
I can make diagnostic assessments before instruction.		.599	
I can use time efficiently.		.576	
I can use formative assessments during instruction.		.522	
I benefit from ICT to give homework.			.792
I can give feedback to students' works after instruction.			.785
I can prepare exams using ICT tools.			.725
I can provide post-instruction additional resources.			.667
I can support students with different communication tools after the course.			.642

F1, F2, and F3 factor scores were also compared with independent sample t-tests, and the results were presented in Table 4.

Table 4.
Comparison of Factor Scores Between Teachers and Faculties

Variable		$\bar{X}$	sd	*t*	df	*p*
F1	Faculty	-.039	.981	-.930	263	.353
	Teacher	.085	1.041			
F2	Faculty	-.135	.991	-3.303	263	.001
	Teacher	.295	.960			
F3	Faculty	.078	.982	1.887	263	.060
	Faculty	-.171	1.023			

Comparison of factor scores had no significant mean differences between teachers and faculties for F1 (t (263) = .930, $p > .05$) and F3 ($t(263) = 1.887$, $p > .05$). In contrast, there was a significant difference between teachers and faculties for F2 ($t(263)$=- -3.303, $p < .05$), and teachers' mean scores were higher.

Content analysis results

After factor analysis, teachers and faculty's responses about instructional materials and methods used in the distance teaching process were analyzed via content analysis. The results showed that although teachers' and faculties' number of materials varied between 1 to 12, the most frequent number was 3 for both groups separately. The number of instructional methods varied between 1 and 9; the most frequent number was 3 for teachers and 2 for faculties.

Instructional Materials

The reported material types were divided into six main themes, namely: (i)audio, (ii)visual, (iii)audio-visual, (iv)interactive, (v)textual, and (vi)real objects/models/sources. Most of the preferred materials generally showed similar tendencies between teachers and faculties. Teachers and faculties use sound clips as audio materials. This type of material was the least used one. On the other hand, audio-visual and digital textual materials had the highest ratings. For visual materials, teachers mentioned four subtypes, including flashcards, concept maps, charts/tables, and stock images, whereas the faculties reported only maps and stock images as visual materials. For audio-visual materials, the gap between teachers and faculties was large. That is, faculties reported the utilization of animations, session recordings, and videos much more than the teachers. Teachers did not use session recordings as instructional materials. For interactive materials, teachers provided a more significant portion of

usage than faculties, but their varieties were very similar. Teachers listed simulations, augmented reality maps, and other interactive materials created using Web 2.0 tools. Faculties also reported such interactive materials, task-based specific materials, and 3D interactive models. For textual materials, participants referred to two sub-types: printed and digital. Faculties reported much higher numbers of printed textual materials than teachers. Teachers prefer worksheets and books as printed textual materials, while faculties prefer textbooks, articles, theses, reports, notes, and guides. The gap between teachers and faculties gets larger in using textual materials. A similar pattern exists in the utilization of digital textual materials. Faculties reported much higher numbers of digital textual materials than teachers, but the subtypes were similar. They were limited to PowerPoint slides and e-books. For real objects/models/sources, teachers mentioned a variety of them, whereas only one faculty reported one real object. The instructional material types integrated into distance education settings by the current study participants were summarized in Table 5.

Table 5.
Instructional Materials in Distance Education

Instructional Material Type	Teacher (%)	Faculty (%)
Audio	3 (3.3%)	4 (2.12%)
Visual	13 (14.29%)	10 (5.29%)
Audio-visual	11 (12.09%)	56 (29.63%)
Interactive	21 (23.08%)	20 (10.58%)
Textual		
Printed	9 (9.89%)	61 (32.28%)
Digital	9 (9.89)	77 (40.74%)
Real objects/models/ sources	7 (7.69)	1 (0.53%)

On the other hand, not all responses given fell into the instructional material category. A few teachers assumed that the tools, such as the smartboard, were instructional materials, but this confusion was more frequent among faculties. A few participants confused the online learning platforms or course/learning management systems with instructional materials. Finally, a few faculty reported instructional methods as instructional materials. Table 6 summarizes the findings about misconceptions.

Table 6.
Misconceptions About Instructional Materials in Distance Education

Confused Construct	Teacher (%)	Faculty (%)
Tool (computer, smartboard, etc.)	12 (13.19%)	40 (21.16%)
Platform (cms/lms, etc.)	5 (5.49%)	8 (4.23%)
Method (assessment, evaluation, etc.)	-	8 (4.23%)

Instructional Methods

Participants' responses were investigated under three main themes, namely: (i)student-centered, (ii)teacher-centered, and (iii)mixed. In general, the mixed instructional methodologies were the least preferred methods, whereas the teacher-centered methodologies were the most preferred ones. For student-centered methods, faculties reported various subtypes, including problem-based learning, discussion, discovery learning, collaborative learning, game-based learning, project-based learning, etc. On the other hand, teachers' responses were limited to discussion, collaborative learning, and project-based learning. For teacher-centered methods, faculties are mentioned much more frequently than teachers. Both reported similar sub-types, including demonstrations and direct instruction. For the mixed method, teachers mentioned the eclectic approach while implementing the methods. Faculties using the mixed method generally combine the methods towards the student-centered approach. The summary of the methods preferred in distance education is presented in Table 7.

Table 7.
Instructional Methods in Distance Education

Instructional Methods/Techniques	Teacher (%)	Faculty (%)
Student-Centered (discussion, project-based, etc.)	16 (17.58%)	77 (40.74 %)
Teacher-Centered (direct instruction, demonstration, etc.)	37(40.66%)	141(76.60%)
Mixed	2 (2.20 %)	7 (3.70 %)

Some participants needed to be more specific about defining the instructional methods. Many faculties, besides a few teachers, assumed that materials are methods. Moreover, a few participants needed clarification on tools and activities with instructional materials. One teacher mentioned distance education as a type of instructional method. Table 8 summarizes the misconceptions.

Table 8.
Confused Construct

Instructional Methods/Techniques	Teacher (%)	Faculty (%)
Material	2 (2.20%)	17 (8.99 %)
Tool	1 (1.10 %)	7 (3.70)
Activity	4 (4.40 %)	7 (3.70)
Education format	1 (1.10%)	-

Discussion

This study demonstrates the comparison of technology integration practices of teachers and faculties from their perspectives. The findings were discussed within this context.

Participants rated their proficiency levels and comfort with technology integration, ICT, and instructional design practices for distance education. Their ratings were considerably high and similar to each other. They generally see themselves as proficient in ICT literacy and its integration into distance education settings, which aligns with recent studies (e.g., Hordatt-Gentles & Haynes-Brown, 2021; Tavares et al., 2021). The qualitative data provided reflections on participants' practices, and thus many misconceptions were explored, which were not supportive of the self-ratings. The material-method distinction was a bit problematic among participants, especially among the faculties, which is expected as not all of the participants had the pedagogical certificate. This aligns with a recent study showing the inconsistencies between teachers' beliefs and ICT integration levels (Lestarina et al., 2022). The ICT literacy level might be critical for eliminating misconceptions as digital sources can be evaluated critically. In Menz et al.'s (2021) study, non-scientific sources were reported as the leading sources of misconceptions of pre-service teachers. In order to discriminate reliable sources from unreliable ones is closely related to digital literacy. Further detailed studies can be designed to extract the patterns of misconceptions caused by a lack of digital or ICT literacy.

The only significant difference between teachers and faculties was about the adaptation process, i.e., faculties' ratings were higher than that of teachers. This may be because faculties have started to use the same PowerPoint presentations they used in distance education courses, as can be understood from the qualitative data. In contrast, teachers did not have much practice in using ICT before the pandemic. In Hordatt-Gentles and Haynes-Brown's (2021) study, teachers had no difficulties teaching online, but in the literature, the comparison of teachers and faculties in terms of adaptation is missing. Further investigation might reveal the differences among various levels of teaching.

Different participants might perceive things to be changed for distance settings differently. Specific studies of the pandemic report that technological competence needed to be improved during the integration process, contrary to content knowledge (Akram et.al, 2021). The qualitative data pointed out the existence of misconceptions among participants about both methods and materials. Some faculties needed clarification on specific terms, tools, and practices with either methods or materials. Although the faculties claimed they were significantly better at adapting, responses provided with examples did not confirm it. They generally referred to teacher-centered methods as direct instruction, which limits interactions among all essential elements of distance learning (Moore, 1991). The issue of misconceptions in the literature generally exists within the scope of pre-service teachers' misconceptions of particular subject areas (e.g., Gorham-Blanco, & Chamberlin, 2019) and students' misconceptions (e.g., Kaniawati et al., 2019). This study extends the literature by comparing teachers' and faculty's misconceptions about online teaching practice. In the literature, misconceptions about class size, testing effect, learning styles, etc., were reported frequently (e.g., Menz et al., 2021), and the findings of the current study enriched the list by focusing on the existence of misconceptions of not only teachers but also the faculties.

Although participants claimed that they were competent in terms of instructional design and the utilization of ICT, most of their responses only went beyond ready-to-use materials. In UNESCO's (2018) ICT competency framework, this is labeled knowledge acquisition and does not go beyond regular usage. A few participants mentioned materials developed via Web 2.0 tools. This might be an example of knowledge deepening (UNESCO, 2018) since these tools support students' development and collaboration. On the other hand, considering both participants' self-scores and qualitative data, it can be inferred that a gap exists between the knowledge and practice of ICT integration (Akram et al., 2021).

To understand the instructional design process of participants, the way they integrate technology into distance education settings was revealed and similarly investigated through three factors in the hypothesized model: preparation, implementation, and follow-up. In the preparation phase, the responses of either group of participants did not significantly differ. In other words, the participants were able to plan content, materials, and methods quickly, besides being sensitive to the needs of learners. They also stated that they could benefit from ICT

to prepare distance instructions. Such an attitude is crucial for technology integration since ICT readiness, acceptance, and literacy are closely related (Petko et.al, 2018).

In the implementation phase, teachers significantly differ from faculties in terms of technology integration practices considering active participation, high motivation, feedback, well-established communication, time management, and methods to monitor students' progress online. Teachers are used to managing a smaller range of face-to-face and online students. However, faculties have to communicate with a more significant number of students, and it might get harder to manage feedback, monitoring, or communication. One advantage of teachers can be the involvement of parents in the synchronous sessions, which might lead students to attend and participate actively. A similar case was reported by Hordatt-Gentles and Haynes-Brown (2021). However, for university students, the conditions were not comparable; hence, the teacher-centered methods and techniques might facilitate faculties' implementation stages. This finding supports Moore et.al (2016) that demonstrated how distance education students, especially graduate ones, do not demand student-student interaction because of a shortage of study time. Similarly, university students might be less eager to interact than K12 students.

Moreover, teachers had already known students better than the faculties. The teacher-centered nature of participants' adopted methods in the distance education context might also smooth the implementation process. This finding supports Li's (2022) results confirming EFL teachers' readiness for technology integration during the pandemic. Li (2022) also reported how teachers suffered from innovative ICT integration, as found in the current study.

In the follow-up phase, teachers and faculties were similar to each other regarding assessment and evaluation processes besides providing additional resources to support students. Although the EIN platform provides opportunities to support students' learning, the teachers might not have preferred it due to the technical barriers that students face. Having restricted data plans or no Internet connection were among the other challenges educators experienced during the pandemic. The case was not different for higher education despite the availability of LMS with rich features for asynchronous activities for follow-up. This might be because faculties were concerned about the ease of cheating offline (St-Onge et al., 2022). For either population, technology integration for assessment and evaluation seems to be challenging, and this confirms the claims of previous studies demonstrating the need for training or guidance specific to integration to overcome this barrier (Akram et al., 2021; Alvarez & Cervera, 2015; St-Onge et al., 2022; Yang et al., 2022).

Participants were asked to give examples from their instructional design for distance education about instructional materials and methods. Audio materials were the least frequent ones. Those who prefer this type of material use ready-to-use sound clips. This might not be surprising because it is not a widely preferred type due to its limitations in terms of attention (Mayer, 2009). Nevertheless, to be sensitive to students with special needs or students with limited data plans, the recordings in Mp3 format or podcasts can be complementary, i.e., as a follow-up source.

Both audio-visual and digital-textual materials were found the highly frequent among all participants. There are lots of ready-to-use instructional materials, even on commercial platforms. Hence, including them in either asynchronous or synchronous activities is effortless. Moreover, the faculties could record their sessions, upload them to LMS as course materials, and keep them in the cloud. The national platform for teachers needed this opportunity. Hence, they need to pay a special effort to deliver their session recordings, which might require a certain level of ICT literacy. Converting PowerPoint slides into Pdf files is very common in higher education, which might explain the high rates of digital-textual material usage.

Moreover, faculties prefer these types of material much more than teachers. This can be because of the need for more ready-to-use textual materials appealing to distance learners of younger ages. The available ones were generally designed for face-to-face instruction, but their integration was up to teachers during the pandemic. Based on the responses, teachers mentioned self-prepared textual materials such as a worksheet, but faculties had a wide range of textual materials, including scientific articles, reports, etc. For higher education learners, the digital-textual materials might be more practical and economical to follow the course content asynchronously. On the other hand, educators might have yet to produce their materials due to limited ICT practice despite high ICT knowledge levels (Akram et al., 2021).

Interactive materials were not rated at the top because they might require motivation to create materials besides ICT knowledge and skills. A few teachers mentioned Web 2.0 tools to create these materials, whereas faculties preferred ready-to-use simulations, models, etc. Such types of material improve the learner-content interaction. However, integrating them into distance courses might require knowledge of online pedagogy, organizational factors, perceived usefulness, and quality (Padayachee & Moodley, 2022). Authentic objects/models/sources are

rarely included in the synchronous activities. A few teachers provided some examples, but the inconvenience caused by lockdowns can explain it.

As participants claimed high levels of comfort in adapting their instructional design practices to distance education settings, they were expected to use various instructional methods eclectically. Qualitative data pointed out their teacher-centered methods, in which teachers are in charge of transferring knowledge instead of facilitating the construction of it. Compared to student-centered methods, teacher-centered ones require less effort because designing constructive feedback, creating various activities and materials, and keeping students' progress might be overwhelming in a distance education setting when the designer needs to learn how to benefit from technological tools. This finding is similar to Tavares et al.'s (2021) findings about educators failing while transitioning traditional pedagogies into online ones. On the other hand, the ones who claimed that they adapted quickly might not have changed their way of instruction, meaning they did not change their methods for distance settings, as mentioned in the literature (Akram et al., 2021; Li, 2022; Tavares et al., 2021; Yang et al., 2022). Teachers mentioned student-centered methods less. This can be related to the barriers caused by the platform's affordances. The usage was also limited for teachers and students. For higher education, CMS/LMS provides many features to create collaboration or keep students connected to the course. The duration of sessions and other affordances of platforms can leverage the level of teaching.

Conclusion and Recommendations

To conclude, the current study aimed to compare teachers' and faculties' perceived technology integration process, used materials, and also used methods in distance education. In addition, content analysis results showed that participants perceived themselves as proficient but needed clarification about methods and materials used in distance education. While participants said they participated in courses about distance education, the results showed they needed more training. In-service teachers and faculties should be given in-service training programs about distance education. They also designed these courses, including theory and practice, which may be more beneficial. Also, universities may be included courses about distance education in their curriculum. The study includes all K-12 teachers. Used materials and instructional methods may be affected by the level/ age of students. Also, the type was an essential factor that affected the materials used and instructional methods. For more detailed information, further studies should focus on one course and level. It was assumed that the participants had a foundational understanding of Information and Communication Technology (ICT) and competencies in ICT usage and instructional design. Additionally, the assessment of these constructs was confined to the items included in the survey.

Consequently, these assumptions and the measured items' scope represent the study's limitations. This study focuses on distance teaching practices and is limited to pandemic conditions. However, the practices in post-pandemic conditions might affect their practices. The additional items about how participants revised and improved their practices should be added to the questionnaire to understand how they evaluate their instructional design skills. The data were collected from two universities and a limited number of teachers in the same city; thus, the results cannot be generalized to all teachers and faculties. Similar studies will be conducted with more teachers from different cities and faculties from different universities.

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