Teachers' Experiences and Perceptions Regarding Technology at Early Childhood

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Abstract

With mobile technology rapidly permeating all aspects of modern society, including education, research on teaching and learning has not only demonstrated its benefits but also highlighted certain limitations, while resistance to their usage continues to be a common response among teachers. However, with the Covid-19 pandemic bringing about unprecedented changes in all levels and sectors of education since 2020, students have been compelled to adopt e-learning to master specific learning skills, such as spelling and counting, while teachers have served as curators for this new educational environment. In this context, the aim of this research is to investigate the experiences of early childhood teachers regarding the use of technology among learners aged five in early childhood educational institutions after the pandemic to offer suitable suggestions for the future of learning. The study participants for this qualitative approach-based research were 20 early childhood teachers identified using a comprehensive case design by employing purposive sampling methods. A questionnaire comprising open-ended questions was sent to the study participants over WhatsApp. This was followed by an interview, after which the obtained data were subjected to content analysis. The participants stated that completing e-activities may be considered time spent productively by students because such activities facilitate access to basic learning skills. The study results could help teachers enhance their skills by making sense of the factors that affect their use of e-learning in the classroom.

Keywords: Covid-19, mobile technology, e-learning, early childhood learning, teachers' views

1. Introduction

The Covid-19 pandemic represents a period of social, economic and health crises that affected human life negatively in an extensive manner – countries around the world were forced to impose social distancing among the population and schools were shut down to reduce infection and, by extension, the spread of the virus. As a result, a series of measures were undertaken that paved the way for innovations in every stage of education and made it necessary to dramatically change existing learning practices to align with the rise of e-learning. E-learning, where teaching is conducted remotely on a digital platform, was implemented in early childhood education based on an understanding and design that were largely different from past learning practices. Subsequently, in classes today, e-learning practices have not only emerged as a substitute for addressing the flaws detected in face-to-face educational environments, but have also met the urgent requirements arising from the pandemic. Therefore, although e-learning began as a plan for the development of the future of learning, it became an urgent necessity during the Covid-19 pandemic, which propelled it to reach a stage of maturity.

In Saudi Arabia, the practice of e-learning, which began with conducting free learning activities at a few Saudi early childhood educational institutions, has reached a wider number of users today due to the efforts of the e-learning and distance education system (Ministry of Education, 2022). Consequently, it has enabled both learners and teachers to easily access necessary information, facilitate learning tasks that do not require the assistance of teachers and closely interact with basic learning tasks through mobile applications (widely known as apps). Ultimately, with the use of apps in education, the modern stage of e-learning has been reached. However, the Covid-19 pandemic ushered in an entirely new era of early childhood education, with e-learning models put into significant practice in all public and private educational institutions (e.g. pre-schools) affiliated with the Ministry of Education (MOE).

Existing literature has proposed several definitions for e-learning (Bose, 2003; Siraj-Blatchford &

Siraj-Blatchford, 2003; Abbas et al., 2005; Li & Masters, 2009; Schlosser & Simonson, 2009; Moore & Kearsley, 2011; Muhammad, Ghalib, Ahmad, Naveed, & Shah, 2016), all of which have primarily drawn attention to the specific aspect of formalizing traditional learning using electronic resources to deliver vocational education. Considering these definitions, it may be argued that e-learning has the potential to provide individuals, especially those who have discontinued their education for various reasons, with the opportunity to access courses anytime and at any place. Furthermore, researchers have stated that e-learning can address time and space limitations related to learning by providing lifelong learning content for individual development (Lu, Ottenbreit-Leftwich, Ding, & Glazewski, 2017). Moreover, e-learning allows learners to study in electronically simulated environments at their own pace and in their preferred environment (Li & Masters, 2009), thus facilitating individual learning. This further indicates that learners interested in realising the benefits of learning through e-education have the opportunity to access large amounts of information and expand their knowledge to accomplish their daily educational goals (Dong & Newman, 2016). Additionally, the implementation of learning activities in conjunction with e-learning significantly contributes to the role played by e-education in enhancing and reforming learning practices.

1.1 E-Learning

In recent times, students belonging to all levels of education have been highly exposed to technology, be it at home or outside. Considering the predominant existence of technology in students' lives, a number of researchers have recognized that the use of mobile technology presents multiple possibilities for the education system (Dennis, 2016; Kokkalia, Drigas, & Economou, 2016; Neumann, 2014; Neumann, 2018; Patchan & Puranik, 2016). As a result, considerable research attention has been paid to the use of technology in learning worldwide (Liu, Toki, & Pange, 2013). For instance, Eng (2005) identified three core phases of technology use in schools – the emerging phase (purchase of tablet computers, with all teachers being aware of their responsibility of exploring them for use in learning), the application phase (where teachers use digital materials, such as software programmes (an app), broadcasts or e-books, and facilitate the creative use of these devices by students) and the infusing phase (where teachers emphasize a new method of using technology in their personal and professional lives and reflect on the helpfulness of such actions in accomplishing a learning goal). However, with the use of mobile technology continuing to widen in the education sector, studies on teaching and learning have not only demonstrated their benefits but also highlighted their limitations, as resistance to their use continues to be a common response among teachers (Howard & Mozejko, 2015). So far, teachers' use of technology in the learning process has been divided into two categories – ineffective use, wherein technology is primarily used to support a teacher's work inside the classroom – for example, teachers using tablet computers for class preparation, and effective use, wherein tablet computers are used as learning tools to improve the academic performance of learners (Blackwell, Lauricella, & Wartella, 2014). However, with the unprecedented changes brought about by the Covid-19 pandemic in all levels and sectors of education since 2020, students have been compelled to adopt e-learning to master specific learning skills, such as spelling and counting, while their teachers have served as curators for this new educational environment. Subsequently, students gradually started to return to school at the beginning of 2022, with the education system continuing to account for the exceptional circumstances posed by the Covid-19 pandemic in its activities.

1.2 Aim and Importance of the Research

During the pandemic, a new method of education based on non-face-to-face learning was enforced globally. In other words, the Covid-19 outbreak pioneered the experience of e-learning in all sectors and dimensions of the education system, primarily driven by advancements in mobile technology tools. Under such circumstances, e-learning presented an interesting phenomenon – the possibility to continue education through e-learning courses based on the conditions posed by the pandemic or to implement changes in the education system to address the challenges encountered due to the pandemic. Furthermore, the e-learning approach is expected to be integrated into all stages of learning, including early childhood – a stage that is likely to attract more attention in the forthcoming years. In view of the pandemic period that necessitated the use of mobile technologies as a basic requirement, this study was conducted to determine the perspectives of early childhood teachers regarding their experiences with e-learning. Specifically, this study sought to answer the following research questions:

1) What are the problems encountered by early childhood teachers in e-learning?

2) What are the positive aspects of e-learning that the teachers have identified in the learning process so far?

2. Methods

Researchers tend to study "things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meaning people bring to them" (Denzin & Lincoin, 2000, p. 3). Drawing on this idea, this study

adopted a qualitative research approach to investigate the experiences of early childhood teachers with regard to the e-learning process during the Covid-19 pandemic.

2.1 Participants

The study participants were 20 early childhood teachers working in a Saudi kindergarten during the academic years spanning 2019–2022. A purposive sampling approach was implemented to identify teachers who were experienced in conducting e-learning even before the Covid-19 pandemic. Notably, the voluntary participation of the early childhood teachers was a selection criterion for this study. To ensure the protection of the participants' personal information, the code 'T', drawn from the initial letter of the word 'Teacher', was used to denote the teachers. In the kindergarten selected for sampling, all the teachers had the same level of professional experience, presented similar evaluation results and implemented similar instructional practices. Furthermore, all the teachers had attained a bachelor's degree and had undergone professional training for preschool education through a sixth-grade certification from a Saudi university. General information about the research participants is presented in Table 1.

Table 1. Information on the early childhood teachers participating in this research

Participant Code	Length of Service	E-learning Experience	Length of E-learning Experience
T1	5 years	Yes	3 years
T2	10 years	Yes	10 years
T3	7 years	Yes	Only during Covid-19
T4	10 years	Yes	3 years
T5	8 years	Yes	8 years
T6	10 years	Yes	5 years
T7	10 years	Yes	10 years
T8	10 years	Yes	10 years
T9	8 years	Yes	5 years
T10	8 years	Yes	5 years
T11	10 years	Yes	10 years
T12	8 years	Yes	Only during Covid-19
T13	6 years	Yes	One year
T14	10 years	Yes	10 years
T15	7 years	Yes	1 year
T16	13 years	Yes	5 years
T17	9 years	Yes	Only during Covid-19
T18	10 years	Yes	Only during Covid-19
T20	10 years	Yes	Only during Covid-19

2.2 Data Collection Tool

All the data considered in this study were collected through a questionnaire and an individual semi-structured interview, both of which were based on a literature review of the subject to ensure the validity of the data collection tools. After receiving the opinions of 10 experts in the field regarding the questionnaire items and the semi-structured interview form, necessary corrections were made before the tools were finalized. The first data collection tool was a questionnaire comprising five questions – three were meant to obtain the participants' personal information (length of service, e-learning experience, etc.), while the remaining two tackled specific issues appropriate to this study. This was followed by an interview, which enabled the participants to further articulate their evaluations of the e-learning process.

Applications seeking the necessary permission to conduct this study were first submitted to the researcher's university unit and then to the Ministry of Education, since the data collection process was to be conducted in a public kindergarten. After obtaining the required approvals, an e-questionnaire was sent to the early childhood teachers over WhatsApp. The researcher decided to follow this method in view of the situation of the kindergarten at the time with regard to strategies in place for continuing the safe operation of the school. Furthermore, a face-to-face gathering with the teachers after the pandemic was still considered inappropriate. Once the questionnaire was sent to the participants, they were reminded of their right to withdraw from the study at any time. Notably, this questionnaire was used as the main source of information in this study.

This was followed by interviews, which were conducted in the teaching staff room at the kindergarten and lasted approximately 15 minutes for each interviewee. The interviews were recorded using the Voice Memos app installed on the researcher's personal mobile device. Each interview was transcribed manually for qualitative analysis. Subsequently, the data were subjected to analysis in relation to the research questions, research purpose, questionnaire and interview questions.

2.3 Data Analysis

The collected data were analyzed by adopting an interpretivist perspective using content analysis (Bryman, 2016). According to Bryman, content analysis is a research method that can be used to draw reproducible conclusions from information with regard to its content. In this method of analysis, the information collected for the purpose of answering research questions is interpreted by following a few practical steps:

1) Coding the data,

2) Identifying themes,

3) Coding the questionnaire data into numerical data,

4) Coding the interview data into content quotes,

5) Organizing the codes and themes to establish connections between their similarities and differences, and

6) Interpreting and commenting on the findings.

Therefore, in compliance with this structure of analysis, the first step in the data analysis process undertaken in this study involved reading and taking notes on the data collected and then determining the codes for grouping the interrelated data. In the second step, thematic coding was implemented on the data to identify the overarching concepts that emerged as a consequence of breaking down the data into categories. The two subsequent steps involved coding the questionnaire data and the interview data into numerical data and content quotes, respectively, before grouping the identified issues under relevant themes. The next step was to strengthen the study's objectivity by first creating a network of the similarities and differences among the codes collected from the two data collection methods and then studying this data in view of the research questions, with the aim of coding and classifying the pre-determined themes. Furthermore, it was confirmed that the coding proposed by the expert and the researcher was mostly similar. Subsequently, the research data were organised in accordance with the identified themes and presented in tables, which noted the frequency of their appearance in the participant responses. Bassey (2001, p. 20) drew attention to the fact that "the estimates – of – trustworthiness may provide a powerful tool for researchers to communicate with potential users of research." Thus, it may be deemed that the feedback received from the expert increased the credibility of this study.

2.4 Limitations of the Study

This study has some limitations that hinder the generalization of its findings. First, although questionnaires and interviews were used to collect data, this study made no attempt to use observation to examine the teachers' beliefs, problems and the effects of e-learning on the learning process. Second, this study included only those participants whose information could be obtained from the Alhsa Local Department of Education. Therefore, the Local Department of Education in other Saudi cities was not explored.

3. Results

The results obtained from analyzing the use of e-learning practices within the framework of the zone learning programme by early childhood teachers demonstrate their perceptions and practices related to e-learning. When asked about their perceptions of teaching through playful learning, the responses of all interviewees focused on the type of teaching-learning tools used, which were primarily related to conventional teaching, such as boards, pens, books and toys, coupled with the use of several digital tools, including televisions, computers and projectors. Notably, T1 and T2 added that they had recently been using iPads to help students practice different types of skills, such as language and counting. To further elaborate on the results of this study, this section summarises the findings drawn from the collected data with regard to e-learning practice in view of the research questions, with the most significant factors presented under separate headings.

3.1 Problems Faced by Early Childhood Teachers During E-learning Practice

The results obtained in relation to the problems faced by early childhood teachers in the e-learning process were classified into three themes, as shown in Table 2. While technical and technological problems took first place in this regard, accounting for 43.5% (f = 20) of the problems faced by early childhood teachers, student-related and teacher-related problems covered 37% (f = 17) and 19.5% (f = 9) of the problems, respectively.

Table 2. Negative aspects of e-learning

Theme	Coding	Frequency	Participants
Technical and technological problems	Poor internet connection	10	T1, T2, T3, T4, T5, T6 T7, T8, T9, T10, T11, T12,T17,T20
	Unavailability of a sufficient number of devices	7	
	Lack of software and maintenance	3	
Student-related problems	Low motivation	8	T1, T2, T3, T4, T5, T6, T8, T9, T11, T12, T13, T14, T17, T18, T19
	Student's attachment to technology	6	
	Lack of feedback	3	
Teacher-related problems	Lack of knowledge in using technology	5	T2, T5, T8, T9, T12, T17, T18, T20
	Finding e-learning pointless	4	

The first finding of this study is related to the theme of technical and technological problems, which comprised three codes. The specific issues related to this theme included poor internet connection, unavailability of equipment and educational software, systemic problems, limited exercises and lack of qualified personnel. More than half of the participant-teachers (f = 10) expressed their concerns pertaining to the first code by drawing attention to the problems experienced due to poor internet connectivity. For instance, T8 shared that "not all children were provided access to the internet, connection problems were experience in general", while T10 expressed the following view, summing up the situation in the best way: "internet connection constitutes a problem on its own. Students were frequently unable to connect to the internet, which affected the continuity of the data flow rate." Furthermore, the unavailability of a sufficient number of mobile devices had negative consequences for student interactions with the learning content. T2 detailed the problem caused by the lack of equipment and its effect on student engagement, emphasizing that "the lack of adequate technical support was the biggest problem that caused the inability to obtain the desired level of efficiency from language, mathematical and scientific learning." T2 further stated that since tablets could not be provided to all students during the learning activities, some of them were compelled to use conventional tools for studying the same learning content, which led to another major problem, as revealed by T3: "During the learning activities, students who could not take part in e-learning refused to engage in the learning activities."

In addition, seven teachers pointed to the reality that they only used conventional tools or a computer with a projector for their classes because they "had no other teaching-learning tools." When asked about the reason for this deficiency, T2 highlighted the lack of adequate hardware, software and network infrastructure. Moreover, according to T5 and T6, although e-learning practice had previously been encouraged by the Local Department of Education, it had not been a very beneficial initiative, as the schools lacked adequate technological infrastructure to initiate e-learning: "The devices were very expensive; thus, the school had difficulty getting a tablet computer for classroom use because of budget constraints" (T1). Moreover, apart from purchase costs, software maintenance was observed to be a significant issue. According to three interviewees, the fact that the devices would be used in schools meant that there was "a high possibility [for the devices] to be broken or damaged'. T1 voiced her concerns about the breakage of or damage to devices by stating that "when the problem comes up with the device, it is very expensive to replace it or get it fixed".

With regard to the second theme, which examined student-related problems, low motivation to participate in class activities was recorded as the most frequently discussed issue among half of the participants (f = 8). In this context, T5 stated that students' low level of motivation stemmed from their reluctance to participate in conventional activities: "students who did not participate in e-learning activities expressed a complete unwillingness to participate in conventional learning". A similar opinion was expressed by T6, who explained, "students who wanted priority for the right to use the device were given the opportunity first, and then they refused to move to conventional learning activities, saying: 'Miss, I don't like these activities'". Meanwhile, four participants claimed that the students made arbitrary decisions in terms of participating in conventional learning activities because of their attachment to technology. In contrast, T12 stated that the lack of communication between the teacher and students was the primary cause of students' low motivation, expressing that "face-to-face interactions have disappeared during e-learning activities because of the reliability of feedback, resulting in the elimination of motivation and competition among students". In addition, T4 and T11 expressed dissatisfaction with the lack of feedback in the majority of e-learning activities – the last problem identified in this category.

Finally, the last theme – teacher-related problems – comprised two codes. In this category, the lack of knowledge in

using technology was identified as the major issue, exhibiting a frequency of 5. The problems related to this issue were expressed by T9 as follows: "having used conventional learning for 22 years, changing teaching tools and methods from conventional learning to technological never crossed my mind, I had trouble understanding how to use technological devices for learning". Furthermore, T12 spoke of the pointlessness she felt in using technology, mentioning that "as a teacher, I have to feel that a conventional learning activity is not as effective in order to change into a new method of teaching. In this process, I feel conventional learning produces a better result."

3.2 Positive Aspects of E-Learning

The positive aspects of the e-learning process in early childhood classrooms, as identified in this study, were classified under three specific themes, as shown in Table 3. The findings revealed that the participants found the e-learning practice to be most useful for the functioning of the learning practice, which accounted for 59% (f = 20) of the total responses. This was followed by positive aspects related to students, which were noted in 35% (f = 12) of the responses. Lastly, positive effects related to teachers comprised 6% (f = 2) of the responses.

Table 3. Positive aspects of e-learning

Theme	Coding	Frequency	Participants
In terms of functioning of the learning practice	Improving the learning process	16	T1, T2, T3, T4, T5, T6 T7, T8, T9, T10, T11, T12, T13, T14, T15, T20
	Making the learning process flexible	4	
In terms of student	Establishing a completely learning-oriented process	8	T2, T3, T4, T6, T8, T9, T11, T12, T13 T16, T17, T19, T20
	Fostering an individual learning-oriented process	4	
In terms of teacher	Encouraging self-development	2	T1, T5

Table 3 shows that the first theme, which pertains to the benefit of e-learning in terms of the functioning of the learning practice, consist of two sub-themes. Most of the participants highlighted improvements in the learning process through the use of visual and audio materials in the e-learning practice, expressing that the various learning applications available in the App Store offered diversity in terms of the methods and techniques used for learning, while the related activities enriched the learning environment. In this context, T5 presented her viewpoint, saying, "the quality of learning has improved since I started to use learning applications for reading and writing – for example, learning an exciting lesson with good display and sound, easy transition between educational processes and the practicality of the medium were attractive for young students". Furthermore, T11 emphasized that e-learning had been successful in grabbing the attention of young students, saying "even if a few of our students were uncomfortable to do hands-on exercises, they always participated in the e-learning exercises". Moreover, four participants stated that due to the flexibility offered by e-learning, young students were able to pay more attention to their lessons, thus contributing to the continuation of their learning. For example, T12 pointed out that "e-learning through various applications provides ease of access when required. It allows for repetition when needed."

Further examination of the data revealed that e-learning is advantageous not only to students but also to teachers. The aspects of e-learning that were observed to be beneficial for students comprised two codes – the first was the establishment of a completely learning-oriented process and the second was fostering individual learning. Nine participants expressed that e-learning represents a completely learning-oriented process, in the sense that it provides opportunities for young students to educate themselves. Moreover, some participants were of the opinion that the quality of exercises had improved significantly under e-learning, especially in terms of increasing the number of students participating in individual learning. In this regard, T3 expressed that e-learning "is a learning-oriented process that enables young students to educate themselves better by avoiding the distractions that exist in completing conventional exercises". Furthermore, T6 mentioned that "it fosters individual learning-oriented processes that enable young students to be more productive". Meanwhile, the feature of e-learning that was observed to be beneficial for teachers was improvements in the aspects of teaching that the early childhood teachers found lacking in themselves. In this context, T1 stated that "e-learning enabled us to reflect on our methods in order to improve the areas we were deficient in", while T5 commented that "particularly with crowded classrooms, conducting exercises were annoying due to the printed papers required for them. However, with e-learning exercises, I had the chance to conduct the exercises in an uninterrupted and fluent way."

3.3 Suggestions for Solving the Problems Encountered in E-learning

Only three codes could be identified from the data with regard to solutions to the problems encountered in e-learning, as presented in Table 4, pertaining to three specific themes. The suggestions offered by the early childhood teachers addressed the technical and technological problems, student-related problems and teacher-related problems related to e-learning equally, with each theme accounting for 33.34% (f = 2) of the responses.

Table 4. Suggestions for prospective e-learning practices

Theme	Coding	Frequency	Participants
Technical and technological problems	Supplying technological tools and equipment inside the classroom	2	T2, T10
Student-related problems	Ensuring limited time spent using technological tools	2	T2, T7
Teacher-related problems	Training courses on e-learning	2	T9, T10

The suggestions offered for addressing the technical and technological problems comprised one code – supply of technological tools and equipment inside the classroom. Two teachers expressed that the sufficient availability of tools and equipment plays a crucial role in managing the time spent on e-learning. Therefore, the school management needs to "make more effective decisions and put them into practice as soon as possible with regard to the supply of technological tools and equipment, such as tablets", as stated by T2. Another suggestion that aimed at solving student-related problems, offered by T2 and T7, involved ensuring limited amount of time spent using technological tools. The two participants stated that since the follow-up interactions n the learning content of tablets greatly attracted the students, teachers must establish time limits for the use of these devices. In this regard, T7 shared that "allowing each student to use the tablet once or twice a week for 15 minutes of the time allocated for the play zone (45 minutes) can be helpful in engaging these students in non-technological activities". The last suggestion, which was offered in terms of solving teacher-related problems, was the provision of training courses on e-learning, as stated by T9 and T10. According to them, receiving support from others, such as the school principal or their colleagues, would be helpful for non-experienced teachers. In this context, T9 expressed that "support from the preschool principal could give non-experienced teachers the motivation to begin using technology in their classroom". Furthermore, T10 pointed at another useful support that non-experienced teachers could receive from their colleagues, especially those experienced in using different types of technology tools in their classroom: "in my own experience, the information I received from my colleagues about the way to use tablets and their applications to benefit my students also motivated me to use them". This encouragement led the teacher to try using different types of learning applications on the tablet during her classes.

4. Discussion

One of the key findings of this research is that in its current state, e-learning is largely inefficient and its negative aspects are far exceeding its positive features. Notably, all the participant-teachers emphasised that the existing problems related to e-learning practice are primarily associated with the inefficient conduction of learning activities, which could otherwise serve to improve basic early childhood skills, such as language and counting. Furthermore, it was confirmed that learning activities within the framework of the zone learning programme could not be conducted efficiently because of internet access and connection problems, which emerged across three axes:

1)   Inadequate school infrastructure resulting in a lack of internet connection,

2)   Insufficient school finances to meet the high cost of purchasing and maintaining technology equipment,

3)   Repeated disruptions caused due to low internet speed, aggravated by simultaneous internet access by more than one device.

In this context, the results of the current study are consistent with earlier research in early childhood education (Almalki & Williams, 2012; Ihmeideh, 2009; Nikolopoulou & Gialamas, 2013) that reported three major barriers perceived by teachers in this context – lack of funding, lack of internet access and lack of technical support. Overall, the data obtained from the early childhood teachers highlighted the need for suitable educational infrastructure for e-learning practice that is supported by adequate technology, sufficient learning tools and equipment, and reliable facilities (Hammed, 2014). These concerns have also been noted in a previous study that found that the provision of digital devices by schools is a significant factor pertaining to the usage of tablets in classes, since access to such infrastructure is an obvious prerequisite (Gil-Flores, Rodríguez-Santero, & Torres-Gordillo, 2017). However, the amount of digital infrastructure in a school is not always directly related to

the frequency of classroom use. For instance, the results of a study by Eng (2005) revealed that teachers used learning applications during specific phases of e-learning, as observed in their classroom practices. Moreover, teachers have greatly benefited from emerging applications that have contributed to modifying classroom learning from conventional learning to e-learning practice. For example, the purchase of tablets enabled them to use different types of learning applications without the need for internet access (Gil-Flores et al., 2017).

Additionally, the results of this study identified the factors contributing to student-related problems pertaining to e-learning – low motivation and individual problems. These problems might have resulted from the fact that young students have yet to understand appropriate ways of practicing individual learning, as also claimed by Arslan (2022). This means that students who are attuned to traditional learning practices based on their individual and social environments, coupled with teacher interventions, often struggle with the practice of self-learning. In this context, as a type of digital self-learning practice, mobile applications have had a considerable effect on student learning, as they have increased the probability of using e-learning practices in classes. The use of these applications enables young students to access exercises that blend game, practice and learning, thus attracting the attention of students enough to encourage their continued learning (Flewitt, Messer, & Kucirkova, 2015). This is consistent with the results of the current study, which identified a high level of student attachment to devices, leading teachers to suggest establishing time limits for using technology tools to overcome this problem.

Another interesting result identified with regard to the problems experienced in e-learning practice is that teachers had long been indifferent to e-learning and were slow to shift from conventional learning to e-learning. The reason for this could be their previous prolonged experience using conventional learning tools (Fullan, 2007), lack of technical infrastructure (Al-Harbi, 2014; Gil-Flores et al., 2017), increased workload and lack of conviction about the benefits of this change (Fullan, 2007). In response to these challenges, a few factors that could help address them were identified in this study, such as extension of support by the head teacher and educational authorities (Al-Sulaimani, 2010), collaboration among teachers through discussions involving exchange of knowledge with experienced teachers (Wong & Li, 2008) and development of knowledge through experience and practice (Al-Harbi, 2014). The implementation of e-learning in a conventional learning environment and in early childhood contexts, which is the context being investigated in this paper, requires those interested in applying this change to pay attention to teachers' perceptions of the integration of e-learning in their teaching practice while also providing systematic support to address any difficulties arising during the transition period.

Despite the problems encountered in conducting early childhood learning using digital learning, some of the participants agreed that e-learning practices offer learning-oriented processes for improving student learning. On using the learning applications, students developed an awareness of their responsibility for learning on their own, as well as realised the possibility of accessing information on their own (Arslan, 2022). A few of the participant-teachers revealed that the active use of different types of learning applications enabled the individual e-learning practice to be conducted more productively, as a result of which teachers were able to save time, as e-learning provided students with an opportunity to participate in more activities.

The early childhood teachers mostly used learning applications designed to deliver predetermined tasks structured in a question-answer format that allowed the measurement of targeted outcomes in the e-learning process. Furthermore, from the perspective of the students, the e-learning practice was observed to be characterised by smooth navigation, tracking ability, easy access to repeated self-paced learning and extensive access to subject knowledge, such as literacy and counting (Liu et al., 2014; Papadakis, Kalogiannakis, & Zaranis, 2018). In other words, students can continue learning by using the various learning applications offered by information and communication technologies while also having the opportunity to access their desired learning content at any time. However, a few of the participants also expressed concern about the evaluation process (feedback) for student outcomes in e-learning, which could not be conducted effectively.

Many participants provided relevant suggestions to solve the problems encountered in the e-learning practice, most of which were related to addressing teaching and technical problems. They recommended improvements in the internet infrastructure in schools and provision of adequate necessary equipment. Furthermore, the participants emphasized that student participation in e-learning should not be based on student initiative; rather, it should be compulsory and a time limitation should be attached to this participation to assist students in accomplishing their learning goals, such as identifying new letters or shapes (McLean, 2017). These suggestions, as identified in relation to the results of this study, may help address the negative aspects of e-learning practice, while also facilitating the creation of a more efficient self-learning environment.

5. Conclusion

The perceptions and suggestions of the early childhood-level participant-teachers regarding e-learning practices in

the aftermath of the Covid-19 pandemic presented a comprehensive overview of their circumstances. Conducting further studies on this issue in the context of different countries and using different samples could offer results that can deepen our understanding of the effects of e-learning. It is evident from the findings of this study that the learning affordances enabled by mobile technologies significantly influence self-learning in the classroom. However, this shift towards using technology in conventional learning environments and in early childhood contexts, which is the issue investigated in this study, requires those interested in implementing this change to pay attention to teachers' perceptions of integrating e-learning into their practice, while also ensuring systematic support to address the difficulties that might arise during the transition period.

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I declare that I have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Obtained.

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No additional data are available.

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