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Technology Integration of Turkish Elementary School: Teaching Literacy Skills in the Post-COVID-19 Era

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Abstract: This research aimed to explore the elementary school classroom teachers' perceptions of technology integration into teaching literacy skills. A total of 122 elementary school classroom teachers working at different elementary schools from the middle socioeconomic status setting, enrolled in the study voluntarily. In this study, a self-report questionnaire developed by the researchers was used. The data was analyzed using Microsoft Excel spreadsheet to get descriptive statistics (frequencies) corresponding the research questions. The research findings indicated that most of the elementary school teachers employ different perspectives, including whole language, literature-based and balanced instruction, and curriculum and related textbooks to teach literacy skills. In addition, the findings showed that teachers use technology to increase the effectiveness of teaching literacy skills and their goals of technology integration to teach literacy skills differentiate. The teachers also benefit from the social media applications and professional organizations in increasing their awareness of technology integration into teaching literacy skills. These results expand our understanding of Turkish elementary school classroom teachers' technology integration into teaching literacy skills by revealing their perceptions.

Keywords: *Elementary school classroom teachers*; *Teaching literacy skills; Technology integration*

Introduction

The rapidly increasing information in today's world, the digital technologies emerging in the light of new information and the penetration of these technologies into our daily life bring along a rapid development and transformation. It becomes inevitable for individuals to acquire new knowledge and skills to adapt to these developments and transformation and education is not exceptional in this regard. In line with these development and transformation, teaching-learning processes are subject to changes and teachers are excepted to benefit from advantages of technology in this process. Now, the use of technology in the context of teaching-learning becomes reality and imperative, rather than an option. Therefore, training leading teachers who have a culture of using and developing digital content effectively is put forward as a target for the development of digital skills (Ministry of National Education [MoNE], 2018). Furthermore, the COVID-19 pandemic appears to have a profound effect on sustainability of education and lead to rely on technology based teaching and learning ever before (Mulenga and Marban, 2020). It appears that we are entering into the new phase of education that is literally driven by information and communication technologies (ICTs). The safe and critical use of these technologies seems more important than ever in the post-COVID-19 world. As a matter of fact, teachers need to have skills to integrate ICT technologies into their teaching along with their digital competencies to educate qualified individuals for the post-COVID-19 period.

On the other hand, several international institutions and organizations such as Partnership for 21st Century Skills (P21), Assessment and Teaching of 21st century skills (ATC21s) and International Society of Technology in Education (ISTE) standards for educators (P21, 2019; ISTE, 2017; Griffin and Care, 2015) identify the knowledge and skills people should equip with in order to succeed in professional and daily life in this 21st century. Accordingly, individuals are expected to communicate effectively, access to information resources and improve themselves mentally, emotionally and socially among other key skills. Reading, writing, speaking and listening skills are key skills in the development of these skills. It appears that technology-based literacy instruction have promising implications for students (Christ, Arya and Liu, 2019). With the promise of technology to enhance literacy-related outcomes, questions concerning teachers learning processes on technology integration into their reading and writing teaching practices arise.

Recent studies examine technology integration motivational beliefs of teachers or pre-service teachers (e.g., Backfisch et al. 2020; Cheng et al. 2020). When these studies are reviewed, it is seen that studies are conducted on usage behavior / intention with technological pedagogical content knowledge (Saubern et al., 2020; Tondeur et al., 2020; Voithofer et al., 2019), and with technology acceptance factors (Liu, Wang, & Koehler, 2019), or digital skill development such as digital competencies (Caena and Redecker, 2019), and digital literacy (List, Brante and Klee, 2020; List, 2019). However, there is still a lack of deeper understanding on teachers' technology engagements. It was reported that pre-service teachers often do not consider adequately prepared to operate digital technologies in their teacher training programs (Aslan and Zhu, 2017; Gill and Dalgarno, 2017). In this paper, we look into teachers' technology integration aims and the ways they learn to engage with the technology such as teacher professional development programs. Delving into teacher education, beliefs and perspectives, we pose the question on how teachers develop understanding to use ICT for their teaching.

Theoretical Framework

In light of developments in the world, teachers' knowledge regarding emerging technologies plays a great role in the use of technology in teaching and learning (Lopez-Belmonte, Marin-Marin, Soler-Costa and Moreno-Guerrero, 2020). Teachers' beliefs, perceptions and attitudes towards technology are major influential factors on the full adaptation of technology into education (Ertmer et al., 2012). In terms of teacher education, it is aimed to equip individuals with a set of digital skills or competencies including ethical, safety and social elements to utilize digital artefacts in educational skills. In this context, various conceptual frameworks such as the Technological Pedagogical Content Knowledge (TPACK) model proposed by Mishra and Koehler (2006), the Technology Acceptance Model (TAM) introduced by Davis (1989), and the teacher digital competence (TDC) framework recently introduced by Falloon (2020) or professional norms/ standards such as the International Society for Technology in Education (ISTE) standards for educators (2017), and United Nations Educational, Scientific and Cultural Organization (UNESCO) ICT competencies for teachers (2011) have been developed to assist teachers' digital competencies.

The (TPACK) model, which extends Shulman's (1986) idea of Pedagogical Content Knowledge, is one of the leading models for effective technology integration in education. Three underlying forms of knowledge, Content (CK), Pedagogy (PK), and Technology (TK) are located at the center of the TPACK framework. It also emphasizes the intersections between these three forms of knowledge, which are Pedagogical Content (PCK), Technological Content (TCK), Technological Pedagogical (TPK), and Technological Pedagogical Content (TPACK). Accordingly, considering the content of knowledge types that form the TPACK model; CK covers teachers' knowledge including concepts, theories, and ideas about the subject to be learned or taught. PK covers practices or methods of teaching and learning, including classroom management skills, lesson planning, and assessment. TK covers an understanding of information technology, tools, and resources broadly. PCK covers identifying the most appropriate method for the subject and the understanding that promotes the teaching of the subject in the best ways. TCK covers an understanding of providing richer and more flexible content via the most appropriate technology for the subject in the field. TPK covers an understanding of how teaching and learning can be promoted when particular tools are used in particular ways. TPACK refers to the understanding of how the subject would be taught using various technologies and taking this process further every time to strengthen prior practices (Koehler & Mishra, 2009). Soler-Costa, Moreno-Guerrero, Lopez-Belmonte and Marin-Marin (2021) state that teachers value the TPACK model increasingly to develop training plans and digital applications.

Another well-known theoretical framework TAM has two core factors, perceived ease of use (PEU) and perceived usefulness (PU). PU indicates the extent to which the use of the technology would improve users' performance, while PEU illustrates the degree to which the technology seems to be free of effort (Davis, Bagozzi, & Warshaw, 1989). In the following years, the scope of TKM was updated and extended as TKM-2 (Venkatesh and Davis, 2000), and TKM-3 (Venkatesh and Bala, 2008). Furthermore, multiple influencing factors were included into the TAM and extended TAM models appear in the literature such as Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by (Venkatesh et al. 2003). The UTAUT model included concepts such as performance expectancy (PE), social influence (SI), effort expectation (EE), and facilitating conditions (FC). The TAM model has been extensively used to investigate the behavior toward using current information systems and technology particularly in online library settings (Rafique et al., 2018). Similarly, The TDC model extends TPACK-aligned competencies and not only focusses on operational aspects of ICT and digital skills but also puts emphasis on diverse knowledge, capabilities and dispositions. Central to the model are core competencies that include ethically, safely and productively use of digital technologies. At a practical level, the TDC framework refers to operational competencies including ongoing professional learning, and productive use of digital information, ethical competencies including safety and wellbeing, and curriculum competencies including TPACK components.

To this point, reviewed literature has presented models such as TPACK, TAM, and TDC to ground the study theoretically and understand factors underlying educators' attitudes, behaviors, and intentions towards digital technologies. This study is crucial to inform how to improve teacher preparation to better equip teachers for their teaching process. The following research questions guide our study.

Q1. What underlying beliefs do elementary school classroom teachers have about teaching literacy skills?

Q2. How do elementary school classroom teachers identify their technology integration experiences?

Method

The study was designed as a descriptive survey based on a questionnaire that was sent to the elementary school classroom teachers. The questionnaire consisted of different parts to gather in-depth information related to the elementary school classroom teachers' technology integration experience related to teaching literacy skills.

Participants

The present research took place in Turkey's Mugla-Mentese province. The population size of the current research was 262 elementary school classroom teachers from 33 elementary schools. A total of 122 elementary school classroom teachers working at 33 elementary schools where are located in the middle socioeconomic status setting, enrolled in the study voluntarily. The researchers reached all the schools to deliver the questionnaire forms to the elementary school classroom teachers. The elementary school classroom teachers enrolled in the present study filled the questionnaire forms in their schools. However, a total of 122 elementary classroom teachers returned the forms to the researchers. While 62 teachers were female, 60 teachers were male. The participants of the study were teaching at different elementary grade levels ranging from 1st grade to 4th grade. 26 of the participants were first grade teachers, 37 of the participants were second grade teachers, 25 of the participants were third grade teachers, and 34 of the participants were fourth grade teachers. All of the participants had more than 1-year professional teaching experience. Around more than half of the teachers had 20 years or more professional teaching experience.

Measurement tool

In this study, a self-report questionnaire developed by the researchers was used. The questionnaire consists of seven parts. In the first part, the items regarding the demographic information of the teachers were included. The items in the first part of the questionnaire were related to gender, what grade level is taught, and professional experience of the participants and this data was provided above. In the second part of the questionnaire, there were seven items and the accompanying question ("The following statements represent different perspectives, beliefs and philosophies for teaching literacy skills. Considering your own teaching processes, how would you define your teaching practices?"). The teachers were asked to choose three of the seven items by their teaching practices. In the third part of the questionnaire, there were four items and the accompanying question ("The following statements represent the aims of teachers in the teaching process of literacy skills. How would you rank the following statements in order of importance from 1 to 4? The number "1" indicates the most important, while the number "4" represents the least important."). The teachers were asked to rank these items by order of importance. In the fourth part of the questionnaire, there were three items and the accompanying question on technology integration ("The following statements represent the aims of teachers on technology integration into teaching literacy skills. Considering your own teaching processes, which

one does reflect your teaching practices?"). The teachers were asked to choose the item that best describes their teaching processes. In the fifth part of the questionnaire, six items and the accompanying question representing the goals that teachers have in integrating technology into teaching literacy skills were included ("The following statements represent the different purposes teachers have in integrating technology into teaching literacy skills. How would you rank the following expressions from 1 to 6? The number "1" represents your most important goal, while the number "6" represents your least important goal."). The teachers were asked to rank these goals by order of importance. In the sixth part of the questionnaire, there were seven items for professional development seminars. The teachers were asked to mark the latest professional development seminars they attended. In the seventh part of the questionnaire, the items including the resources that teachers use in learning technology were included. The teachers were asked how often they access to these resources.

The questionnaire developed by the researchers was given to 6 experts before the implementation and necessary revisions were made to the questionnaire through the concerns raised by the experts. Afterward, the questionnaire was given to a total of 20 elementary school classroom teachers and asked to complete the questionnaire and to mark the places they did not understand. Following the concerns raised by the teachers, the questionnaire was finalized and made ready for the actual implementation.

Procedure

Before the implementation of the questionnaire, the required permissions were obtained from the education board of Mugla province. The verbal consent of the teachers was obtained when the schools were visited and the written consent of the teachers in the research was provided through the IRB procedure (ethical review board) of Mugla Sitki Kocman Univesity before the implementation. The questionnaire forms were then delivered to the teachers in 33 elementary schools and the teachers were given one week to complete. A total of 122 elementary school classroom teachers returned the forms to the researchers. The data gathered through the questionnaires from the teachers was transferred to a Microsoft Excel spreadsheet. Then, descriptive analyses including frequencies were carried out on the data to address the research questions.

Findings

Descriptive statistics (frequencies), which are based on the self-reported perceptions of the teachers, are displayed in the tables below. While Table 1 and Table 2 show the elementary school classroom teachers' experiences of teaching literacy skills in their classroom settings corresponding the first research question, Table 3, Table 4, Table 5, and Table 6 indicate the teachers' experiences of technology integration corresponding the second research question. Table 1 shows the elementary school classroom teachers' underlying beliefs, perspectives, and philosophies of preferences for teaching literacy skills.

Table 1

Elementary School Classroom Teachers' Underlying Beliefs, Perspectives, and Philosophies of Preferences for Teaching Literacy Skills

	f
Considering teaching literacy skills and related materials, I can say that my teaching is traditional.	17
I can define myself as "eclectic" in teaching literacy skills. I use multiple perspectives and materials while teaching.	72
I benefit from the "whole language approach" in teaching literacy skills. The compulsory curriculum and related textbooks are not the only resources I use. I often include authentic texts and materials that reflect real life in my classroom. My teaching process focuses on the experiences and activities associated with students' own lives and needs.	78
I use the "literature-based literacy instruction approach" effectively. I include children's picture books in teaching literacy skills.	51
I use the "balanced literacy instruction approach" in my classroom. Considering the individual needs of the students, I carry out activities for vocabulary recognition, vocabulary development, reading comprehension, motivation, and socio-cultural gains suitable for their teaching levels. My classroom activities related to literacy instruction are skill-based and whole language approach.	69
I think that the existing curriculum and related textbooks about it are sufficient for teaching literacy skills.	69
Becoming a proficient reader, students need to be integrated into materials and experiences related to children's literature.	13

The elementary school classroom teachers prefer a variety of different perspectives on teaching literacy skills including literature-based, whole language, balanced, eclectic approaches, and traditional approach which is based on compulsory curriculum and related textbooks (Table 1). However, it is understood from the table that the teachers internalize eclectic, the whole language, and literature-based approaches in their teaching processes more while the teachers have to follow the learning outcomes in the compulsory curriculum and the accompanying textbooks in Turkey. The main point in Table 1 is that according to the self-reported perceptions of the teachers, the teachers focus on authentic materials and activities more to teach literacy skills. Table 2 shows how the elementary school teachers prioritized the goals of teaching literacy skills in their classroom settings.

Table 2

Teachers' Goals of Teaching Literacy Skills in Order of Importance

		Order of importance/*f*				
	Goals	**1st**	**2nd**	**3rd**	**4th**	**Total**
1.	My main goal is to develop students' word recognition, fluency, and reading comprehension skills.	74	11	25	12	122
2.	My goal is to raise individuals who are critical and thoughtful to learn people and ideas, and who can also use their reading and writing skills to positively change the world in which they live.	74	25	13	10	122
3.	My goal is to raise individuals who are independent, motivated, enjoy reading, and are happy with what they learn.	68	25	17	12	122
4.	My goal is to raise individuals who are familiar with reading and writing forms and different text structures.	35	23	22	42	122

Table 3

Teachers' Technology Integration Preferences for Teaching Literacy Skills

Integration of Technology	***f***
I use technological tools and materials instead of traditional learning materials. My instructional practices include technological tools and materials rather than paper, white/blackboard, manual, or other traditional materials.	15
I use technology to increase the effectiveness of my teaching process. My teaching process becomes more effective with the use of technology. Although my educational goals have not changed, my ability to achieve my goals has increased with the use of technology.	90
I use technology to change and transform my teaching. My teaching process has newer goals, roles, and structures after I start to use technology.	17

Considering Table 2, it was understood that 74 teachers placed the first goal in the first place by the importance for teaching literacy skills compared to the other ones. Similarly, 74 teachers put the second goal in the table in the first

place by the importance for teaching literacy skills. The third goal was placed in the first place by 68 teachers. The fourth goal was placed first by 35 teachers. According to the teachers' self-reported perceptions, the teachers prioritized the first and second goals for teaching literacy skills. The following statements in the table below describe the teachers' technology integration preferences for teaching literacy skills.

In general, when the table above is considered, it indicates that the teachers who participated in the research use the technology to increase the effectiveness of teaching literacy skills, to change and transform their teaching practices, and to have newer perspectives on teaching literacy skills. Table 3 shows how the teachers prioritized the goals they have in integrating technology into teaching literacy skills.

Table 4

Teachers' Goals of Technology Integration into Teaching Literacy Skills

		Order of Importance/*f*						
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**Total**
1.	My goal is to raise readers who can use technology effectively.	20	27	23	18	12	22	122
2.	My goal is to raise readers who ask questions and solve problems by consciously collaborating with others.	61	24	11	8	4	14	122
3.	My goal is to raise readers who produce and share knowledge.	59	24	13	7	12	7	122
4.	My goal is to raise readers who control, analyze, and synthesize concurrently information from different ways.	47	24	24	8	6	13	122
5.	My goal is to raise readers who create, criticize, analyze, and evaluate media texts.	31	13	23	21	17	17	122
6.	My goal is to raise readers who can enter different environments and fulfill ethical responsibilities in these environments.	44	20	17	8	23	10	122

When the table above is considered, it is seen that 20 teachers put the first goal in the first place in order of importance. 61 teachers placed the second goal in the first place. 59 teachers placed the third goal in the first place. 47 teachers placed the fourth goal in the first place. 31 teachers placed the fifth goal in the first place. In addition, 44 teachers

placed the sixth goal in the first place in order of importance. The teachers particularly prioritized second, third, and fourth goals for technology integration into teaching literacy skills. Table 5 shows the professional development seminars that teachers have recently participated in.

Table 5

Professional Development Seminars Teachers Participate

		f
1	Literacy and technology integration seminars organized within the scope of the school	41
2	Literacy teaching and technology integration seminars organized by the city education board	62
3	Literacy teaching and technology integration seminars organized by the Ministry of National Education	29
4	Conferences on teaching literacy skills	20
5	Workshops organized by professional organizations on teaching literacy skills	6
6	Training on teaching literacy skills as online or personally	15

Considering the table above, 41 teachers attended the training organized at school, 62 teachers attended the training organized by the city education board, 29 teachers attended the training organized by the Ministry of National Education, 20 teachers attended conferences related to the teaching of literacy skills, 6 teachers attended the training organized by professional institutions, and 15 teachers participated in personal or online training. While the teachers mostly attended technology integration and literacy seminars by the schools and the city education board, workshops organized by professional organizations on teaching literacy skills were the least attended seminars where only 6 teachers participated. Table 6 indicates how often the teachers benefit from the resources related to technology integration into teaching literacy skills.

When the table is considered, it is understood that 29 teachers do not use the guidance of their colleagues at school, 26 teachers do not take any contribution from the technologists at school, 37 teachers do not use online resources, 19 teachers do not benefit from professional organizations, 42 teachers do not get help from the curriculum and related materials, and 22 teachers do not use social media to increase awareness of technology integration into literacy skills.

Table 6

Resources Teachers Benefit for Technology Integration

	Always	Often	Sometimes	Never	Total
Other elementary school classroom teachers at school	5	60	28	29	122
Technologists at school or technologists at other schools	11	46	39	26	122
Online resources (websites, videos etc.)	4	24	57	37	122
Professional organizations	29	51	23	19	122
Curriculum and compulsory course materials	8	24	48	42	122
Social media (Facebook, Twitter, Instagram etc.)	39	41	20	22	122

Discussion and Conclusion

The study findings extend the existing research in various important ways. First finding reflected specific preferences, beliefs that teachers internalize in their literacy teaching process. This is important as indistinct interrelations between TPACK knowledge types and arguments about to what extent these relations are integrative or transformative lead us to examine beliefs and perceptions of teachers (Graham, 2011). It appears that the whole language, eclectic, balanced and literature-based teaching approaches are adopted by the teachers at most. This finding implies that real life contexts and experiences, multiple materials-rich resources as well as individual needs and differences are main factors that ought to be considered in teachers' literacy teaching. This sort of attitude as a teaching perspective appears to be encouragement to integrate technology in literacy instruction. This is because experiences with contemporary approaches and techniques, mindset in ways of obtaining knowledge may lead to emerge rich interactions with different technological tools. Our finding in this regard cohered with previous research that suggested these sorts of teaching values would aid effective technology practices (Kim, Kim, Lee, and Spector, 2013). Based on this finding, it seems that teacher beliefs and perspectives ought to be considered to improve technology integration as teachers' processes of integrating technology into reading and writing teaching process is affected by their beliefs and perceptions (Lai & Lin, 2018). Another finding suggested that teachers main goal of teaching literacy is to develop students' reading and writing skills to prepare students to have global understanding of the context through which a literacy text is emerged. It appears that teachers' aim of teaching literacy is not only to enable students to acquire knowledge and improve linguistic expressions but also build a global perspective through insights emerged into different ideas and diverse cultures. The finding indicates that teachers focus on practices through interpersonal lens. Similar findings were revealed in the study of Saleem & İlyas (2019).

Another finding indicated that teachers' preferences of implementing a new technology initiative is to deliver their teaching effectively. This indicates that, perhaps not surprisingly, teachers value effective technology integration into classroom settings to aid their teaching methods rather than revolutionizing their teaching. In line with this finding, Niess (2005) points out that more effective technology integration can be achieved when pre-service teachers build

pedagogical content knowledge along with their technological knowledge. Parallel to previous findings, another finding indicated that teachers mostly aim to educate productive readers who question source of the information and collaborate with others through technology integration. This sort of skill is pointed out as one of the 21st century skills and described within the broad concepts such information literacy, digital literacy, new media literacy (Koltay, 2011). This suggests that ICT-related skills and capabilities are considered central in shaping communicating, participating and sharing knowledge. On the other hand, another finding revealed that majority of teachers engage in seminars organized by the city education board or by their schools to improve their capacity in technology integration. This suggests that teachers with an external motivation mainly rely on a planned support which involves the sharing of examples and hands-on experiences for technology integration. It reflects the Avidov-Ungar's (2016) finding of teachers' intrinsic/extrinsic professional development motivation and aspirations. However, what is less evident is to what extend this learning process result in new practices and change. Lastly, another finding indicated that teachers mainly benefit from social media channels and professional organizations for technology integration and curriculum and compulsory course materials at the least. This suggests that teachers value potential social media affordances to form their technology integration.

The results obtained promote various implications, both in theory and in practice. One a theoretical level, this study contributes to the literature with a concreate analysis of issues in technology integration in teacher education. These can serve as a guide and support for future research. On a practical level, this study offers some valuable information for stakeholders within the educational community. The results obtained can serve as a guide on how to improve and update teacher training in the technological era.

Limitations and Future Studies

There are some limitations which may be subject to further research. The first one may be related to the sample. Sample-related limitations could be the non-random sampling technique of the participants and the non-homogeneous nature of the sample. Recruiting samples from more universities and different disciplines using a random sampling approach can improve the generalizability of the findings. Further studies can be conducted with a larger sample. Future studies should focus on gaining a better understanding of technology integration practices involved in the teaching of reading and writing practices and further exploration of the learning outcomes emerged through this integration. Though this study focuses narrowly on integrating technology within reading and writing processes, analyzing how such practices foster technology integration would provide new insights to enhance teacher education.

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