EDUCATIONAL SCIENCES IN THEORY AND PRACTICE

Editor
Prof. Dr. Fethi KAYALAR

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Chapter 1

A Comparison of The English Teaching Structure Of Poland, Latvia And Turkey

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Introduction

Some of the forces that have shaped up the globe in the 20th and 21st century are the conflicts, human migrations, and technological advancement. Major technological developments were propelled mainly by the labor demands, especially in the period just after the Second World War. People from all walks of life can now communicate with others who are situated anywhere in the world due to eradication of time and space constraints brought about by technological advancement, and this has brought a much stronger focus on language teaching by researchers today. The traditional approaches gave way to the more modern approaches that bring in the communicative and multicultural viewpoint. This is the evolving theory underlying language acquisition for a second language. This does raise issues for educators and policy makers. In this context, the methodology of teaching languages has been continuously updated and adapted according to the historical developments, and they have also been adjusted to the political regimes of the countries where they were and are being implemented. The current research focuses on the English language teaching systems of Poland and Latvia, two countries that faced extreme socio-political and economic changes after World War II. These changes, with their unique historical trajectories, have influenced their current policies regarding English language education. A comparison of such systems against their historical backgrounds provides a striking insight into the ways political and social forces cut through educational practice.

This paper further carries an added dimension-a comparative study involving the English Language teaching system of Turkey as well. Geographically and culturally, Turkey is distinct from Poland and Latvia; as such, it presents an interesting case study in the light of recent experiences dealing with large-scale migration and refugees. Comparatively, it will bring to light the differing social and political contexts which shape the priorities and challenges within English language education. In sum, the analysis will present a subtle understanding of the various elements that shape English language teaching in these three countries.

Education Structure Latvia

Regarding English teaching in Latvia, this first requires consideration within a broader educational context. Indeed, the educational system of Latvia is well-regulated for general learning at every stage among students. It embraces intellectual growth, critical thinking skill enhancements, and development with higher education and job prospective intentions during study sessions (Mhamed

et al., 2018). This provides a crucial framework for the particular methodologies and approaches followed in teaching the English language.

Latvian education starts with pre-school, though it is not obligatory. Pre-schools are designed for children between 1 and 6 years of age, and their programs focus on developing the social, emotional, and cognitive abilities of children.

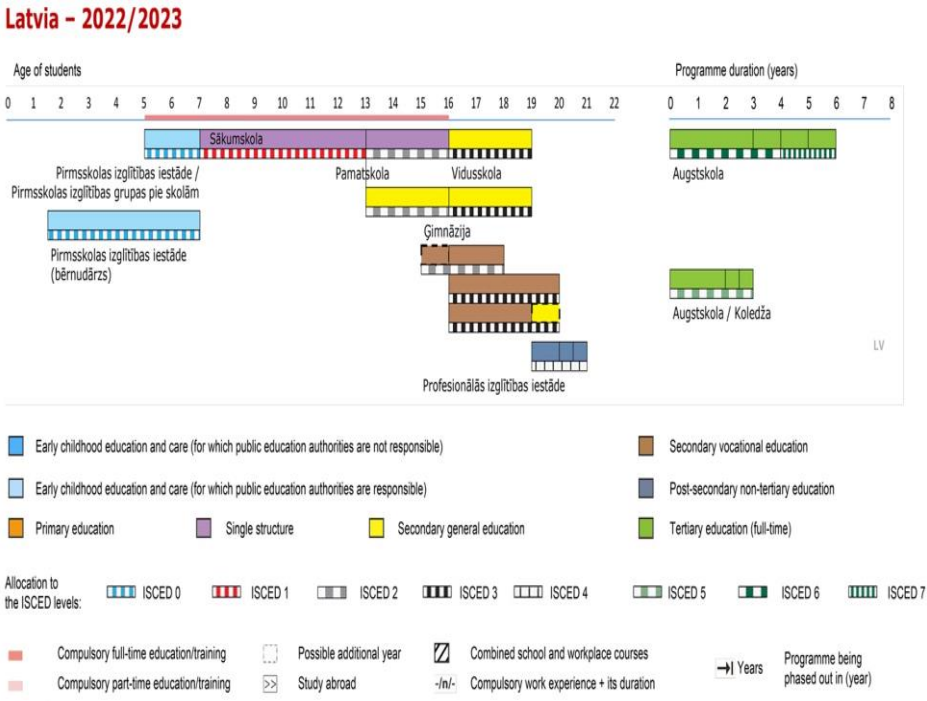
Primary education is compulsory for children aged 6-15 and includes nine grades, 1 through 9. It provides a solid foundation in knowledge and competencies in mathematics, languages—the main one being Latvian, usually supplemented by either English or Russian—sciences, arts, and physical education. The curriculum of primary education is targeted at providing initial skills and core knowledge that will serve as the foundation for further learning. Upon completion of primary education, students enter secondary education, which is divided into two stages: lower secondary and upper secondary.

Lower secondary education spans grades 10-12, typically attended by students aged 16-19. The curriculum at this level of schooling continues from the attainment of primary education and introduces a wider range of subjects. Core subjects include mathematics, sciences, languages, social sciences, and electives that enable students to pursue individual interests and career options. Upper secondary education, while not compulsory, prepares students for higher education or vocational training.

Upper secondary education includes grades 10 to 12, allowing students to choose between general education or VET (vocational education and training) programs. General education curricula have an academic core, enabling the provision of a proper knowledge base for students; these programs prepare students to go to university. In contrast, VET programs provide vocational competencies and knowledge for various occupations, preparing students directly for jobs (OECD, 2016).

Latvia’s higher education landscape encompasses both universities and specialized establishments, offering a broad range of programs. Students can pursue Bachelor's, Master's, and Doctoral degrees in everything from humanities and social sciences to STEM disciplines: science, technology, engineering, and mathematics. While Latvian remains the dominant language of instruction, there is an increasing number of study programs offered in English, attracting international students and contributing to Latvia’s global exposure. (Refer to Figure 1 for a detailed visual representation of Latvia's education system).

Figure 1: Education Structure of Latvia



Source: European Commission – Eurydice

English Language Teaching System of Latvia

The dissolution of the Soviet Union in the early 1990s had far-reaching changes in the language policy of many former Soviet republics. Due to its complex history of occupation and linguistic diversity, Latvia would experience some of the most dramatic changes. Throughout the latter half of the 20th century, Latvia struggled to balance its competing linguistic influences, with the resurgent Latvian nationalism colliding directly with the presence of minority languages, particularly Russian (Druviete, 2000). This created a dynamic that was full of tension and challenges for language planning and policy. Further complicating the contemporary language debates has been Latvia's history of being ruled successively by various powers: Sweden, the Russian Empire, Germany, and the Soviet Union. All these historical layers contribute to ongoing discussions on language identity, preservation, and integration within the country (Rozenvalde2019). While Russian is still widespread in post-Soviet Latvia, the forces of globalization have catapulted English to the fore.

Correspondingly, the role of English in the education system of Latvia has been developing with the establishment of English as the lingua franca of most

professional areas (Stavicka, 2015). It is reflected in the educational system of Latvia. Thus, according to the Ministry of Education and Science of the Republic of Latvia, EFL is taught in all elementary and secondary schools (Mikael, 2013). Besides, most state institutions offer a number of study programs that are fully taught in English, including all three levels of higher education. In fact, there is an increased disposition of using English as a medium of instruction in specialized courses within Latvian universities.

In addition to serving as the language of instruction in higher education, English can also be presented to students as a second or even third language. In addition, a specific level of English proficiency is typically required of prospective students in order for them to be accepted into the majority of academic programs. While the proficiency levels of applicants are determined by looking at their test results and their level on the Common European Framework of Reference for Languages (CEFR), individual educational institutions are in charge of determining the requirements rather than a centralized authority. In addition, while the ability to communicate in English is one of the criteria that universities look at when deciding who to let into their degree programs, the procedure that is most commonly followed is to hold admissions competitions. This usually results in classrooms with students of extremely varying levels of skill in the subjects at hand (including English), which makes for an uncomfortable learning environment for everyone involved (Uysal et al., 2007).

In Latvia, English language instruction at the elementary and secondary levels is typically provided by teachers who have completed a 4-year English language teaching program. This ensures that educators possess specialized training in language pedagogy and methodology. However, graduates from related fields like English Philology can also qualify to teach English if they obtain a pedagogical teacher education certificate (Kravale-Pauliņa, 2022). This flexibility allows for a broader pool of qualified educators while maintaining certain standards for teacher training.

When it comes to the English education system, learning a first foreign language begins in the third grade, and learning a second foreign language begins in the sixth grade. On the other hand, some pre-primary programs also include instruction in a foreign language (Eurybase, 2004/2005). In Latvia, the selection of a first foreign language and a second foreign language is contingent on the options that are made available to children and the decisions made by their parents. English, on the other hand, is the language most commonly used.

Latvia's secondary school English curriculum aims to equip students with a strong foundation in the language, emphasizing competency in all four skills: listening, speaking, reading, and writing. This emphasis stems from the

recognition of English as a vital language for communication, education, and future career prospects (Druviete, 2014). By fostering English proficiency, the curriculum aims to prepare students for success in an increasingly interconnected world.

In most schools, teaching English use a method that is sequential, building upon prior knowledge as students advance through the grade levels. The path of studying the English language for the students begins in the lower secondary school and continues all the way to the completion of the upper secondary school. During this time period, the educational program places an emphasis on the steady growth of language as well as the acquisition of new vocabulary, grammar, and communication skills.

The course material was developed to place an appropriate amount of focus on each of the various language abilities. For the purpose of improving students' ability to comprehend what they hear when they listen, listening exercises expose them to authentic English resources such as recordings of native speakers, music, and films. Students are encouraged to express themselves in English through conversations, presentations, debates, and role-playing activities that fall under the category of speaking activities. The goal of these exercises is to improve the participants' fluency, accuracy, and confidence in their use of spoken English (Jankovskıs, 2022).

The curriculum for teaching English also includes literature as an essential component of the curriculum. The students read a variety of works of English literature, ranging from the classics to more recent works. They investigate different cultural backgrounds, as well as characters, themes, and literary strategies. Reading and analyzing literature cultivates analytical thinking, cultural sensitivity, and an understanding for the civilizations that speak English.

It is essential to take into account the possibility of several schools and locations in Latvia employing somewhat different approaches to instructing students in English. The Ministry of Education and Science offers broad standards and frameworks for the teaching of the English language; nevertheless, schools and instructors have some leeway in executing the curriculum depending on the particular circumstances of their institutions and the requirements of their student bodies (Andersone, 2020).

Although the system was meant to equip students at the secondary schools in Latvia with critical language skills, it has received many criticisms. One of them is, it is hard for the pupils to develop their improvement of language and competency skills.

Another common criticism of the approach of the Latvian education system to English is that it leans too much toward course books and controlled exercises

at the expense of authentic materials. The critics claim such a case may limit the chances for students to engage in real texts, films, and audio recordings, therefore restricting their knowledge of how English is used in natural situations (Uysal et al., 2007. Proponents of more use of authentic materials argue that the former would better prepare students to cope with the complexities of the living, breathing English language in use across a wide range of contexts. Other concerns relate to the competency and continuing professional development of teachers of English in Latvia.

For this, it is important that the teachers have a good command over the language and are continuously trained in the best pedagogical methods. According to Sizer (1984), the professional development of teachers is the single most important factor in improving the quality of education. This would help educators acquire the knowledge and competencies needed to provide an interactive and dynamic classroom, supportive of student development and language learning. Investing in teacher development is not a cost; it is an investment in the future (OECD, 2018). With continuous development in the methodology of teaching languages and with new research emerging, continuous professional development will help teachers stay current with the best practices and hone their skills in teaching. Ongoing development in this area is what enables teachers to call on appropriate knowledge, skills, and understanding in the planning and delivering of effective lessons.

Education Structure of Poland

Presently, the Polish education system is undergoing a period of transformation, mainly supported by structural reforms that came into being in 1999 and 2017. These reforms, to be fully realized by 2023, have brought about an unprecedented sea change in the organization, administration, and funding of pre-university education. Most notably, the reforms have eliminated the gymnasium or lower secondary school and extended the duration of basic education from seven to eight years. Resultingly, the students in Poland nowadays stay for one year more in liceum (or in general secondary, or at vocational high schools), afterwards, upon completion, pass this type of exam, namely Matura. The Matura examination is of a ranking equivalent to, for instance, the English A-levels or French Baccalaureate but then qualifies a student directly to access higher education (Herbst & Wojciuk, 2017).

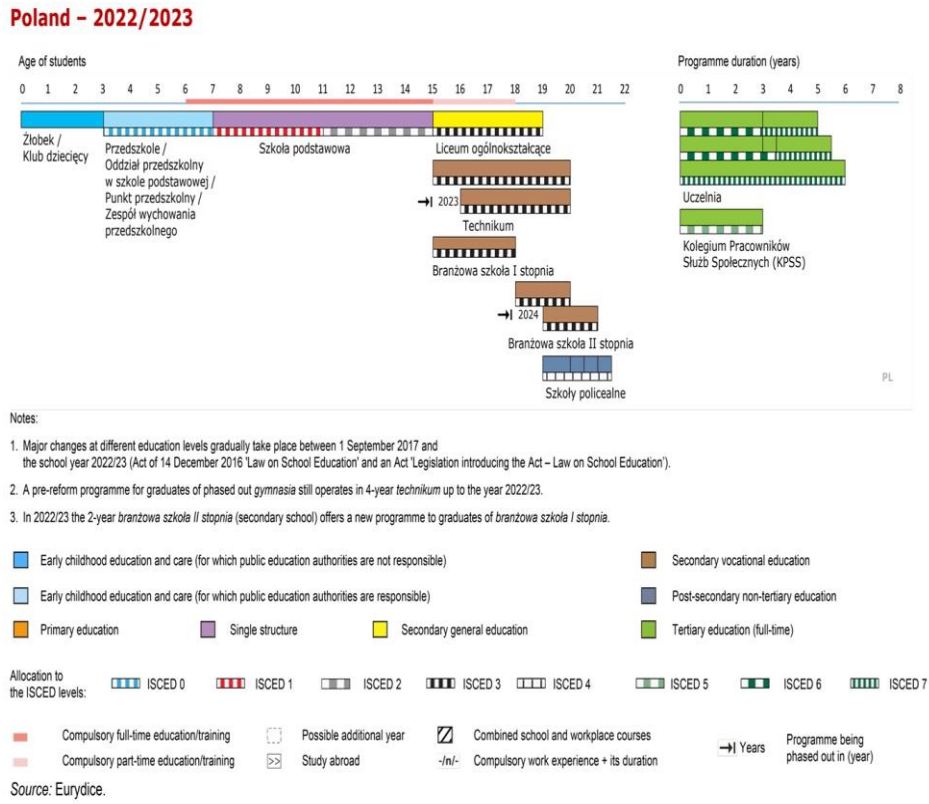
The Polish education system has undergone quite a lot of development over the last years, bringing a noticeable increase in literacy, numeracy, science, and foreign language proficiency. This progress is mirrored by the rise to the position of sixth in Europe and tenth globally in some of the most recent rankings.

Secondly, the system became more open and accessible: textbooks were provided for free starting from 2017 to alleviate at least some of the costs for families. Other than that, Poland has schools for special needs answering to the various needs: schools of national minorities in which teaching is conducted in languages such as German, Kashubian, Ukrainian, and Belarusian, and schools for students with disabilities (Wiśniewski & Zahorska, 2020).

Poland's education system offers a structured, gradual learning journey, starting with optional pre-school for children aged 3–6. The final pre-school year is mandatory for 6-year-olds to prepare them for formal schooling. Students then attend an 8-year primary school, divided into early education (grades I–III) for foundational skills and a subject-focused stage (grades IV–VIII) for specialized learning. After primary school, secondary education, mandatory until age 18, provides various pathways: a 4-year general secondary school (liceum), a 5-year technical school (technikum), and two levels of vocational schools. A 3-year special school supports students with additional needs. These options cater to diverse academic and career goals, helping students explore fields aligned with their interests. Graduates can take the "matura" exam to access higher education or attend post-secondary schools (szkoły policealne) for practical training and professional qualifications. Poland’s education system balances academic and vocational opportunities, equipping students for both personal and professional growth (welcome.uw.edu.pl, 2023).

The most popular foreign language taught in Polish schools is English, followed by German, Spanish, French, Latin, and Russian. After completing eight years of primary school, students take the mandatory Eight Grade exam, which typically takes place over three days in May (Wiśniewski and Zahorska, 2020). (Refer to Figure 2 for a detailed visual representation of Poland’s education system)

Figure 2: Education Structure of Poland



Source: European Commission – Eurydice

Poland has established itself as a major center for English in Europe, with approximately 11 million people speaking it as a second or additional language (Eurobarometer 2006). The country's embrace of English began in 1990, after decades of political turmoil and isolation. During Soviet rule, English, symbolizing the West, represented resistance and opportunities for education and employment (Reichelt, 2005). Following the fall of communism, the influx of English-language media—music, films, and news—deepened Poland's fascination with English and the cultures of English-speaking nations. This trend fueled demand for English instructors, language programs, private tutors, and immersion camps (Kasztalska,2014). Today, 89% of Polish students study English, positioning it as the nation's most widely spoken foreign language (Sliwa, 2010).

English Language Teaching System of Poland

Beginning with the first grade, students are required to attend a foreign language lesson for a total of two hours and forty-five minutes each week. Since 2015, complying with the requirement that you work a minimum of 190 hours throughout the course of the three-year term is mandatory (Smoczyska 2014). Children attend classes in a second language three times each week for a total of one hour and forty-five minutes beginning in the fourth grade. "Communication skills in the mother tongue and in a foreign language, including both speaking and writing skills" are the mandatory skills that must be obtained in order to finish elementary school (Smoczynska 2014, page 31). The Polish educational system is currently in the midst of a revolution as it is resigning from the lower secondary school (which formerly lasted three years and required a minimum of 290 foreign language sessions in addition to providing an external evaluation that was based on the national examinational requirements).

Beginning in the early years of secondary education in Poland, students are required to study the English language as an obligatory subject in their local secondary schools. The development of these four essential language skills—listening, speaking, reading, and writing—are the primary emphasis of the program. The students participate in a wide variety of learning activities designed to foster communication in English that is both meaningful and participatory (Ekiert, 2004).

Over the course of its history, the English teaching style utilized in Polish secondary schools has gradually shifted to place an increased emphasis on learner-centered approaches. The goal of the teachers in the classroom is to cultivate a stimulating and lively atmosphere in which the students are encouraged to take an active role in group projects, discussions, and debates. Students will be able to more boldly communicate their thoughts after adopting this strategy, which encourages the development of critical thinking, creative thinking, and problem-solving abilities (Sarbiewska, 2019).

The teaching of English grammatical rules and expanding students' vocabularies is normally approached in a methodical manner in Poland's secondary schools (Gimnazjum and Liceum) as part of the country's curriculum. In order for students to be able to successfully express themselves in English, they are taught to correctly use grammatical structures and to enhance their vocabulary. The English curriculum also includes lessons on the history, culture, and traditions of nations with a predominant English language population. Through the study of literature, the viewing of films, and the investigation of contemporary concerns in English-speaking nations, students get an understanding of many aspects of culture. The study of English literature is a

subject that is covered in both the Gimnazjum and the Liceum. This subject requires students to analyze and understand a variety of literary works, including as novels, plays, poems, and short tales. Students are able to improve their critical thinking and analytical abilities, as well as their grasp of literature written in the English language, as a result of this.

Towards the end of their time in upper secondary education, students frequently study for standardized examinations like as the English Matura, which evaluates the students' level of language skill. Students taking English lessons could participate in specialized exam preparation tactics, practice tests, and activities designed to get them used to the structure and requirements of the exam (Kasztalska, 2014).

Educational Structure of Turkey

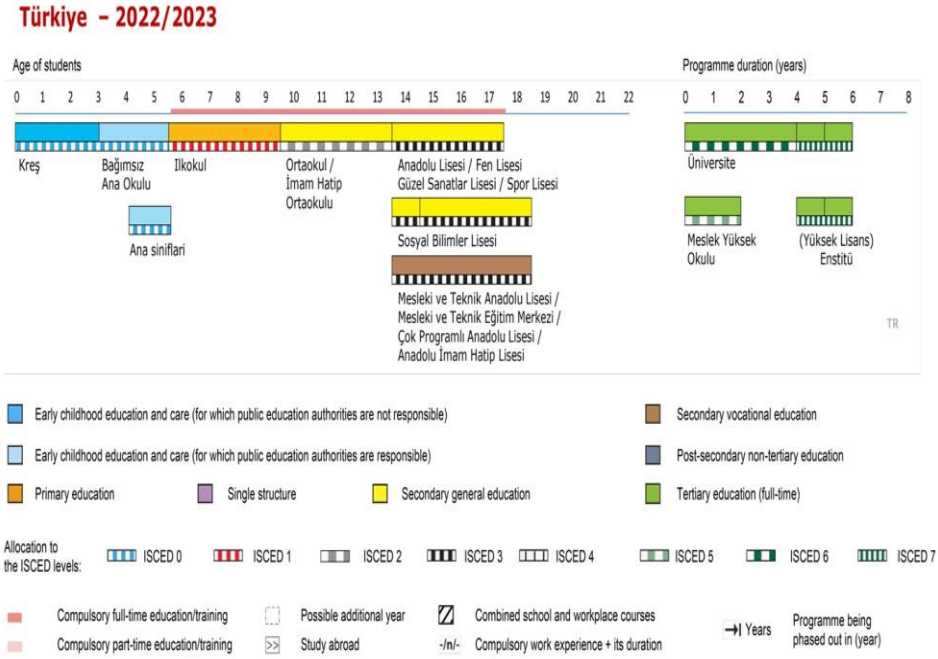
The Ministry of National Education (Milli Eğitim Bakanlığı) is in charge of Turkey's education system, which offers a complete framework for education at all levels, from pre-primary to higher education (MEB, 2005). Pre-primary education is accessible on an opt-in basis for children between the ages of 36 and 72 months. In order to get children ready for primary school, this program places an emphasis on children's sociability, fundamental cognitive abilities, and early language development (Saylık et al., 2020).

Primary schooling is required beginning at the age of six and continuing for a total of four years. Students strengthen their foundational knowledge in a variety of disciplines, including Turkish, mathematics, science, social studies, physical education, and the arts, throughout this period of their schooling. Lower secondary education, also known as secondary school, and upper secondary education, sometimes known as high school, are the two levels that make up Turkey's secondary education system. Education up till the level of the lower secondary is mandatory and lasts for a total of four years. Secondary education is provided to students between the ages of 10 and 14, during which time they study topics such as Turkish, mathematics, science, social studies, foreign languages (typically English), physical education, and optional courses (İlğan, 2021).

After finishing the lower level of secondary education, students continue their study by enrolling in the higher level of secondary education, also referred to as high school. Even though attendance at upper secondary school is not required, the vast majority of pupils choose to continue their studies at this level. High school programs typically continue for four years and provide a variety of paths for students to choose from based on their interests and their goals for the future. General education, vocational education, and technical education are the three

distinct paths that fall under this category. After finishing their secondary education, students have the option of continuing their education in colleges, vocational schools, or one of the many different types of tertiary institutions. Universities in Turkey provide students with access to a diverse array of undergraduate and graduate degree programs in a variety of fields. (Refer to Figure 3 for a detailed visual representation of Turkey's education system)

Figure 3: Education Structure of Turkey



Source: European Commission – Eurydice

English Language Teaching System of Turkey

Since the end of World War II and Turkey's NATO membership, English as a Foreign Language (EFL) has been a formal part of Turkey's education system. In the 1950s, English became a mandatory subject in secondary schools for students pursuing higher education and those attending vocational schools. However, widespread inconsistencies in teaching content, resources, instructional hours, and teacher quality limited student competency (Kırkgöz, 2007).

These issues prompted significant reforms by the Ministry of National Education (MoNE), reflecting the growing importance of English for Turkey's economic and sociopolitical progress. In 1997, English was introduced as a compulsory subject from elementary school through high school, starting in 4th

grade and continuing until 12th grade. A new, communicative curriculum was implemented nationwide to standardize EFL instruction and improve student outcomes. Despite these efforts, ongoing shortcomings in English proficiency led to further reforms in 2005 and 2012.

The 2012 reform was particularly impactful, lowering the formal schooling age to 5–5½ years and introducing English instruction starting in the 2nd grade. This allowed Turkish children to begin EFL education as early as six years old, continuing through high school (Kırkgöz, 2007, 2009; Kırkgöz et al., 2016). Although these changes expanded access to English instruction, challenges in Turkey's EFL system remain, warranting further analysis and comparison with other countries.

Comparison and Discussion of English Language Teaching Systems of Turkey Poland and Latvia

As we have shown in further detail above, wars, the geopolitical locations of nations, world viewpoints, and where individuals wish to perceive themselves in a sociological sense are directly mirrored in the educational systems of the English speaking countries. It is feasible to conclude that all three nations were impacted by the Second World War, and that as a result, significant shifts were made in the educational practices that each country followed regarding the English language. On the other hand, Poland and Latvia are not in the same position as Turkey since they are participants in the conflict and are experiencing life-threatening circumstances. Because Poland and Latvia underwent significant transformations in response to the socioeconomic devastation that they were experiencing at the same time that Turkey was broadening the scope of English instruction for NATO membership. On the other hand, the issue of migration and refugees that Turkey has been facing as of late may provide a new angle on this predicament. Arabic is the primary language spoken by most immigrants from Middle Eastern countries. In Turkey, however, the significance of using English in order to communicate with one another in a language they both understand may grow even more.

It is feasible to state that the teaching of English as a second language in these three nations shares both similarities and variations in terms of the cultural components that are involved. The countries of Poland and Latvia, both of which are included in the European Union, have a diverse range of cultural traditions. These nations welcome people from all over the world for the sake of education and employment, and the English language acts as the common language for communication among these people. The findings of Eurobarometer (2006) provide a crystal clear reflection of the current state of affairs. Even though

Turkey has a huge population and a vast geography, as well as the fact that people of different cultures speak languages that are close to one another, multiculturalism does not greatly help to the teaching of English in this nation. In addition, Doğançay-Aktuna and Kiziltepe (2005) state that there is a school of thought in Turkey that believes learning English in the classroom might result in the country's cultural decline.

Due to the influence of dominant nations such as Russia and Germany, Poland and Latvia have become multilingual. In light of the large number of people who speak Russian and German respectively, it is clear that these nations place a tremendous amount of value on the language arts, particularly Russian and German. However, because Turkey has a history of not being dominated by other nations for extended periods of time, its population are satisfied with their own language and attach less value to various languages. This has led to Turkey's language being more standardized.

The Common European Framework of Reference for Languages (CEFR) provides the structure upon which all three nations base their English educational systems and language classifications. When it comes to education, one may say that Turkey is more conservative than other countries since every school follows the same set of educational guidelines. On the other hand, it is clear from the reasons provided above that educational areas and schools within Latvia are responsible for developing their own English education curricula that are suited to their particular circumstances. Because of the rising prevalence of vocational institutions in Poland and Latvia, the relevance of speaking English well in the workplace has increased.

It is easy to observe that all three nations' language education programs take a communicative approach, which is one of the approaches that is available to be seen. By adopting new ways of approaching the teaching of English, new policies and regulations are being implemented. Despite the fact that creative and student-centered methods such as Task-Based Language Teaching are utilized, creativity and success cannot be generalized, as Paker (2012) pointed out.

In Poland and Latvia, particularly for pupils in middle school, the selection of language textbooks takes place at the institutional level. This is another distinction that can be drawn between the two countries. In the same way as textbooks in Latvia are provided free of charge by the Ministry of National Education, they are also provided free of charge in Turkey; however, educational institutions are not permitted to use any other publications save textbooks.

Conclusion

The significance of knowing English has risen to levels not seen in the past, particularly in the 20th and 21st centuries, due to the way in which our world is being remodeled by technology and the intricacies of our society and culture. The decision-makers in charge of education policy in countries reflect these shifts in how languages are taught inside their educational systems. However, the anticipated results are not always attained in each nation because of the many different causes. The purpose of this study is to investigate the English education systems in Poland, Latvia, and Turkey by situating them within the context of the general education system and taking the relevant historical facts into consideration. Throughout the course of this investigation, it has been shown that both nations share similarities and contrasts. One may make the argument that the English language education systems in Latvia and Poland would benefit more from greater cultural and linguistic diversity. The English education system in Turkey is nevertheless subject to major criticism, despite the fact that the curriculum has undergone significant revisions in recent years.

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Chapter 2

Evaluation of Parental Awareness Regarding the Importance of the Language Environment in Early Childhood *

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* This book chapter is derived from the master's thesis titled "Examining Parents' Awareness of Language Environment, Interactive Book Reading, and Practices in the Preschool Period."

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Language is humanity's greatest asset, distinguishing us from other living beings. Humans differ from other species through abilities such as perception, focus, abstraction, reasoning, coordination of emotions and thoughts, learning, decision-making, and language acquisitifon. Language is a communication system, and this system includes fundamental elements such as sounds and signs (Baykoç, 1986). Language, which fundamentally enables communication among people, also facilitates mutual understanding, opening new doors in the universe through direct communication (Poyraz, 1995). Language is a complex structure with endless components, expressed through symbols, and is one of the most essential means for emotional and social communication. The emergence of these qualities is not related to the brain's mass but to the development of neural networks connecting the highly complex brain (Ergenç, 2008). Two important factors in achieving the expected development of these neural networks are environment and heredity. The presence of necessary stimuli in the environment is crucial for forming neuron connections in the brain. Some key figures who examine language development from biological and psychological foundations include Chomsky, McNeill, and Lenneberg. According to Chomsky, a child is born with the ability to acquire language and has the potential to learn all languages. However, parental encouragement is essential for directing the child to learn their native language (Bacanlı, 2002). Here, the importance of parents spending quality time with their children in the early years of language development is also emphasized.

It can be said that language acquisition begins by hearing sounds in the womb. Communication, which starts with crying when the child is born, eventually progresses to language as the child matures. In this process, the child explores surrounding objects, recognizes people, and expresses these discoveries. Children meet their daily communication needs through language. From birth, arranging the child's environment and providing the necessary stimuli, as well as examining the effects of these stimuli on the child, are of great importance. Children first encounter the concept of literacy in their home environment and need stimuli to develop early literacy skills. To make the most of these stimuli, children need the support and communication of their parents (Çetin, 2020; DeFord, 1981; Erdoğan, 2013; Scarborough, 2001). Especially significant are the family’s or parents' interest in the child's education, knowledge level, and the educational environment at home. Early literacy broadly aligns with the preschool period, a critical phase for early literacy (NELP, 2008).

The most critical period for language development is between the ages of 2 and 6. By 36 months, the brain, with its hundred billion nerve cells, completes 85% of its growth (Suskind & Suskind, 2021). This shows that all foundational

thinking and learning skills, that is, neuron-to-neuron connections, are formed in early childhood. Parent-child communication through conversation is the most valuable part of this critical brain development period. Language allows the brain to reach its full potential, regardless of individual or environmental differences. Without such stimulation, brain development may be hindered. A child raised in an environment where language is not fully utilized, even with healthy hearing, is no different from a child with hearing impairment (Suskind & Suskind, 2021). In such an environment, children may remain silent, unable to express themselves. Conversely, children born with or later granted hearing ability achieve remarkable success in a language-rich environment (Suskind & Suskind, 2021). As the child's first social environment, the family's provision of rich auditory stimuli and healthy communication is highly effective for development in all areas.

Early childhood is a critical period for language development, where the child grasps the basics of their native language, starts using language actively, and gains essential foundational knowledge for language and concept development (Dereobalı ve Mihriban, 2018). During early childhood, feedback provided by parents and teachers after activities contributes to the development of communication skills by supporting verbal communication. Utilizing spontaneous or planned opportunities at home or school helps the child develop language and cognitive skills. Since the family is the child's first educational institution, children learn initial behaviors and attitudes by modeling family members. The family's communication with the child plays a significant role in initiating language learning and developing mental skills (Çakmak ve Yılmaz, 2009). Early childhood is a period of intensive development and learning activities, with children actively communicating with their surroundings. This interaction marks the beginning of literacy experiences, allowing children to recognize and experience spoken and written language, familiarizing them with the factors that constitute language (Gök, 2013).

This period is a complex process with multiple factors at play. Stimuli and education provided to the child during this time are essential. However, considering the impact of language, the most powerful tool of communication, its effectiveness in early childhood development becomes even more critical. In this stage, children process and infer learned knowledge, marking their transition from dependence on their surroundings to taking steps toward independence (Uyanık ve Sinanoğlu, 2016). The knowledge and experiences gained during this period form the foundation for future academic and literacy skills (Whitehurst et al., 1998). Consequently, reaching targeted academic skills in this period is vital (Enerem, 2018). When children are born, their first interaction environment is

undoubtedly their family. These interactions support the child's brain development (Enerem, 2018). The foundations of language development, closely linked to brain development, are also laid during early childhood.

Given this, it is essential to carry out early literacy activities diligently to achieve the desired gains in this period. The productivity of the preschool period also affects the productivity of primary education. In Bronfenbrenner's (2000) "Ecological Systems Theory," the importance of an individual's relationships with their multi-layered environment is emphasized, stressing the significance of these relationships. Influenced by Vygotsky and Lewin, Bronfenbrenner describes five primary systems—the microsystem, mesosystem, exosystem, macrosystem, and chronosystem—that shape a person's development through reciprocal interactions. The microsystem, for example, shows that the child is influenced most by close environments like family, school, relatives, and friends (Polat ve Akyol, 2019).

The preschool period holds great significance in an individual's life. During this period, the child completes much of their personality, emotional, social, cognitive, language, and academic development. The child, especially in mental and language development, receives support from the family and school environment. By 60 months, about two-thirds of language development is complete, with a 5-year-old possessing a vocabulary of approximately 2,000 words, able to express themselves at an adult level (Kol, 2011). In the post-birth period, the child initially produces sounds like grunts, groans, and yawns—natural sounds that gradually take on meaning. For thought development, language must first develop and take shape. Mental activities that enable individuals to perceive their environment and the external world are part of cognitive development. Cognitive development allows the child, during the transition to adulthood, to understand the world and their environment, enhancing their thinking in more complex and active ways. Language and cognitive development work together in generating ideas, analyzing and synthesizing, and solving problems. When considering these factors, the importance of language in learning becomes undeniable. Given the intensive development of language from ages 2 to 6, the significance of the preschool period in language programming is heightened (Fişek ve Yıldırım, 1983).

The book environment provided to children in early childhood education institutions consists of many important components, such as reading and writing materials, access to these materials, classroom design, and teacher guidance (Duyan, 2022). The catalyst for these components at home, of course, is the family. In addition to serving as a role model in this process, the family should support the child by providing the necessary environment, materials, and

practices during early childhood. Therefore, it is important for families to be aware of the language environment during the early literacy period and to provide the required support (Duyan, 2022).

The early literacy environment can be described as consisting of two components: the physical environment for reading and writing and the learning support provided by the family (Neuman et al., 2008). The physical environment can be defined as books that address early literacy and an environment where these books are easily accessible. Many studies have pointed out the close relationship between literacy and early literacy, emphasizing that both should be supported holistically at home and school (Edwards & Willis, 2000; Molfese et al., 2006). Failing to provide the necessary environment, opportunities, and stimuli for the child in this process hinders the achievement of the desired outcomes in the long term (Ghoting & Martin-Diaz, 2006). Therefore, the opportunities and stimuli provided to children during this period are crucial for their acquisition of early literacy skills (Morrow, 2007). A language environment that aligns with the child's developmental stage and offers a broad range of materials should be created. Research has emphasized the importance of providing children with extensive opportunities in the language environment to contribute to their early literacy skills (Morrow, 1990; Vukelich, 1994; Dynia et al., 2016). In light of these studies, the family should guide the child in acquiring early literacy skills, read aloud to the child, and ensure access to books. It is essential not to wait until the child is one year old to start early literacy activities; instead, mental connections should be strengthened with visual and auditory stimuli from birth. Thus, the home's early literacy environment should fully support the child's development in terms of resources and activities. Families can provide this support by setting up a children's library at home, reading books aloud with the child daily, engaging in interactive reading activities during the early literacy process, and patiently answering every question the child asks.

As is well known, the path to developing language and communication between a child and an adult primarily comes through reading books. Storybooks help children learn language and expand their vocabulary (Snow, 1983). Selecting books appropriate to the child's developmental level and reading them aloud plays a crucial role in their language, social, and emotional development (Garvie, 1990). Through books, children begin to understand that different individuals have different emotions and lives (Yıldız Bıçakçı ve Aral, 2009). Reading, writing, self-expression, and understanding incoming stimuli are skills that will accompany children throughout their lives. For this reason, children who have reached the necessary cognitive and physical maturity are expected to learn to read and write during primary school. The speed and quality of this process

are directly proportional to the experiences gained before entering primary school, which highlights the determining characteristic of early literacy (Sulzby & Teale, 1991; Uzuner, 1997; Whitehurst & Lonigan, 1998).

Researchers define parents as the first teachers in the home environment, as they play a direct or indirect role in children's education at home (Hollingsworth & Hoover, 1999). John Dewey, one of the world's leading educational philosophers, also emphasized in his work *School and Society* in the 1800s that schools and families must collaborate (Dewey, 2022). Education begins in the family, the smallest unit of society. Therefore, to raise creative individuals who form healthy brain connections and use language effectively, the focus must begin with the family and language environment. For this reason, families should be involved in the early literacy education process. To ensure effective communication and successful activities, the home language environment must be healthy, and parents must have the necessary awareness.

In the period following birth, a child initially produces sounds similar to grunts and yawns. The child will later use these sounds only when imitating noises. However, as the child develops, sounds resembling grunts or growls are replaced by meaningful sounds and words. The development of language shapes the development of thought. The process of a baby, who initially expresses their needs only by crying, transforming into an individual who shares their experiences, jokes with us, and tries to learn by asking questions, is a wonderful process (Başal, 2004). The most important facilitators of this process are the parents, as the first step in providing these stimuli is the home environment. Thoughts emerge as generalizations, and generalizations create words. Words are the counterparts of the entities and concepts in the environment. Language allows us to establish connections between words and concepts. We make our thoughts concrete with words. It is known that concepts are formed during childhood (Ergün ve Özsüer, 2006). In this context, every stimulus coming from the environment that helps form concepts plays a vital role in language formation. A child's ability to form meaningful sentences earlier than expected can be linked to the positive relationship they have with their family. Linguists emphasize that the early childhood period is crucial for language acquisition, and delays in language development can impact the entire lifetime. Similarly, it is believed that in inadequate preschool programs that are detached from the child's cognitive and linguistic development, the development level may not reach the desired level (Aydoğan ve Koçak, 2003). Here, we must emphasize how meticulously preschool education programs should be prepared. Whether at home or school, planning activities that will impact the child's development or spontaneously carrying out evolving activities is important for seizing opportunities to

contribute to the development of the child's language and cognitive skills. Considering that the family is the primary institution that provides the child's first education, effective communication between the family and the child plays a critical role in initiating the language learning process and stimulating mental activities (Çakmak ve Yılmaz, 2009). The child's mental development can be negatively affected in situations where the child is not spoken to, does not receive answers to their questions, or cannot satisfy their curiosity. Language development is shaped by the frequency and quality of interactive communication activities with the people in the child's environment (Çakmak ve Yılmaz, 2009).

Having a book-reading culture as part of the family's daily life is extremely important for the child to adopt this activity as a natural process and to establish a close relationship with books (Akıncı Oktay, 2006). Research has also shown that there is a significant link between parents' book-reading habits and the book-reading habits and attitudes of children aged 3-6 (Marjanović, 2012). A study has revealed that children's future book-reading habits are closely related to the book-reading habits of their family members. This study highlights the importance of the book-reading culture and the richness of the language environment. In another study, Roberts, Jurgens, and Burchinal (2005) demonstrated that early literacy activities at home are strongly connected to early literacy gains, including receptive and expressive language skills and understanding words for reading (Roberts, Jergens, & Burchinal, 2005). Morrow and Gambrell (2002) pointed out that the best way to reach early literacy skills most effectively during early childhood is through reading books with children. This study also emphasized that these activities should be supported not only in school but also at home (Morrow & Gambrell, 2001). In conclusion, the stimuli and opportunities provided to the child for acquiring early literacy skills must also be ensured at home, and parents need to be conscious and responsive in this regard (Polat Unutkan, 2006). The early childhood period is of great importance in terms of its effect on later early literacy skills and academic attitudes. The importance of this process requires adults to be more conscious during this period and to provide a more equipped language environment (Altınkaynak Özen, 2019).

Many studies have explored the relationship between early literacy skills and academic success. Some of these studies show that academic success in primary school is based on the development of skills during the early literacy period, while others demonstrate that academic success in primary, middle, and high school is linked to the success achieved during the early literacy period (Ergül, Dolunay Sarıca ve Akoğlu, 2016). Other research on early literacy has also examined the impact of socio-economic status (SES) on the development of early

literacy skills and found that children from low SES families are at a disadvantage when it comes to acquiring these skills in early childhood (Bursuck & Damer, 2007; Çakmak ve Yılmaz, 2009; Dickinson & McCabe, 2001; Foorman et al., 1998; Lonigan & Whitehurst, 1998; Niklas & Schneider, 2013; Raz & Bryant, 1990; Rush, 1999; Stevenson & Fredman, 1990). Studies have shown that children raised in families with low income and cultural status tend to perform at lower academic levels in primary school and beyond when compared to their peers from middle or upper SES families (Dickinson & Tabors, 2001; Justice et al., 2005; McCardle et al., 2001; Snow et al., 1998; Whitehurst & Lonigan, 2001). Research has also shown that interactive reading activities, when managed consciously by adults, have a positive impact on children's language development (Robbins & Ehri, 1994; Senechal & Cornell, 1993; Senechal, Lefevre, & Daley, 1998). It has been found that children who respond to and comment on words during reading activities have richer vocabularies compared to those who memorize words (Senechal, 1997; Senechal, Thomas, & Monker, 1995). Based on these findings, it can be concluded that children's active involvement in reading activities is an important element that positively stimulates learning (Ergül, Dolunay Sarıca, ve Akoğlu, 2016). Children whose parents regularly support them with reading activities tend to perform better in expressing themselves and using words functionally compared to their peers (Armbruster et al., 2003; Beck et al., 2002; Greene & Lynch-Brown, 2002; Hart & Risley, 2003; Huebner & Payne, 2010; Robbins & Ehri, 1994). Reading with an adult is a highly effective way to add new words to a child's vocabulary (Senechal & Cornell, 1993). A common finding in literacy research is that literacy begins with a child's birth and develops and strengthens with the support of the family, and these gains can be achieved by the end of the preschool period (Justice & Ezell, 2004). It is known that it is not appropriate for a child in the preschool period to actively learn reading and writing. Early childhood knowledge and skills can include activities such as scribbling, mimicking letters, understanding the difference between writing and pictures, and pretending to read a book. In other words, early literacy skills lay the foundation for later formal education (Justice & Kaderavek, 2002).

Recently, the low rates of book reading and the increasing number of children who do not use language effectively have led to a need for increased research in this area and for raising awareness and experience among both parents and teachers regarding interactive book reading activities in early childhood. The "1 Million Books" project implemented in our country addresses this issue. Launched by Prof. Dr. Selçuk Şirin as a social initiative, this project highlights that about 1.3 million babies are born in the country every year, but only 20% of

them have access to books during early childhood. The critical importance of this situation is linked to research showing that children's language and interaction styles, as well as the words they use, are very similar to those of the family members who provide their first education (Hart & Risley, 2003). The variation in book-reading rates at home, depending on the socio-economic status of children of the same age group and potential, directly affects their academic success in the later stages of their development (www.1milyonkitap.com). The lack of early literacy skills not only impacts children's academic success but also leads to social problems and feelings of inadequacy (Snow, Burns, & Peg, 1998). The purpose of this research is to evaluate the early language environment of preschool children based on parental opinions. The research questions are:

1. What is the language environment like for children in the preschool period?
2. According to parental opinions, what is the level of their children's early literacy skills?
3. What types of activities do parents engage in at home to support their children's early literacy skills?

METHOD

Research Model

In the field of research, types of research are defined under different headings, and various criteria are used to define them. In today's world, the level of knowledge is frequently measured using technological tools. As there are many points to consider in the decision-making phase of research, descriptive research is the most commonly used type of research (Acuner, 1990). In descriptive research, the main goal is to describe the situation in the best possible way. Descriptive research involves surveys and aims to describe events, objects, beings, institutions, and situations without intervention (Kaptan, 1998). The problem is presented without interference, revealing the current state (Büyüköztürk et al., 2020). In this study, descriptive research, one of the most commonly used qualitative research methods in education, was applied. The study aimed to describe how parents provide opportunities for early literacy at home, their attitudes toward early literacy efforts, and their awareness of these activities. The study aimed to assess the current attitudes, behaviors, and knowledge of parents without any workshop or informational process. Thus, the attitudes and awareness of parents toward interactive book reading and the early literacy environment at home, particularly based on socio-economic status, were examined.

Sample

The population of the research consists of parents of children aged 48 to 72 months in early childhood. The sample of this study includes parents of 167 students attending 2 public and 1 private preschool institutions in the city of Bursa. Approximately 80% of the participants are parents over the age of 31. About 94% of the survey data was obtained from mothers. In terms of the parents' education levels, approximately 38% are high school graduates, ranking first. The second group, with about 34%, consists of parents with bachelor's degrees. The demographic information of the parents who participated in the study is provided below. Table 1 presents the type of school the parents' children attend (public/private), parental age, education level, and marital status. Table 2 presents findings related to the parents' work intensity. Later, the findings regarding the research questions are presented and interpreted.

Table 1. Demographic information of parents

		n	%
Please tick the pre-school education institution your child is attending.	Private pre-school education institution	43	25,7%
	Pre-school education institution within the state	124	74,3%
The Degree of Relation to The Child	Mum	155	93,4%
	Father	11	6,6%
	Other	0	0,0%
Age	15-19	0	0,0%
	20-25	3	1,8%
	26-30	31	18,6%
	31-35	59	35,3%
	36+	74	44,3%
Education Level	Primary education	0	0,0%
	High School	65	38,9%
	Associate Degree	27	16,2%
	Licence	58	34,7%
	Master's Degree	15	9,0%
	PhD	2	1,2%
Marital Status	Married	163	97,6%
	Single	4	2,4%

25.7% of the participants' children attend private preschool institutions, while 74.3% are enrolled in public preschool institutions. The participant with the closest relationship to the child is the mother, accounting for 93.4%. The largest group of participants, 44.3%, is aged 36 or older. The highest level of education among participants is high school, with 38.9%. Of the participants, 97.6% are married, and 2.4% are single.

Table 2. Parental work intensity

Mother/Father Work Intensity		n	%
6 days including Saturday	Mum	15	16,0%
	Father	79	84,0%
Every weekday	Mum	53	57,0%
	Father	40	43,0%
Part-time	Mum	8	80,0%
	Father	2	20,0%
Not working	Mum	56	98,2%
	Father	1	1,8%
Other	Mum	7	43,8%
	Father	9	56,3%

When examining the work intensity of parents, the highest percentages are as follows: 84% of fathers work 6 days a week, including Saturdays; 57% of mothers work every weekday; 80% of mothers work part-time; 98.2% of mothers do not work; and the person with the next highest work intensity is the father, with 56.3%.

Data Collection Process and Data Collection Tool

In the data collection process, first, permission documents from official authorities and approval regarding the suitability of the study were obtained. Subsequently, the "Early Literacy Parent Survey" (Deniz, 2023), which was prepared specifically for this study, was administered to the parents at the pre-approved and permitted preschool institutions, based on voluntary participation, both via "Google Doc" and in printed form. The survey used for collecting research data consists of 47 questions, 7 of which are related to the demographic information of the parents. In this context, the family's income status, education level, work tempo, number of children, and whether the child attends a private or public school were determined. Based on the question regarding whether the child attends a private or public school, inferences were made about the family's socio-economic level (SEL). The remaining 40 questions aimed to assess the reading environment at home, the number of books, the quality and frequency of writing and speaking activities, the parents' knowledge regarding early literacy, and their attitudes and awareness toward interactive reading. Of the 40 questions, 26 have been analyzed and presented in this study. The language parents use while reading books with their children, how often children are involved in the reading process, and parents' knowledge, background, awareness, and attitudes toward interactive reading will be published in a separate paper. During the preparation of the survey, the questionnaires from internationally trusted educational assessments such as TIMSS and PIRLS, known for their reliability in measuring educational outcomes, were thoroughly examined. Some of the questions from these surveys were translated or adapted to create the survey

questions used in this study. TIMSS is an international exam used every four years since 1995 to predict the mathematical and scientific success of 4th and 8th-grade students. The exams include more than just multiple-choice questions; they also assess reasoning based on reading and comprehension skills. PIRLS exams, held every 5 years since 2001, aim to track the reading performance trends of 4th-grade students (IEA-TIMSS&PIRLS, 2023). In line with this purpose, various surveys are administered to parents, teachers, and students. These surveys were translated into Turkish and analyzed, providing inspiration for the "Early Literacy Parent Survey" used in this study. Though not directly copied, these surveys informed the questions on the language environment at home. Additionally, the book *Thirty Million Words* by Suskind, which emphasizes the importance of language and word usage with children, also contributed to shaping the survey. In this work, Suskind highlights that a child who is not exposed to language stimulation, even without a physical disability, is no different from a child with hearing impairment (Suskind, 2021).

Data Analysis

The collected data were first transferred to Microsoft Excel and then to SPSS 28.0 for analysis. The survey data were analyzed in the same program, and the frequencies and percentages of the obtained data were calculated and interpreted. The original survey used in this study can be found under the appendices section of the thesis. The first 7 questions of the 47-question survey address demographic characteristics, and these questions are located in the introduction of the survey. Questions numbered 23 to 47 aim to determine the parents' attitudes and behaviors regarding early literacy. The data derived from these questions will be presented in another publication. The remaining questions (8-19, 20-21, and 22) focus on defining the language environment during early childhood. The sub-items of these questions were converted into numerical form and analyzed descriptively.

FINDINGS

Below, the findings regarding the language environment of preschool children, according to parents' perspectives, are presented in sequence.

What is the language environment like for children in the preschool period?

There is no doubt that the family plays a significant role in early literacy development. In this regard, the presence of books, magazines, bookshelves, desks, internet access, and electronic book readers in the home are all important indicators. The frequency table related to these factors is presented below.

Table 3. Frequency table of books, magazines, bookshelves, desks, internet and electronic book readers at home

		n	%
Apart from magazines and newspapers, how many books for adults do you have at home?	0-25	45	26,9%
	26-50	37	22,2%
	51-100	38	22,8%
	101-200	18	10,8%
	200+	29	17,4%
Apart from children's magazines and textbooks, how many children's books do you have at home?	0-10	21	12,6%
	11-25	26	15,6%
	26-50	54	32,3%
	51-100	43	25,7%
	100+	23	13,8%
Home Equipment			
Bookshelf	None	35	21,0%
	There is	132	79,0%
Computer Desk	None	106	63,5%
	There is	61	36,5%
Working Desk	None	96	57,5%
	There is	71	42,5%
Your Child's Own Room	None	72	43,1%
	There is	95	56,9%
Internet Connection	None	13	7,8%
	There is	154	92,2%
Electronic Book Reader Tablet	None	156	93,4%
	There is	11	6,6%

The highest percentage in terms of the number of responses to the question "How many books for adults (excluding magazines and newspapers) are in your home?" was 26.9%, with the answer being 0-25. The highest response to the question "How many children's books (excluding children's magazines and textbooks) are in your home?" was 32.3%, with the answer being 26-50.

Looking at the available equipment in the home, 79% of participants reported not having a bookshelf, 63.5% reported not having a computer desk, 42.5% reported having a study desk, 56.9% reported that the child has their own room, and 7.8% reported not having an internet connection.

The frequency analysis of responses to questions regarding parent attitudes and behaviors about book culture in the home—such as reading books, purchasing books, or borrowing books from the library—is presented in Table 4.

Table 4. Frequency analysis of the answers to the questions about reading culture in home environment.

		n	%
How much time do you spend reading books, magazines, newspapers or work-related material on the computer?	Less than 1 hour per week	57	34,1%
	1-5 hours per week	67	40,1%
	6-10 hours per week	21	12,6%

	More than 10 hours a week	22	13,2%
How often do you regularly read books at home?	Every day	40	24,0%
	1-2 per week	70	41,9%
	1-2 per month	38	22,8%
	Never	19	11,4%
How many years has your child been attending nursery or kindergarten?	More than 3 years	12	7,2%
	2-3 years	22	13,2%
	2 years	17	10,2%
	1-2 years	59	35,3%
	Less than 1 year	57	34,1%
How often do you discuss your child's development and learning with his/her teacher?	1-2 times a week	64	38,3%
	1-2 times a month	73	43,7%
	4-6 times a year	20	12,0%
	1-3 times a year	10	6,0%
How often do you borrow books from the school or library to read to your child?	Never	131	78,4%
	1-2 times a week	10	6,0%
	1-2 times a month	16	9,6%
	Several times a year	10	6,0%
How often do you give your child the opportunity to go to the bookshop and choose a book?	Never	16	10,1%
	1-2 times a week	0	0,0%
	1-2 times a month	90	56,6%
	Several times a year	53	33,3%
How often do you read aloud with your child at home?	Never	11	6,6%
	1-2 times a week	38	22,8%
	1-2 times a month	55	32,9%
	Almost every day	63	37,7%
How much time does your child spend a day on the computer or tablet for games, videos, social media?	Nothing.	14	8,4%
	30 minutes less	25	15,0%
	30-60 min	54	32,3%
	1-2 hours	49	29,3%
	More than 2 hours	25	15,0%
How long do you read e-books to your child on a computer or tablet every day?	Never	114	68,3%
	Less than 1 hour	49	29,3%
	1-5 hours	4	2,4%
	6-10 hours	0	0,0%
	More than 10 hours	0	0,0%

The biggest percentage in terms of the number of responses to the question "How much time do you spend reading books, magazines, newspapers, or work-related materials on the computer?" was 40.4%, with the answer being 1-5 hours per week. The highest response to the question "How frequently do you regularly read books at home?" was 41.9%, with the answer being 1-2 times per week. The highest response to the question "How many years has your child been attending preschool or kindergarten?" was 35.3%, with the answer being 1-2 years. The highest response to the question "How often do you meet with your child's teacher regarding their development and learning?" was 43.7%, with the answer being 1-2 times per month. The highest response to the question "How often do you borrow books from your child's school or library for reading?" was 78.4%, with the answer being never. The highest response to the question "How often do

you take your child to a bookstore to choose books for them?" was 56.6%, with the answer being 1-2 times per month. The highest response to the question "How often do you read aloud with your child at home?" was 37.7%, with the answer being almost every day. The highest response to the question "How much time does your child spend on the computer or tablet playing games, watching videos, or using social media in a day?" was 32.3%, with the answer being 30-60 minutes. The highest response to the question "How much time do you spend reading e-books to your child every day on the computer or tablet?" was 68.3%, with the answer being never.

What is the level of early literacy skills of children according to parental views?

The frequency analysis of the survey questions designed to measure children's early literacy skills, based on parental views, has been conducted and the results are presented below.

Table 5. Frequency analysis of preschool children's early literacy skills according to parents' views.

		n	%
Knows most of the letters	Nothing.	19	11,4%
	A little bit	69	41,3%
	Good	34	20,4%
	Very Good	45	26,9%
He reads some words	Nothing.	89	53,3%
	A little bit	39	23,4%
	Good	21	12,6%
	Very Good	18	10,8%
Can read sentences	Nothing.	126	75,4%
	A little bit	21	12,6%
	Good	5	3,0%
	Very Good	15	9,0%
Can write letters	Nothing.	23	13,8%
	A little bit	58	34,7%
	Good	38	22,8%
	Very Good	48	28,7%
Can write some words	Nothing.	67	40,1%
	A little bit	44	26,3%
	Good	34	20,4%
	Very Good	22	13,2%
Writing and recognising numbers	Can't count at all	3	1,8%
	Up to 10	21	12,6%
	Up to 20	43	25,7%
	Up to 100	100	59,9%
Writing numbers	Can't count at all	16	9,6%
	Up to 10	50	29,9%
	Up to 20	49	29,3%

	Up to 100	52	31,1%
Recognise shapes such as triangle, square and circle	Nothing.	1	0,6%
	1-2 Shape	5	3,0%
	3-5 Shape	26	15,6%
	More than 4 Shapes	135	80,8%

According to the participants' responses, the highest percentages of children are reported to know most of the letters (41.3%), can read some words (53.3%), cannot read sentences (75.4%), can write letters (34.7%), can write some words (40.1%), can write and recognize numbers (59.9%), can count up to 100 (31.1%), and can identify more than four shapes (80.8%).

The frequency analysis of the activities parents engage in at home to support their children's early literacy skills is presented below.

What types of activities do parents do at home to support their children's early literacy skills?

The frequency analysis of the activities parents perform at home to develop their children's language skills is presented in the table below.

Table 6 Frequency analysis of the activities that parents do at home to support children's early literacy skills

	Never		Sometimes		Frequently	
	n	%	n	%	n	%
Reading a book	9	5,4%	65	38,9%	93	55,7%
Storytelling	3	1,8%	70	41,9%	94	56,3%
Playing alphabet games	27	16,2%	104	62,3%	36	21,6%
Talking about what you did during the day	2	1,2%	23	13,8%	142	85,0%
Talking about the books we read	16	9,6%	90	53,9%	61	36,5%
Playing word games	26	15,6%	95	56,9%	46	27,5%
Writing words	59	35,3%	80	47,9%	28	16,8%
Singing loudly	2	1,2%	52	31,1%	113	67,7%
Playing rhymes and riddles	24	14,4%	86	51,5%	57	34,1%
Playing number games	14	8,4%	89	53,3%	64	38,3%
Counting the objects around us	6	3,6%	65	38,9%	96	57,5%

Playing games about shapes	9	5,4%	100	59,9%	58	34,7%
Playing board and card games	19	11,4%	79	47,3%	69	41,3%
Talking about the things you do together	1	0,6%	46	27,5%	120	71,9%
Talking about what your child is interested in	1	0,6%	40	24,0%	126	75,4%
Talking about what they did at school	2	1,2%	26	15,6%	139	83,2%
To help with your studies	7	4,2%	42	25,1%	118	70,7%
Asking questions about what they learnt at school	2	1,2%	30	18,0%	135	80,8%
Help with maths skills	5	3,0%	63	37,7%	99	59,3%
Speech about the books read at school	13	7,8%	89	53,3%	65	38,9%

According to the participants' responses, the following frequencies were observed for various activities:

- 55.7% frequently read books,
- 56.3% frequently tell stories,
- 62.3% frequently play alphabet games,
- 85% frequently talk about things they did during the day,
- 53.9% sometimes talk about the books they read,
- 56.9% sometimes play word games,
- 47.9% sometimes write words,
- 67.7% frequently sing songs aloud,
- 51.5% sometimes play tongue-twisters and riddles,
- 53.3% sometimes play number games,
- 57.5% frequently count objects in the environment,
- 59.9% sometimes play shape-related games,
- 47.3% sometimes play table and card games,
- 71.9% frequently talk about the things they do together,
- 75.4% frequently talk about things their children are interested in,
- 83.2% frequently talk about what they did at school,
- 70.7% frequently help with their children's lessons,
- 80.8% frequently ask questions about what they learned at school,

- 59.3% frequently help with math skills,
- 53.3% sometimes talk about the books read at school.

Conclusion and Discussion

In this section, the findings regarding the linguistic environment parents provide for early literacy development at home are interpreted and supported by relevant literature. The first research question aims to describe the language environment presented to children at home during the preschool period based on the findings. Children's books are undoubtedly the primary material in interactive reading activities for early literacy. Approximately one-third of participating parents reported having between 26 and 50 children's books at home. Considering the environmental factor in early literacy, it is essential to increase the number of children's books in the household. Literacy is a complex skill that extends beyond merely reading and writing a language. This skill encompasses various aspects of language that facilitate human communication, including cultural and spiritual values, behaviors, thoughts, plans, and the ability to express future desires. Literacy emerges through reciprocal interaction (Jones & Diaz, 2007). At this point, establishing communication with children during their critical early childhood years is the primary condition for becoming a proficient reader. As indicated by other studies, literacy not only involves reading and writing but also stimulates cognitive development, emphasizing the cognitive and social dimensions of literacy skills (Goodman et al., 2003).

Another finding is that around one-fourth of participating parents have only between 0 and 25 books at home. A shared conclusion from these two findings is that both children's and parents' home libraries are limited. This lack is thought to be primarily due to low reading rates and cultural factors. The Turkish proverb "A wolf cub will do what it learns at home" points to the role of parents as crucial role models for children. Teaching a behavior by example is more effective than simply instructing, "Do this." Thus, it can be concluded that parents should enrich their home libraries for both themselves and their children during the early literacy period. When examining the item related to bookshelves as another material to emphasize books and reading at home, it is noted that approximately one-quarter of homes do not even have a bookshelf. About 7% of families do not have internet access at home, yet having internet, a primary tool for accessing information, in most homes is promising. However, according to parents' responses, approximately 93% of children do not have a tablet or e-reader at home. Considering the challenging period in 2020 when all activities were conducted online due to the COVID-19 pandemic, examining how early literacy activities at home were supported during this time may provide insight. Researchers who view

early literacy as foundational for future academic success highlight that high-quality interactions with a child's environment are necessary for effective language use. A rich home environment with linguistic stimuli supports higher-level language development and facilitates early literacy skill acquisition (Çubukçu, 1991). Given these findings, the number of books and bookshelves in homes is low on average, suggesting that children are not provided with a sufficient linguistic environment. Additionally, nearly half of the families do not provide their children with a private room, indicating a lack of quiet, productive space for interactive reading with parents. In interactive reading, children should participate in the reading process under adult guidance, sharing their views and impressions. This is best done in a designated personal space.

Research from leading developed countries shows that children should regularly engage with writing activities and receive guidance from adults to foster early literacy skills (Azazi, 2022). Early literacy activities involve not only reading but also writing-related tasks, and over half of the families in this study reported not having a desk at home, indicating a limitation in the language environment. One common complaint among parents of primary and older students is their children's lack of focus and independence in studying. This may stem from the lack of early literacy support and habit formation during the preschool period. A 2023 study by Adsız on primary students suggested that when provided with an appropriate study environment, parental support, and topics aligned with their interests, children were more likely to overcome focus issues. This foundation is expected to be more robust if established early in life.

The findings indicate that fathers primarily work six days a week, leaving mothers as the primary caregivers at home. This idea is further supported by the large percentage of mothers working part-time or not at all (80% and 98%, respectively). Studies recognize the importance of reading activities in establishing healthy, productive communication between children and parents. Books that appeal to children's interests and support early literacy skills, as well as receptive and expressive language skills, enhance children's language abilities (Garvie, 1990). However, the habit of regular reading at home is mostly limited to "1–2 times a week," indicating a low level of role modeling in early literacy awareness. Only about one-fourth of families read daily at home, and around 11% never read at home. In a home without reading, children have no one to emulate, risking developmental challenges during this critical period.

Snow's 1983 study demonstrated that reading aloud accelerates language acquisition, significantly enriches vocabulary, and teaches book orientation naturally. A related item in the survey shows that about one-tenth of the sample never engages in reading aloud with their children, suggesting that early literacy skills are supported

primarily in school rather than at home. For approximately one-third of families, reading aloud happens only "once or twice a month," showing a similarly weak support environment. Among all options, the proportion of parents who read aloud daily (around 40%) is the highest, indicating that although early literacy is primarily supported by read-aloud activities, overall awareness is insufficient for providing adequate home support. Furthermore, approximately 80% of parents reported never borrowing books from schools or libraries for their children, reflecting a lack of book-supported early literacy and low awareness. More than half of the parents do not read to their children from digital devices, despite most homes having internet access. This finding suggests that while virtual connections are available in most homes, they are not utilized to support early literacy. Additionally, according to parents, over 60% of children spend between 30 minutes and 2 hours daily on tablets, watching videos, playing games, or using social media. This long duration indicates a lack of early literacy stimuli and points to generally low parental awareness of early literacy and interactive reading practices.

Stegelin (2002) emphasized that early literacy opportunities begin at home and provide significant advantages in future academic and social contexts. Research shows that children who lack sufficient language skills in preschool experience a gap that becomes harder to bridge as they grow (Oğuzkan ve Oral, 2003). With only 7.2% of children attending preschool for three years, it seems that most people do not fully understand the importance of starting preschool education at the earliest age. Examining the frequency of activities supporting early literacy skills at home, it was found that parents regularly discuss daily routines and sing songs with their children, which contributes to receptive and expressive language. However, alphabet games, which support letter knowledge, are rarely played. Additionally, almost one-third of parents never engage in word-writing activities at home. Early literacy does not aim to teach reading or writing words but to enhance alphabet knowledge through small, supportive writing exercises that aid future writing proficiency. Alphabet games, an optional item in the survey, are only occasionally played in about 65% of households, offering hope yet still needing improvement. In interactive reading activities, the frequency of options such as "reading books, discussing them, storytelling, and playing word and shape games" was primarily "sometimes," showing a need for increased frequency. However, parental knowledge about early literacy and the preparation of the home linguistic environment are crucial for the success of these activities.

Recommendations

Since early literacy forms the foundation for both academic and social development in the preschool period, parental awareness of this topic is crucial.

The study findings indicate that parents' awareness of early literacy and their attitudes towards enriching the child's language environment and reading habits are inadequate. Therefore, parents need education on enriching the linguistic environment at home. Enrichment of the linguistic environment includes raising parents' awareness about selecting quality books appropriate for the preschool period.

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Chapter 3

"I Am Inside The Circle": A Study Based On Improve Reading Skills

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INTRODUCTION

During the Covid-19 pandemic, schools closed down in 159 countries, and conventional schooling was interrupted for a long time in developing and underdeveloped countries (ERG, 2020). In this period, 94% of students worldwide participated in distance education practices, which are preferred as an alternative to face-to-face education (UN, 2020). Countries could not provide adequate support to this type of education for which they were unprepared, and the problems experienced in terms of access to education and regular participation, peer interaction, teacher guidance, technological infrastructure, and equipment supply reduced the efficiency of learning processes and the quality of education (Reimers, 2022). Research on educational activities during the pandemic period confirms that students experienced learning loss in many areas (Alper, 2020; Baz, 2021; Can, 2020; Duman, 2020; Kahraman, 2020; Elçi & Tünkler, 2022; Reimers, 2021; Yıldız & Vural, 2020).

There is much research suggesting that the learning losses caused by the Covid-19 pandemic are primarily in the mathematics and reading skills of primary school students (Angrist et al., 2020; Bailey et al., 2021; Borman, 2020; Di Pietro et al., 2020; Engzell et al., 2021; Kaffenberger, 2020; Kuhfeld & Tarasawa, 2020; Wyse, Stickney, Butz, Beckler, & Close, 2020). This can be attributed to the fact that students who are deprived of instructional practices to develop reading, reading comprehension, and critical reading skills in the distance education process have difficulties in understanding and solving mathematical problems (Ferah Özcan & Saydam, 2022; Hathaway, 2020; NESET, 2021).

Reading and reading comprehension skills are critical for individuals to be open and adapt to innovations in education, economy, science, and health and protect themselves from information pollution (Bhatt, 2000; Slavin, 2013; EAEA, 2018). Reading comprehension is a person-specific process guided by cognitive activities and personal experiences (Lemov, 2017). Meanwhile, it is closely associated with individuals' behaviors and attitudes toward reading as well as its cognitive and personal dimensions. These are guided by the affective characteristics of the individual, such as curiosity, interest, and desire, in other words, which are related to the individual's attitude, and determine whether a student prefers to read or stops reading (Katrancı, 2015). It is suggested that individuals motivated to read feel competent while reading, try to make sense of the text, and integrate it with their prior knowledge (Yıldız, 2010). Previous literature also suggests that individuals' positive attitudes toward reading, including desire, curiosity, and interest in reading, affect accurate reading and comprehension (Wolters, Yu, & Pintrich, 1996; Baker, Dreher, & Guthrie, 2000).

Reading circle is a group work-oriented collaborative teaching method in which students who come together by choosing the same book, story, or poem use the processes of analysis, synthesis, creation, and evaluation under different roles and create personal connections with the text and others in understanding what they read (Anderson & Corbett, 2008; Harvey & Daniels, 2009; Lee, 2002; Noe & Johnson, 1999; Youngblood, 2014). Reading circle is an interactive process that provides students with direct strategy instruction to improve reading comprehension and vocabulary through rich discussion-based content (Avalos, Plasencia, Chavez, & Rascon, 2007/2008, Beck & McKeown, 2006; Kong & Pearson, 2003). On the other hand, in this method, students share their thoughts to make sense of the text, structure it and integrate it with their prior knowledge. Thus, the reading circle method is a mutual exchange process contributing to the development of social bonds between teachers, students, and peers (Au & Raphael, 2000).

There is a considerable amount of literature suggesting that reading circles are influential in developing cognitive and affective skills for reading (Alvermann & Young, 1996; Anderson, Wilson, & Fielding, 1988; Atwell, 1998; Barone & Barone, 2012; Berne & Clark, 2008; Certo, Moxley, Reffitt, & Miller, 2010; Dail, McGee, & Edwards, 2009; Daniels, 1994; Daniels, 2002; Day & Ainley, 2008; Farinacci, 1998; Flowerday, Schraw, & Stevens, 2004; Klingner, Vaughn, & Schumm, 1998; Maraccini, 2011; Pei, 2018; Stein & Beed, 2004; Su, 2009). The studies conclude that reading circles provide students with affluent benefits, such as interpreting what they read through structured discussions, decision-making skills because they choose the books, using thinking skills through different roles, and developing a sense of responsibility performing these roles. Although studies conducted on students from different grade levels have consistent findings, it is essential to evaluate reading skills during primary school in terms of their role in shaping individuals' further education (Çernik, & Ateş, 2018).

Purpose of the Study

Among OECD countries, Turkey was the second where schools were closed for the longest time during the Covid-19 pandemic. Accordingly, it is one of the countries with a high rate of decline in reading skills (Akköse, 2020; Özel, 2020). Research showed that compared with the pre-pandemic period, 2nd-grade primary school students experienced a loss of approximately 5% in their reading skills and completed the year without any improvement. While these students read with an error rate of 5% (95% accuracy) before the pandemic, the error rate doubled to 10% (90% accuracy) post-pandemic period (Yıldız, Aksoy, Eryılmaz, & Korkmaz, 2021).

Although this study deals with the Covid-19 pandemic, pre-pandemic period research suggests that Türkiye fails in reading comprehension and developing reading habits (Baydık, 2011; Erdem, 2012; Karatay, 2007; Karatay & Okur, 2012; Yantır, 2011). On the other hand, PISA, OECD, and WRH reports indicate a gradual decrease in Türkiye's average scores in recent years (PISA, 2020; OECD, 2021; WRH, 2022) which suggests that there is a need for teaching practices to bring in and develop reading skills.

Reading and comprehension skills acquired during the primary school period, when the foundations of academic life are laid, are the primary skills ensuring success in all subjects by nurturing mental development (Akay, 2004; Ateş, 2008; Çavuşoğlu, 2010; Göktaş, 2010; Güneş, 2007; Obalı, 2009; Oluk & Başöncül, 2009). Previous research provides evidence that incompetent readers in early childhood demonstrate low academic achievement (Taşkaya, 2010; Yurdakal, 2014). On the other hand, individuals who lack reading habits are more likely to fail in fields that necessitate cognitive skills such as problem-solving, decision-making, research and development, and using information technologies, and they tend to exhibit negative attitudes such as lack of confidence and reluctance (Altun, Ekiz, & Odabaşı, 2011; Çayçı & Demir, 2006; Demirtaş & Söğümlü, 2013; Tatar & Soylu, 2006; Uzunkol, 2013). Therefore, proficiency level in reading considerably impacts individuals' educational attainment.

The current study, carried out during the Covid-19 pandemic, focused on boosting reading comprehension skills and attitudes towards reading in 2nd-grade students. Previous research on improving reading skills highlights the significance of interactive instructional practices in the classroom (Cummins, 2003; Kendall & Khuon, 2005). Thus, this study was designed based on the reading circle, which is an interactive method. The basic steps followed in the study are identifying the problem, need and learner analysis, designing, implementing, and evaluating an instruction "I am inside the circle."

The study sought answers to the following questions:

1. Is there a statistically significant difference between post-test scores of the experimental and control group students' reading comprehension achievement test?
2. Is there a statistically significant difference between the post-test scores of the experimental and control group students' attitudes toward the reading scale?

METHODOLOGY

This study adopted a quasi-experimental design with a pre-and post-test control group because study groups are partially controllable (Singh, 2007).

Participants

The subjects of this study were 2nd-grade students at a public school. The students were attending the school where the corresponding author of this study was working. This school was chosen because it was easily accessible under pandemic conditions. This is a sampling method chosen in line with the aim of the study (Büyüköztürk et al., 2008). Thus, class 2/C (25 students) was appointed as the experimental group since their need for instruction was identified at the beginning of the research. Table 1 below presents the demographics of students in class 2/C who were the subject of need analysis.

Table 1. Demographics of the Experimental Group

Item	**Group**	**Frequency**
Gender	Female	14
	Male	11
Home Library	Yes	8
	No	17
Reading frequency per week during spare times	3	9
	5	12
	7	4

Although this study did not aim to compare groups, in the case of comparison, groups need to have similar characteristics. In this sense, to determine whether there was a statistically significant difference between the experimental and control groups' reading comprehension and attitudes toward reading, we conducted independent samples t-test. The findings are presented in Table 2 below.

Table 2. The Comparison of Experimental and Control Groups' Reading Comprehension Achievement Pre-Test Scores

Variable	**Group**	**n**	**x̄**	**Sd**	**t**	**p**
Achievement test (pre-test)	Experimental	25	72,80	22.2	,069	0,945
	Control	25	72,40	18,3		

Table 2 shows that there is no statistically significant difference between the experimental and control groups' reading comprehension achievement pre-test scores *(p> 0.05)*.

Table 3. The Comparison of Experimental and Control Groups' Attitudes Toward Reading Pre-Test Scores

Variable	Group	n	x̄	Sd	t	p
Attitude toward reading (pre-test)	Experimental	25	61,92	10,75	1,573	0,122
	Control	25	65,72	9,51		

Table 3 shows that there is no statistically significant difference between the experimental and control groups' reading attitude pre-test scores *(p>0.05)*. Drawing on these findings, it can be concluded that experimental and control groups are equivalent.

Process

Need analysis: The rationale of this study is the 1st-grade students' incompetency and failure in reading comprehension and attitudes toward reading or reading habits. They completed their first literacy process under the Covid-19 restrictions. The first data source was story maps in which students were asked to outline a story (time, setting, plot, and characters) appropriate to their level. The second was the views of 15 parents', who were chosen randomly, and the third was the classroom teachers' views. The findings revealed that the mean scores of the story maps were *"low."* On the other hand, parents' views implied that the students were not eager enough to read, so parents often had to resort to reward and punishment. The teacher mainly focused on distance education and stated that online courses were not conducive to improving students' reading skills.

Learner analysis: The learners were 25 students in class 1/C, 11 male and 14 female, aged between 7-8. They were at the concrete operational stage. During need analysis, teachers' views suggested that students considered reading books as a *"duty or assignment"*; it was not fun for them, and they preferred playing house games or painting to reading books.

Objectives: The objectives of the *"I am inside the circle"* instructional design was set within the framework of Bloom's Taxonomy and based on the findings obtained from need and learner analysis. In this sense, 15 objectives were set. Of these, 12 were cognitive, and 3 were affective level. The objectives related to each other were grouped under three modules. The first module was *"Concepts"* and the objectives of this module were to explain the function of reading, recognize the importance of reading comprehension, define reading motivation, and analyze the association between reading comprehension and motivation. The

second module was *"Method"*; the objectives of this module included explaining the reading circle method's purpose, stages, and roles. The third module was *"Practice"* and within this module, the students were expected to participate in group discussions actively, perform the requirements of their roles in the reading circle, contribute to product development processes, prepare a presentation plan, and make a presentation.

Preparing learning modules: The content of the *"I am inside the circle"* instructional design was prepared in accordance with the modular approach and under three modules. These modules were not phased or sequenced. The objective-content compatibility was checked through the table of specifications for each module.

Administration: The *"I am in the circle"* instructional design was completed between 15th November and 23rd January of the 2021-2022 academic year for 20 classes, two classes per week. Activities in Modules 1 and 2 were conducted in the classroom, while group meetings and presentations were held in the school conference hall. The administration was designed based on the principles and stages constituting the theoretical framework of the reading circle (Moeller & Moeller, 2007; Daniels, 2002). Below are the details of the administration:

Module 1 includes reading and reading activities such as matching, interpreting visuals, gap-filling, and classification. The time allocated for the activities in this module was four classes during the first two weeks of the administration.

In Module 2, the students were informed about the reading circle method and presented sample practices. To this end, the researcher presented the reading circle's objectives, procedures, and role behaviors to the experimental group. The students were shown sample practices from different grade levels and countries. Activities such as roleplays, preparing posters, and creating slogans were conducted during four classes.

The reading circle practices, the central part of this research, were conducted in *Module 3.* The procedure started with group formation, and the experimental group with 25 students was divided into five subgroups with five students in each. They participated in the activities in these groups. Firstly, the teacher offered five different story books (five of each) appropriate for students' level and appealing to different interests. The students who chose the same book were in the same group, which distinguishes reading circle from traditional methods. This also positively contributes to individuals' self-guidance in learning, decision-making, self-respect, and students' autonomy (Blum et al., 2002). Assigning the roles, four primary ones *(connector, chief detective, visualizer, and highlighter)* suggested in the literature for reading circles were considered. *The connector* is

expected to establish various connections between the book s/he read and real-life experiences or other stories. *The chief detective* prepares questions about the book and leads the group discussions. *Highlighter* highlights the important and interesting parts of the books and shares them with other group members. *Visualizer*, on the other hand, prepares the drawings, graphs, and cartoons about the book (Daniels, 2002). In addition to these four roles, the optional summarizer role was also included in the *"I am inside the circle"* instructional design. This role summarized the book and was preferred to provide the students with the book's outline (Daniels, 2002). In Module 3, one class was allocated for group meetings and one class for presentations. Students interpreted the book from different perspectives in group meetings based on their roles. The researcher was the observer and involved in the discussion when needed. For example, the researcher ensured that the discussions did not deviate from the topic; the students adhered to their roles and obeyed the discussion rules. Group meetings and presentations took place in the conference hall during the free-time activities. During presentations, group members presented the main idea or an exciting part of the book to their classmates through various techniques and materials such as drama, summarizing, or posters.

During the *"I am inside the circle"* activities, the control group students attended classes based on the Turkish Language Teaching Programme.

Evaluation : Teacher observation and peer evaluation forms were used to give feedback to the students on their preparations and performances during group meetings and group presentations within the reading circle practices. The results of the evaluations were shared with the students after the presentations. To evaluate the effectiveness of the *"I am inside the circle"* instructional design, students in experimental and control groups took the reading comprehension test and responded to the reading attitude scale as pre-tests. Following the administration of the instructional design, both groups took the same tests as post-tests.

Data Collection

Reading Comprehension Test for 2nd Graders (Ceran et al., 2014) consisted of 10 items, each corresponding to 10 points. Thus, the maximum score that could be obtained from the test was 100. The reliability coefficient of the test was α=.88, and students' score was calculated through arithmetic means. Garfield Elementary Reading Attitude Survey (McKenna & Kear, 1990), adapted into Turkish by Kocaarslan (2016), was used to measure students' reading attitudes. It is a bidimensional scale with 20 items. The dimensions are *"recreational reading"* and *"academic reading."* Cronbach's Alpha internal consistency coefficient for the Turkish version was α=.88.

Data Analysis

The data were analyzed on IBM SPSS Statistics. The data distribution was checked through the Kolmogorov-Smirnov test, and the findings suggested that the data had a normal distribution. To compare groups, independent samples t-test was run.

FINDINGS

The first problem of the study investigated the difference between reading comprehension achievement post-test scores of experimental and control groups. Table 4 below presents the findings.

Table 4. The Comparison of Experimental and Control Groups' Reading Comprehension Achievement Post-Test Scores

Variable	Group	n	x̄	Sd	t	p
Achievement test (post-test)	Experimental	25	88,80	8,32	2,576	0,002
	Control	25	79,68	8,41		

Table 4 shows a statistically significant difference between the experimental and control groups' post-test scores *(p<.05)*, indicating that both groups' post-test scores increased, and the instructional design had a significant effect. Although there was an increase in the control group's post-test scores, the fact that there was a statistically significant difference between the two groups demonstrated that the design administered to the experimental group was more effective than the traditional instruction administered to the control group.

The second problem of the study investigated the difference between the experimental and control groups' reading attitude post-test scores and whether the change in groups' reading attitudes following the administration of the instructional design was statistically significant. The findings are presented in Table 5 below.

Table 5. The Comparison of Experimental and Control Groups'Attitudes Toward Reading Post-Test Scores

Variable	Group	n	x̄	Sd	t	p
Attitude toward reading (post-test)	Experimental	25	71,16	4,59	2,732	0,004
	Control	25	67,28	5,41		

Table 5 shows a statistically significant difference between the experimental and control groups' reading attitude post-test scores *(p<.05)*. The experimental group's score is statistically significantly higher than the control group's score. Based on this finding, it can be concluded that the *"I am inside the circle"* instructional design significantly contribute to developing positive attitudes toward reading.

RESULTS, DISCUSSION AND RECOMMENDATIONS

The findings revealed a significant difference between the experimental and control groups' reading comprehension achievement post-test scores, implying the effect of the *"I am inside the circle"* instructional design. There is abundant literature suggesting that the reading circle method effectively improves reading skills (Almasi et al., 2001; Briggs, 2010; Daniels, 2002). On the other hand, as studies on gifted children (Smith & Feng, 2018) and students with learning difficulties (Anderson & Corbett, 2008) show, reading circles are influential with students having different learning levels (Meyer & Schendel, 2014; Pambianchi, 2017). The reading circle provides students with different perspectives, enables them to acquire more profound comprehension skills and progress independently, and can easily be included in curricula (Avcı & Yüksel, 2011; Bingman, 2014; Devick-Fry & LeSage, 2010; Hsu, 2004; Kaya, 2008; Maraccini, 2011; McCall, 2010; Miller et al., 2007; Stix, 2000; Straits & Nichols, 2006; Straits, 2007).

The findings also suggested a statistically significant difference between the groups' reading attitude post-test scores in favor of the experimental group. This finding implies that the *"I am inside the circle"* instructional design effectively improved students' reading attitudes. The methods that give students autonomy to select the book they will read and allow them to guide and evaluate their reading through small group discussions enhance their motivation to read (Ford & Opitz, 2008; Meredith, 2015). On the other hand, research investigating participants' views on reading circle showed that it improved affective skills such as self-efficacy and self-confidence (Bedee, 2010; Katrancı, 2015; McElvain, 2010; Monaghan, 2016; Nurjati, 2013; Praver et al., 2011; Sai ve Hsu, 2007; Widodo, 2016).

Based on the findings, it can be inferred that the utilization of the "I am inside the circle" approach, which is based on the reading circle, proved to be an effective method for enhancing reading comprehension skills and attitudes toward reading among second-grade students. Therefore, it is recommended that primary school teachers incorporate instructional methods based on the reading circle to assist students in developing reading habits. Additionally, future research should explore the impact of the reading circle approach across various grade levels.

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Chapter 4

Reflections of the 2023 Education Vision on Foreign Language Education Policies in Turkey

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1. Introduction

In the globalizing world, the term “global citizen” has emerged, acting together against global problems, and thanks to technology, the boundaries between people have rapidly disappeared and interaction between societies has become inevitable. The ease of communication and accessibility has enabled people of different races to communicate and interact in areas such as friendship, business partnership and education, which has created the opportunity to act and work together, and today this has brought about the necessity of knowing at least one foreign language, while the most learned foreign language is English, the languages such as German, French, Chinese, Spanish have taken their place in the foreign language teaching programs of countries as the second and third foreign languages (Ateş& Aytekin, 2020). When we look at the changes in foreign language education in Turkey before 2018, it is seen that it has gone through various stages, reflecting the changes in education policy, social trends and global needs. It has been greatly affected by factors such as Turkey's desire to adapt more closely to the European Union.

Especially in the 1980s, foreign language education continued to expand and the demand for English increased due to the country's desire for international integration. Accordingly, English was taught in primary and secondary schools, but the level of teaching was generally inadequate and emphasis was placed on rote learning, grammar rules and memorization. For this reason, while students generally left school with a basic knowledge of a foreign language, the teaching was not sufficient to use it effectively for communication. The 1990s, especially with the increasing global importance of English, were important years for foreign language education in Turkey. More systematic foreign language education policies were implemented in the country. Foreign language curricula in schools began to focus more on English, and English was seen as the most important foreign language to be learned, primarily due to its role in science, technology and global communication. The Ministry of National Education (MEB) began to reorganize foreign language teaching by emphasizing communicative language skills rather than just grammar and translation. English was made compulsory in many secondary schools starting from the 5th grade and was taught as a basic course in high schools. In the 1997 Education Reform, when compulsory education was extended to eight years, English teaching began in the fourth grade. In addition to state education, private language schools and English preparatory courses came to the fore as many students sought to improve their language proficiency for university entrance exams and professional purposes.

2. Foreign Language Education Policies in the 21st Century

In the 2000s, Turkey's desire to join the European Union (EU) became important in education policy, including foreign language education. The importance given by the EU to language skills, mobility and multiculturalism also encouraged reforms aimed at improving foreign language proficiency. In line with the decision taken in Barcelona in 2002 that every European citizen should learn at least two foreign languages, the European Union has taken various steps to improve and expand foreign language education. These steps include the preparation of an action plan by the European Commission between 2004 and 2006 to encourage language learning and ensure linguistic diversity (European Commission, 2003, cited in Deregözü, 2021). The Ministry of National Education curriculum reforms revised the foreign language curriculum and moved towards a more communicative, student-centered approach. New methods were introduced, including a shift in focus from passive learning to active language use. English became the dominant foreign language taught in schools, with most students in Turkey learning English, and in some schools French and German were taught as optional foreign languages. Many universities introduced English preparatory programs to ensure that students had the language skills needed to succeed in higher education. Some departments were taught in English at certain universities. There was also an increase in the number of private institutions offering language courses, which provided an alternative route for students wishing to improve their English proficiency (Kayalar and Kayalar 2024a).

In the early 2010s, foreign language education in Turkey continued to focus on English as the primary foreign language. A major shift occurred when policies were implemented to encourage other foreign languages such as German, French and Arabic. English continued to dominate foreign language education, especially in private and international schools and universities (Kayalar and Kayalar, 2024b). Proficiency in this foreign language was increasingly seen as an important skill for employment in global markets. The Ministry of National Education initiated reforms to improve foreign language teaching. With the education reform carried out in 2012, compulsory education was extended to 12 years with the 4+4+4 (primary school + secondary school + high school) model and English language education was started at an earlier age, starting from the 2nd grade of primary school.

The European Commission's action plan emphasizes the need to learn two foreign languages in addition to the mother tongue and to start language education at an early age (European Commission, 2003, pp.7 – 8, cited in Deregözü, 2021). Indeed, the literature also supports foreign language education

at an early age. In addition, digital tools suitable for the technology of the years have been introduced, including the development of multimedia resources, language learning applications and online platforms. In addition, the Ministry of National Education has periodically implemented various projects aimed at improving the quality and effectiveness of English language education in Turkey. For example, "DynEd (Dynamic Education) Computer-Assisted Foreign Language Teaching System" was introduced for use in the 4th, 5th, 6th, 7th and 8th grades in the 2008-2009 academic year and later opened for use for high school students as of the 2014-2015 academic year (Karakaş, 2021). Of course, despite these efforts, there was still a significant gap between the goals of foreign language education and the actual language proficiency of Turkish students, many students faced difficulties in achieving communicative fluency and continued to rank low in international language proficiency tests such as TOEFL or IELTS.

English language education in Turkey is provided for approximately 1200 hours from primary school to the end of secondary school. As part of the FATİH (Movement for Increasing Opportunities and Improving Technology) Project, smart boards and technological equipment were placed in classrooms, and significant quotas were allocated for the appointment of English teachers. However, despite all these positive developments, the desired levels in language education have not been achieved. The English Proficiency Index (EPI) developed by English First ranks Turkey 41st out of 60 countries (Istanbul MEB, 2019). When current data is examined, Turkey is ranked 65th out of 116 countries in the EF English Proficiency Index (EPI) and is rated as low proficiency, while it is ranked 34th out of 35 countries in the European rankings, with the Netherlands being the first country (EF English Proficiency Index, 2024). When teacher quality was questioned, there was also an ongoing challenge. There were regional differences in the quality of language education, and many foreign language teachers in public schools still did not have sufficient training in modern teaching methods. Studies on foreign language education in Turkey have identified a common source of problems. It is stated that this source of problems stems from the lack of foreign language education policy and planning. (Yıldız and Durmuşçelebi, 2013, p.20, cited in Deregözü, 2021).

In general, in the foreign language education system in Turkey before 2018, English surpassed French and German to become the primary foreign language in Turkish education. However, difficulties with quality, consistency and practical application of language skills continued.

3. Foreign Language Education in the 2023 Education Vision

The 2023 Education Vision, which began to take shape around 2018, was designed to address many of these gaps and further increase the quality of foreign language education in the country. The MEB 2023 Education Vision, which was introduced in 2018 (by Minister Ziya Selçuk) and encompasses a broad reform agenda, also includes important goals for foreign language education. Here, it is emphasized that foreign language proficiency is important in preparing students to participate in the global society and economy. In the Eleventh Development Plan covering the period of 2019-2023, it is aimed to increase the number of programs providing education in a foreign language, to organize in-service training to improve the qualifications of foreign language teachers, to enrich foreign language education materials and to develop a system to measure all listening, speaking, reading and writing skills (Ministry of Development of the Republic of Turkey, 2019, pp. 136-140, cited in Deregözü, 2021). In addition, in the Education Vision 2023 document published by the Ministry of National Education, it is emphasized that a new approach should be adopted in foreign language education as of the 2019-2020 academic year. The planned transformation includes a three-year phase plan. However, traditional, teacher-centered methods may still be prevalent in some schools, and it is stated that all teachers should be trained in accordance with this approach. With the interdisciplinary approach, different disciplines such as mathematics, science, social studies and visual arts will be integrated into English language education, enabling students to transfer their use of foreign languages to different areas. This main goal was not seen as achievable in a short time by the teachers in the Karakaş (2021) study due to the inadequacy of the field teachers' English language skills and the lack of professional English background of the English teachers.

Bayrambaş et al. (2022), while collecting the opinions of secondary school teachers on the interdisciplinary approach, observed that the teachers did not have an organized knowledge and study on these subjects. However, an attempt was made to match the outcome and subject, and for example, English teachers stated that some subjects in Turkish and science were related to their own subjects and that it was beneficial to explain in English after learning in the main course. In addition, the existing and piloted Harezmi Education model, “an education model in which teachers plan the process with an interdisciplinary approach, children determine problems from life based on data and produce ideas and designs for solutions” can be used more actively in the field of foreign languages (MEB, 2024a). For this reason, it is seen that the interdisciplinary approach is applied to a limited extent in some schools.

The integration of English lessons with other lessons and the efforts to increase students' skills in producing and using content in a foreign language are still in the development phase. In the interdisciplinary homework guide published by the MEB General Directorate of Secondary Education, no examples of joint studies for foreign languages have yet been presented (MEB, 2023a). Foreign language skills and needs will be structured according to school and program types. Differentiation of foreign language skills according to school types and student needs has begun to be implemented to a large extent. However, inequality of application and local differences may not occur at the same level in every school. In secondary education, the focus should be on skill development rather than just acquiring knowledge. Although reaching native language fluency is not the goal, it is emphasized that students should aim to reach a level of language proficiency that enables effective communication in reading, writing, listening and speaking in two foreign languages (European Commission, 2003, pp.7 – 8, cited in Deregözü, 2021). For example, the "Believe in Yourself and Just Speak" project (MEB, 2020), carried out by the Istanbul Provincial Directorate of National Education, focuses on developing communication skills in English and aims to make speaking a key component of the lessons so that students can speak English at the level they want.

A survey conducted with 66,190 students in 91 secondary schools found that many students could not speak English. In response, experts prepared a bulletin and teachers were given practical training. In the schools implementing the project, lessons were changed from grammar-focused to speaking-based, and speaking clubs and language workshops were introduced. In Turkey, the B2 level is targeted for English, the first foreign language, in secondary education, and for German and French, the A2.1 level is targeted for schools with a preparatory class in secondary education and the A1.2 level is targeted for schools without a preparatory class (MEB, 2018, cited in Deregözü, 2021).

The uniform implementation of curriculums throughout the country will be abandoned. Although important steps have been taken towards this goal, fully differentiated curriculums are still not widely implemented in all schools. Although flexibility is provided in some schools, uniform programs are still valid in all school types and regions. Compulsory elective foreign language courses will be arranged according to needs. Although some arrangements have been made on compulsory and elective foreign language courses, the full adaptation of the courses to student needs is still lacking. It is stated that a balance should be achieved between students' language skills and lesson hours. Flexible arrangements will be made regarding lesson hour durations. Work has begun to make flexible arrangements regarding lesson hours, but standard hours

are still used in some schools at the implementation level and full compliance has not been achieved regarding flexibility. Original productions with subtitles and produced directly in foreign languages on subjects such as films, animations, etc. will be prepared in cooperation with TRT. Some projects have been carried out in cooperation with TRT. However, the number and prevalence of these projects are limited. More content production is expected for subtitles and foreign language productions.

The second main goal is "Students Will Be Provided to Experience the English-Speaking World with New Resources". As Ateş&Aytekin (2020) also stated, culture has a place that cannot be ignored when learning a foreign language. In a language course where culture is not included, it is not possible to talk about the complete learning and teaching of the target language.

Learning a language in all its aspects means learning the language used in written works by members of the society speaking that language and the language used in certain places and situations in their social lives. In fact, it is social life that creates the language. Sub-goals and realizations regarding this main goal are; Digital environments will be created so that students can follow teachers whose native language is English, German, French, access the living language, and do online writing and discussion activities. Various steps have been taken to create digital environments in line with this goal. Online platforms where students can develop their language skills have started to be used in some schools. However, access to these digital resources is not yet widespread in all schools, and in some regions, the effective use of digital environments is limited due to lack of infrastructure. In order to implement these applications, it is very important for students to reach a level where they can effectively use the language they learn, which affects their intrinsic motivation. This corresponds to the B1-B2 levels defined in the Common European Framework of Reference for Languages (European Commission, 2013, cited in Deregözü, 2021). Innovative digital resources will be provided from national and international publishers to expand the content pool on the Education Information Network (EBA). The integration of technology has increased especially during the COVID-19 pandemic, when online learning platforms have become indispensable. However, there are inequalities in access to technological tools, especially in rural areas, which limits the effectiveness of digital resources. Various digital resources have been provided to expand the content pool on the EBA. Collaboration with national and international publishers has begun, and innovative digital resources have been added. However, there may be occasional deficiencies in enriching and updating the content appropriate for each level. All digital content will be designed within

the context of themes that develop students' listening, speaking, reading and writing language skills in a holistic manner.

The “DIALECT” application, developed within the scope of foreign language training at TEKNOFEST 2023, was introduced (MEB, 2024b). Digital content is designed with themes that aim to develop students’ four language skills (listening, speaking, reading, writing). However, some content focuses more on reading and writing, and the number and variety of content aimed at developing speaking and listening skills has not yet reached a sufficient level. Differentiated content, methods, and techniques will be designed according to the levels. Differentiated content suitable for the levels is more widely applied, especially at the primary school level. It is stated that the content should be diversified more according to the development levels of the students at the middle and high school levels. Video games, songs, interactive activities, interactive games, and stories will be included in the 4th grades. The use of materials such as interactive content, video games, songs, and stories has increased for the 4th grades. However, more teacher training and technology infrastructure support is required for the effective integration of such materials in all schools. In grades 5-8, online storybooks that are leveled to meet the individual needs of each student, writing activities, vocabulary studies, etc. will be provided with learning resources that allow them to do work. In grades 5-8, leveled online storybooks and other interactive materials have begun to be used in some schools. However, there may be difficulties in making content that is customized to the individual needs of each student accessible to all students. In grades 9-12, content that will develop speaking, listening, reading, and writing skills will be prepared in accordance with the priorities of the school type that students attend. In grades 9-12, content has been prepared according to the school type and some digital materials have been provided for students to develop the four language skills. However, these contents need to be customized more according to the school type and made more suitable for individual differences. Although some progress has been made in achieving the second main goal, there are still areas for development in terms of widespread use of digital resources in all schools, more diversification of content at all levels, and customization according to student needs. Technological infrastructure and strengthening teachers' digital skills play an important role in implementing these goals more effectively.

The third main goal is "Increasing Teacher Qualifications and Competencies in Foreign Language Education". Sub-goals and realization statuses related to this main goal are; With the support of international organizations, higher education institutions, NGOs, master's degrees, international certification,

themed certificates and similar training activities will be carried out online, offline and face-to-face for all foreign language teachers in a three-year projection. Various training projects and certification programs have been initiated for foreign language teachers. Within the framework of international cooperation, some of the online and face-to-face trainings have been implemented. However, in order for all teachers to participate in these trainings, wider access should be provided and the programs should be expanded. Foreign language teachers will be provided with online and face-to-face trainings in line with the "Lifelong Learning" philosophy, and they will be provided with teachers whose native language is English. The Common European Framework of Reference for Languages (D-AOBM) Supplementary Volume Trainer Training Course for English teachers continues to be provided at the central level within the scope of the Development of Foreign Language Education (YADEG) Project funded by the Presidency Investment Program and implemented by the Board of Education. Online and face-to-face trainings have been organized for teachers in line with the philosophy of lifelong learning. Opportunities to work with native English teachers have been implemented with some projects. However, it is important to make these opportunities more widespread and regular for all teachers (Kayalar and Kayalar, 2022).

4. Conclusion

The number of applied programs that will allow teachers to practice more can be increased. In addition to teachers' mastery of field methodology, opportunities will be provided for them to use digital resources. Various trainings and resources have been provided on teachers' skills in using digital resources. However, more training and practice opportunities are needed for teachers to use digital tools effectively in classes. Deficiencies and inequalities continue in some schools in terms of digital literacy. Teachers and trainers will be sent to teacher education certification programs abroad during the summer vacation. The number of teachers sent to teacher education certification programs abroad is limited. However, it is emphasized that this opportunity should be increased and that more budget and organizational support is required to ensure the participation of all teachers in these programs. A “National Foreign Language Education Council” will be established to determine language policies, language teaching standards, classroom practices and teacher competencies in foreign language education for qualified foreign language education. Work has begun to establish the National Foreign Language Education Council, but the functionality and impact of this council have not yet been fully revealed. More action and coordination are needed for the council to

determine language policies and teaching standards and to guide educational processes. In addition, the Turkish and Language Education Research and Development Center was established in September 2021. The center's activities include activities for teaching Turkish as a mother tongue, teaching it as a foreign language and teaching it to bilingual individuals, as well as activities for English, Spanish, German, French, Arabic and Russian languages (MEB, 2024b). A central exams commission will be established. A central exams commission has been established and some exam practices have begun to be managed by this commission. However, the commission needs further work to increase the effectiveness and objectivity of the processes. An educational materials commission will be established. An educational materials commission has been established and work has been done to improve the quality of digital content and teaching materials. However, more coordination and resources need to be allocated for this commission to provide appropriate materials for all schools and teachers.

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Chapter 5

Examining Mathematics Task Type Studies in Mathematics Education

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INTRODUCTION

Although standards in countries change as a result of global developments and needs, the purpose of the curriculum, how teaching is implemented in the classroom and what is shown to students are always at the forefront in curriculum (Houang & Schmidt, 2008). On the other hand, considering that curricula are seen as a collection of academic tasks (Doyle, 1983), it is understood that textbooks are important in terms of the tasks they contain. Doyle (1983) defined tasks as the products that students are expected to create, the processes that students are expected to use to create these products, and the resources they can use while producing the products, drawing attention to the characteristics of the tasks to be implemented in the classroom environment and stating that academic tasks are based on three aspects of student work. These are; the products that students create, such as a personalized composition or answers to a series of test questions, the processes used to create the product, such as memorizing a list of words or classifying examples of a concept, and the data or resources that students can access while creating the product, such as a composition model written by the teacher or the student. During the task creation phase, the cognitive demands of the task refer to the thinking processes that must be involved in the task-solving process (Hiebert & Wearne, 1993; Yılmaz, 2018). Therefore, the types of tasks that the teacher will implement in the classroom environment and the cognitive demand dimension of these tasks play a critical role in the development of students' thinking processes (Stein, Grover & Henningsen, 1996). In this context, it is recommended that mathematical teaching should be based on rich and valuable mathematical task types in mathematics teaching environments and processes (see NCTM, 1991; Schoenfeld, 1994). Therefore, it may be a matter of curiosity how mathematical tasks are handled and what studies have been conducted on mathematical task types.

Purpose of the Research

The purpose of this research is to examine the studies conducted in the field of mathematical task type in mathematics education in Türkiye and to synthesize and interpret the findings. In this context, the following research questions were sought.

a) What is the distribution of studies on mathematical task type in mathematics education by year?

b) What is the frequency distribution according to the universities where mathematical task type studies in mathematics education were conducted?

c) What are the keywords frequently used in studies on mathematical task type in mathematics education?

d) What is the distribution of studies on mathematical task type in mathematics education by publication type?

METHOD

The current study is a descriptive study using qualitative research methods. Since the data in the study will be obtained from the examination of studies conducted in Türkiye, the document analysis technique was used. When we look at document analysis, in addition to being accepted as a research method in disciplines such as anthropology, philosophy, and history, it has also begun to be used as another method alongside methods such as surveys, interviews, and observations, which are frequently used in other social science fields (Mogalakwe, 2006). Document analysis is a research method that can be expressed as the collection, examination, review, analysis, and evaluation of various documents in obtaining research data (Creswell, 2012). One of the methods used in document analysis is descriptive content analysis. Content analysis is a qualitative research method that aims to analyze many different materials such as documents, texts, and papers in accordance with certain rules and criteria in order to analyze documents, texts, and other materials in order to reach objective, measurable information. The basic process in content analysis is to bring together similar data within the framework of certain concepts and themes and to organize and interpret them in a way that the reader can understand (Yıldırım and Şimşek, 2013).

Data collection process

In this study, academic studies addressing the issue of mathematical task type in mathematics education were examined. Google scholar and national thesis center database was used in the literature review. In the google scholar database, a literature review was conducted with expressions such as "mathematic education, mathematical task type, task type, problem type, content analysis, questions mathematics education, mathematical problems type, non-routine mathematics problems, routine mathematics problems". In addition, theses, articles, reports and internet data were examined and analyzed with the keywords related to "mathematical task type, task type mathematics education". In this study, all studies conducted in Türkiye were examined without any year limitation. Therefore, considering that technology has been on the rise recently, more emphasis has been placed on current academic studies in order for current research to contribute to the literature and be more useful. When the analysis was made in this direction, it was determined that the articles and other studies reached were conducted between the years 2004-2024. Later,

the academic studies were examined in more detail, the findings were obtained and an attempt was made to interpret them as a whole.

FINDINGS

In this section, the findings obtained for each research question are examined. The findings are presented and interpreted with tables and graphs. First, the distribution of the studies conducted by year is given in Table 1 below.

Table 1. Distribution of Studies Related to Mathematical Task Type in Mathematics Education by Year

Years	f	Article Code
2004	1	A2
2005	1	A1
2006	1	A3
2007	1	A4
2009	1	A5
2010	2	A6, A7
2012	2	A8, A10
2013	2	A9, A17
2016	1	A29
2017	1	A12
2020	5	A13, A14, A16, A30, A31
2021	2	A18, A26
2022	2	A11, A15
2023	3	A19, A22, A25
2024	5	A20, A21, A23, A24, A27

When Table 1 given above is examined, it can be said that studies related to Mathematical Task Type in mathematics education have been conducted since 2004. When the status of the studies is examined by year, it is determined that the number of studies (f) varies between 1-5. It is seen that the number of studies is high in 2020 and 2024. On the other hand, it is seen that there is an increase in 2024 but a decrease occurs again in 2021. The graph below can be examined to better see the comparisons. When Figure 1 given below is examined, it is seen that the number of studies (f) on mathematical task type changes frequently over the years.

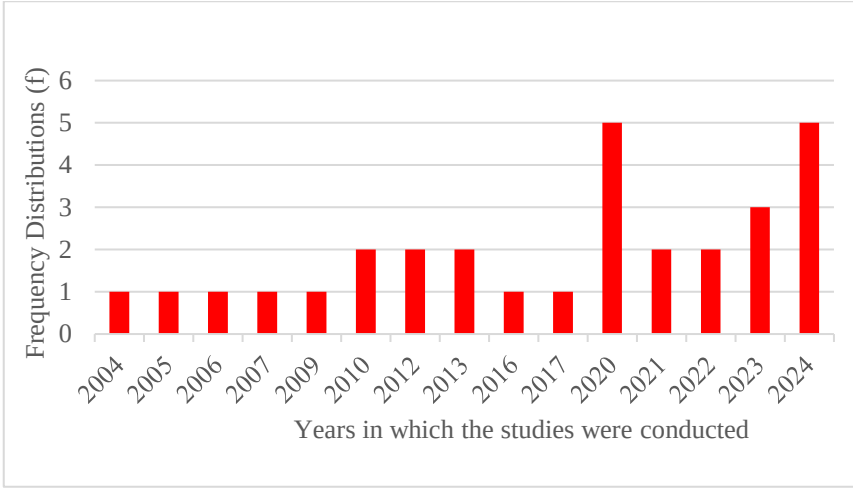

Figure 1. Distribution of Studies Related to Mathematical Task Type in

Secondly, the situation according to the universities where academic studies are conducted is given in Table 2.

Table 2. Distribution of Studies on Mathematical Task Type in Mathematics Education According to the Universities Where They Were Conducted

University Name	**f**	**Article Code**
Eskişehir Osmangazi University	2	A4, A7
Hacettepe University	2	A1, A2
Marmara University	4	A6, A19, A27, A29
Çukurova University	1	A9
Karadeniz Teknik University	1	A10
Yıldız Teknik University	1	A11
Gaziantep University	2	A8, A17
Trakya University	1	A11
Anadolu University	2	A5, A12
Gazi University	5	A3, A15, A16, A21, A26
Sakarya University	1	A14
Balıkesir University	1	A15
Uludağ University	3	A23, A30, A31
Kocaeli University	1	A18
Ordu University	1	A20
Tokat Gaziosmanpaşa University	1	A22
Siirt University	1	A25
Recep Tayyip Erdoğan University	1	A24
Boğaziçi University	1	A28
İn-Service Teacher	1	A13
*** If there is more than one researcher from different universities in a study under review, they are included in the relevant university frequency separately.		

When Table 2 given above is examined, it can be said that studies on mathematical task type in mathematics education have been conducted in almost many university. When the status of the studies is examined on a university basis, it is seen that more studies have been conducted in the Marmara and Gazi University. But the fact that only one study was conducted at each university may indicate that the issue of mathematical task type in mathematics education is not salient to researchers. As a result, more studies are expected to be conducted in other university in the coming years on the relationship between mathematical task and mathematics education. The graph below can be examined to better see the comparisons.

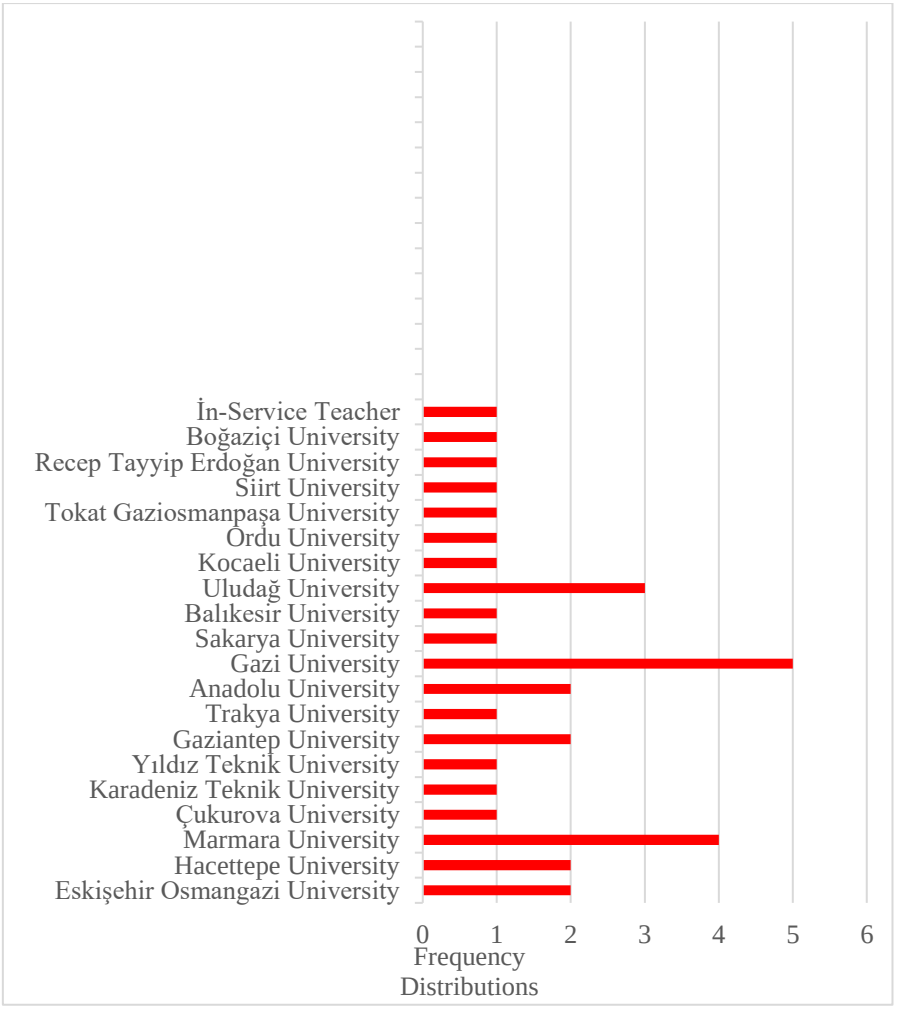

Figure 2. Frequency Distribution of Mathematical Task Type Studies in Mathematics Education According to Universities Where They were Conducted.

When Figure 2 given above is examined, the distribution of studies on task type studies in mathematics education by university is clearly seen. It is seen that the situation, which is limited to only one study in many university, is at the highest level in Marmara and Gazi University. It was determined that the number of studies in other university remained between 1 and 2. The fact that there is only one study in most university may indicate that the orientation on this subject is not at the desired level in many university.

Third, Table 3 shows the status of the studies according to the most used keywords.

Table 3. Distribution of Keywords Used in Studies Related to Mathematical Task Type in Mathematics Education

Keywords Used	**f**	**Article Code**
Mathematics education/ Mathematics/ Mathematics teaching	10	A1, A2, A4, A5, A7, A10, A11, A12, A29, A31
Word problems	1	A2
Geometry Problem	1	A6
Non-routine problem	5	A12, A18, A19, A21, A25
Open-Ended Questions	4	A3, A17, A21, A29
Multiple Choice Questions	2	A17, A30
Contextual problem	1	A32
Mathematical modeling	1	A22
Mathematical literacy	4	A14, A20, A23, A30
Proportional reasoning	1	A1
Mathematics Teaching Program/ Mathematics curriculum	1	A4
Analysis of textbook /Textbook/ Mathematics textbook	2	A9, A27
Solution strategies	1	A1
Problem posing	1	A3
Mathematics Curriculum	2	A26, A27
Problem solving	6	A4, A7, A9, A10, A13, A19
Task/Problem types	9	A7, A8, A10, A15, A16, A17, A18, A26, A28
Mathematical Values	1	A16
Mathematical Problem Types Test	1	A13

Developing scale	1	A13
National exams	3	A14, A15, A16
Another keywords: Addition, Subtraction	1	A2

When Table 3 given above is examined, it is determined that the keywords used in studies related to the Mathematical Task Type in mathematics education are diverse. İt is determined that the mathematics education, mathematics, mathematics teaching, task/problem types is used as the keyword in almost all of the studies. In other respects, it is determined that the majority of the studies include the concepts of non-routine problem, open-ended questions, problem solving as the keyword. In addition, studies using " National exams" as the keyword are also noteworthy. It is also found that there are keywords used only in some studies such as "developing scale, mathematical problem types test, proportional reasoning". The graph below can be examined to better see the comparisons.

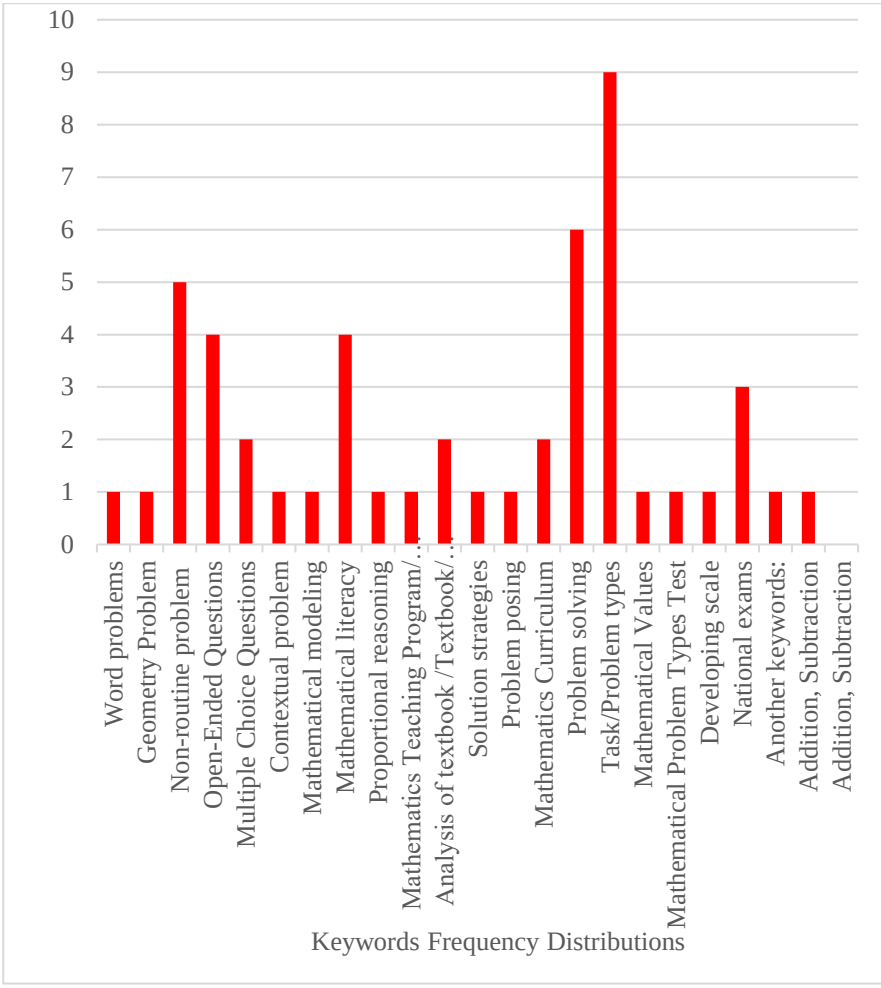

Figure 3. Distribution of Keywords Used in Studies on Mathematical Task Types in Mathematics Education

Fifth, the distribution of the studies in terms of publication type is given in the table below.

Table 5. Distribution of Studies on Mathematical Task Type in Mathematics Education by Publication Type

Publication Type		**Article Code**
Master's or Doctoral Thesis	8	A5, A8, A14, A16, A17, A18, A19, A20, A21, A22, A23, A24, A25, A26, A27, A28, A29, A31,
Article	3	A1, A2, A3, A4, A6, A7, A9, A10, A11, A12, A13, A15, A30

When Table 5 is examined, it is seen that more than half of the studies were conducted as thesis. Secondly, it was determined that the articles addressed the context of mathematical task type in mathematics education.

Table 5. Distribution of mathematical task types used on mathematics education studies

Task Type		**Article Code**
Word Problems		A2
Multiple Choice Problems		A17, A26, A29
Routine Mathematical Problem		A9, A10, A13, A15
Non-Routine Mathematical Problem		A9, A10, A12, A13, A15, A21, A25, A26
Proportional Reasoning Questions		A1
Open-Ended Questions		A3, A4, A5, A7, A15, A17, A27, A29
Closed-Ended Questions		A4, A5, A6, A15, A17, A26
The task of presenting a scientific explanation related to real life		A26
Tasks Involving Exploration of Mathematical Situations with Figures/Graphs		A26
Tasks that only include real life related problem situations		A26
Tasks that require mathematical expression of a situation related to real life		A26
Tasks Containing a Scientific Explanation of the Discovery of an Algorithm		A26
Classic Question		A26

Blank/Box/Table Completion questions		A26
Matching Questions		A26
True/False Questions		A26
Problem Posing Approach		A4
Problem Which İnclude Extra or İmperfect Knowledge		A7
Nonnumeric Problem		A7
Problem Which İnclude an Application of Real Life		A7
Problems Requiring Table and Graph Interpretation		A7, A26
A problem that requires making a shape or drawing		A7
Unsolvable problem		A7
Real life problem		A7, A10, A26
Problem requiring data collection		A7
A problem that requires the application of a formula		A7
Problem without numerical data		A7
Problem Containing Irrelevant Data		A10
Problem with Irrelevant Data		A10
Eksik Veri İçeren problem		A10
Problem with Missing Data		A10
Problem not		A10

related to daily life		
Contextual problem		A15, A16, A30, A31
Mathematical literacy problem		A14, A20, A23, A30
Mathematical modeling problem		A22

Conclusion and Recommendations

This study aimed to examine studies related to mathematical task types in mathematics education. Based on the findings, it was observed that research on the subject increased since 2020 and 2024 and peaked in this year. It was determined that the majority of the studies were conducted in Gazi university compared to other university. Considering that mathematical task types are an acceptable part of the present and the future, it is recommended that research on this topic be conducted at other universities as well. The keywords used in the studies give us ideas about the context of the studies. First of all, it was seen that the most frequently used keywords in the studies were Mathematics education/ Mathematics/ Mathematics teaching. Secondly, it was determined that mathematical task types were mostly examined in theses. It was found that a significant portion of the studies (f=18) were conducted with theses. It was determined that there were only one scale creation studies on the subject of mathematical task type. Additionally, when we look at the publication type of studies on mathematical task types in mathematics education, it is striking that there are fewer doctoral dissertations. It should be noted that master's theses can be written on different mathematical task types. In this context, it can be suggested that studies to be conducted in the coming years should be related to mathematical task types that are less frequently addressed. On the other hand, considering that the interest in mathematical task types in mathematics education in Turkey has decreased significantly in some years, it can be said that it would be useful to refocus studies in this direction.

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A1: An investigation on students' solution strategies for different proportional reasoning items

A2: Elementary school students' decisions in choosing an arithmetic operation for standard word problems

A3: Problem posing experiences and using open-ended questions in mathematics teaching

A4: A research on problem solving skills of the primary school students

A5: Revising discover problem continium matrix and investigating its psychometric properties

A6: İnvestigation of visualization ability in geometry problem solving process: auxiliary drawings

A7: Primary school students' determination levels about problem types

A8: An investigation of question types that elementary classroom and elementary mathematics teachers prefer

A9: Matematik ders ve çalışma kitabında yer alan problemlerin bazı kriterlere göre incelenmesi

A10: Determining the types of problems used by 7th grade math teachers

A11:Examining skill-based mathematics questions according to proportional reasoning problem types

A12: Scaffolding students in nonroutine problem solving environment: The case of two mathematics teachers

A13: Developing the mathematical problem types test

A14: Classification of the high school central exam math questions according to the pisa mathematical literacy levels

A15: Problem types used by content areas: a comparative analysis on pisa and national exams.

A17: To what extent alternative solution methods and different question types are given place in mathematics teaching?: examples from real classroom practices

A16: İnvestigation of pisa and national exams: a comparative analysis from perspective of values, problem types and content areas in mathematics

A18: To what extent alternative solution methods and different question types are given place in mathematics teaching?: examples from real classroom practices.

A19: İnvestigation of the secondary school students' nonroutine mathematical problem solving achievement on the context of beliefs towards mathematical problem solving

A20: İnvestigation of 6th, 7th, and 8th grade students' mathematical communication competencies in the solution processes of mathematical literacy problems

A21: İnvestigation of the effect of grading key type on rater behavior in non-routine mathematics problems scoring

A22: ExamİnAtion of middle school students' mathematization processes through mathematical modeling problems

A23: Evaluation of literacy problems in terms of improving mathematical thinking

A24: Analysis of problems containing diagrams in middle school mathematics textbooks

A25: The effect of secondary school students' mathematical metacognition awareness on their non-routine problem solving skills
A26: Examining mathematical task types in middle school mathematics textbooks in terms of cognitive demand levels: algebra learning domain
A27: Examination of the tasks in the mathematics textbooks of secondary schools in the context of mathematical creativity
A28: Examining algebraic thinking of sixth-grade students in realistic mathematics education-based lessons enriched with three-act math tasks
A29: İnspection of mathematic exams with open ended questions from the perspective of measurement and evaluation
A30: İnvestigation of the challenges of seventh grade students in solving mathematics literacy questions
A31: İnvestigation of student errors in solution of contextual problems and suggestions for solution

Chapter 6

The Impacts of Digital Transformation on Education

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Section I. Introduction

In today's world, education is being significantly affected due to the unparalleled rate at which technology advances. According to Valverde-Berrocoso, Acevedo-Borrega, & Cerezo-Pizarro (2022), digital transformation is a huge driver of these changes in education. This chapter reflects upon the broad-ranging effects resulting from the integration of digital technologies into education. Attention will be given to how these changes shape various levels of education-from early K-12 schooling to higher education and lifelong learning-and thus, how teaching and learning are evolving in response to these digital advancements.

A. Conceptual Definition of Digital Transformation

Digital transformation in education represents a significant shift that redefines traditional teaching and learning practices by integrating digital tools, platforms, and methods (Nguyen, 2015). This transformation goes beyond simply adopting new technologies; it involves a comprehensive restructuring of educational systems, including curriculum design, teaching methods, assessment processes, and the broader learning environment. Building on established scholarly definitions, this chapter considers digital transformation to be a complex process that incorporates technological integration into educational practice (Bates, 2015; Selwyn, 2016).

B. General Significance of Digital Transformation

The significance of digital transformation in education is directly related to the major socio-technological changes of our era (Castells, 2010; Dede, 2010). Since digital technologies permeate almost every aspect of modern life, education is one of the fields that are most influenced. The emergence of remote learning, the increasing relevance of digital literacy, and the changing landscape of employment have all put digital transformation into the core of educational discourse throughout the recent years (Hodges et al., 2020; OECD, 2019; World Economic Forum, 2020). This chapter examines the links between societal change and the rising importance of technology-driven education.

C. Objectives and Scope

The aim of this chapter is to discuss the dynamic relationship between digital transformation and education. It combines empirical evidence and academic discussions in an attempt to highlight both the opportunities and challenges arising from the integration of digital technologies in educational settings, as stated by Bocconi et al. (2018) and Ertmer & Ottenbreit-Leftwich (2013). It will

provide a broad scope that covers different levels of education, as digital transformation happens in varied ways in such contexts. According to Fullan & Langworthy (2014) and Voogt et al. (2013), the chapter has been enriched by case studies to present practical insights into the topic.

This introduction defines what digital transformation is, its relevance within the changing society of today, and what this chapter aims to achieve and cover. The paper goes on to discuss the impact brought forth by digital transformation on the methodologies of teaching, the role of the educator, assessment of students, and finally, the impacts of digital transformation on the pedagogical landscape and emergent trends in education for the future.

Section II: Effects of Digital Transformation on the Educational System

This section focuses on how digital transformation reshapes education by highlighting a wide range of its effects on the traditional system, teaching, and learning innovations, as well as the influence it brings to curricula.

A. Challenges in Traditional Education

Traditional education systems, rooted in established methods, face significant changes and challenges due to digital transformation (Vassilakopoulou & Hustad, 2023; Valverde-Berrocoso, Acevedo-Borrega, & Cerezo-Pizarro, 2022). While digital resources have improved flexibility in learning, issues like the digital divide remain a major barrier, especially in underprivileged areas (Inegbedion, 2021; OECD, 2015). Many students still lack access to essential technology, widening inequalities between different socioeconomic groups (OECD, 2015).

Traditional teaching methods usually adopt a one-size-fits-all approach, which may disengage students and fail to meet their unique learning needs. Digital tools, however, enable more personalized approaches to education, adapting to individual learning styles, strengths, and paces (Liu et al., 2014; Hwang & Tsai, 2011). This shift toward personalized learning fosters deeper engagement and better outcomes for students.

B. Innovations Brought by Digital Transformation

Digital transformation has brought about epochal changes, most of which are the rise in remote learning (Bates 2015; Anderson & Dron, 2011). Digital platforms, video conferencing, and learning management systems have made education more accessible, removing geographical barriers. However, certain challenges, such as the maintenance of student engagement and isolation feelings, need to be tackled with due care.

Personalized learning has also evolved through the use of adaptive technologies and data analytics. AI-driven and machine learning-powered tools

assess student performance and offer appropriate content and pace (Kulik & Fletcher, 2016; Roll & Wylie, 2016). This approach helps improve knowledge retention and strengthens students' grasp of even complex concepts.

Furthermore, digital resources have made traditional learning materials more interactive and accessible. E-books, simulations, and multimedia resources have made learning more engaging. Features such as text-to-speech and other access options ensure that education becomes more inclusive for learners of diverse needs. This is supported by the works of Larson & Murray, 2008; Warschauer, 2011; Rose et al., 2006; Edyburn, 2010.

C. Changes in Curriculum

Digital transformation has therefore raised a need to rethink traditional curricula for the inclusion of new skills such as digital literacy, critical thinking, and information management. According to Onyura et al. (2022), these skills are necessary to help students navigate the challenges of a digital world as noted by Mohamed Hashim, Tlemsani & Matthews, 2022.

Emerging fields such as coding, data science, and digital ethics, once considered secondary, now play a central role in modern education (Schultz & Seele, 2023). Curriculum design must strike a balance between subject-specific knowledge and digital competencies, ensuring that students are well-prepared for the demands of the future.

Section III: Technology Integration in Classrooms and Teaching Methods

The integration of technology into classrooms has dramatically changed the face of education and transformed teaching methods. This section explores the different ways in which technology has been incorporated into education and how this has affected teaching and learning.

A. Smart Boards and Interactive Technologies

Smart boards and interactive technologies have revolutionized traditional classrooms. These tools allow teachers to create engaging and dynamic lessons by incorporating digital content, interactive activities, and multimedia elements (Tsayang, Batane & Majuta, 2020). Such technologies promote visual and hands-on learning, making it easier for students to understand complex ideas (Cox, 2019).

B. The Role of Digital Tools in Teaching

Digital tools, such as educational apps, simulations, and online platforms, have expanded teaching methods and personalized learning experiences. These

tools let students learn at their own pace and based on their unique needs (Koehler, Mishra & Cain, 2017). At the same time, teachers can use data provided by these tools to better understand each student's progress and adapt their teaching strategies accordingly (Koehler, Mishra & Cain, 2017).

C. Benefits and Challenges of Educational Technologies

Technology in education offers many benefits but also comes with challenges. On the positive side, it increases student engagement (D'Mello, 2021), provides easy access to learning resources (Moreno-Guerrero et al., 2023), and helps students develop essential digital skills (Audrin & Audrin, 2022). Yet, a number of other concerns would also have to be resolved with regard to unequal technology access, or the "digital divide" (O'Hagan, 2020), possible distractions created by overuse of devices, and the necessity of teachers receiving training to effectively use technology (Falloon, 2020).

D. Ethical Issues Pertaining to Technology in Education

There are many ethical issues raised by integrating technology into education. One key issue is the protection of student data privacy in the digital world (Huang et al., 2020). Another critical consideration is teaching students to be responsible digital citizens who use technology wisely (Öztürk, 2021). Moreover, algorithmic bias in educational software has to be cautiously considered in order to make sure that technology is being used fairly and inclusively (Baker & Hawn, 2022).

In other words, technology offers exciting opportunities to improve education, but it also brings new responsibilities. How it is implemented will be the key to the future of teaching and learning.

Section IV: Shifts in Student Experience

The digital era has ushered in sweeping transformation into the very way learners experience education. This section looks at those transformations from the critical Digital Advancement-driven changed landscapes: ease of access to resources, interactivity introduced in learning spaces, adoption of virtual and augmented reality uses in education, and technology usage affecting students' social and emotional lives.

A. Ease of Access to Educational Resources

One of the important impacts of digital transformation was better accessibility to educational resources. Technology gave the ability to students of getting access to a manifold of learning materials from any part of the world at any time. This, therefore, includes online libraries, virtual databases, and OERs that are publicly

available to anyone (Tang, 2021). By breaking down geographical barriers, these resources have made education more equitable, offering opportunities to students who might not otherwise have had access to such materials (Ramoutar, 2021). Digital technology has shifted resources from being confined to physical spaces to being widely available, creating a more inclusive learning environment.

B. Creation of Interactive Learning Environments

Technology has transformed traditional teaching into an interactive and engaging process. Digital tools, such as online simulations and gamified platforms, allow educators to create dynamic and participatory learning environments. These tools encourage active involvement from students, making lessons more engaging and improving their understanding of complex topics (Rafique, 2023; Ong & Quek, 2023). Interactive learning encourages collaboration and ensures that education becomes more than just passive knowledge transfer, fostering a deeper connection to the material being taught.

C. Integration of Virtual Reality and Augmented Reality in Education

Virtual and augmented reality have both added new dimensions to the mode of learning among students through the creation of immersive educational experiences. The students can further explore these complex concepts practically, which brings theoretical knowledge into practical, interactive realities. For instance, VR and AR can simulate environments to learn anatomy, astronomy, or engineering, affording students the opportunity to explore real-world scenarios in a controlled environment. These tools enhance understanding and make learning more engaging and memorable (Hamilton et al., 2021; Radu, 2014).

D. Social and Emotional Impact of Technology on Students

Technology has also influenced students' social and emotional experiences in education. On one hand, digital tools promote collaboration and connection by enabling students from different locations to learn and interact together (Steinert & Dennis, 2022). On the other hand, technology can present challenges, such as increased distractions or feelings of social isolation (Bekalu, 2020). Balancing the use of technology is crucial to fostering a healthy learning environment. Educators must find ways to minimize distractions while helping students develop strong social and emotional skills, ensuring a well-rounded educational experience.

This digital transformation has affected the experiences of students in higher education through an increase in resource accessibility, interactive learning, immersive technologies, and social and emotional changes. These are

developments in the ever-evolving relationship between technology and education, with the future of learning evolving in the digital age.

Section V. Role and Competencies of Educators

Within this ever-changing, contemporary environment in which educational methods have transformed, there is an unprecedented need for educators to exhibit an unprecedentedly high level of digital skills (Ferrari, 2013; Redecker et al., 2017; Mishra & Koehler, 2006). The role of educators in this highly digitized era has been explained well below.

A. Digital Competence for Teacher Training

Development of digital competence is considered to be one of the very important components in the process of preparing teachers (Falloon, 2020). Inserting digital literacy in the course work of teacher training would equip them to navigate through the changes in technology in classrooms (Fernández-Sánchez, Revuelta Dominguez, & Sosa-Díaz, 2021). Essential competencies include using digital tools for instruction, assessing student progress through technology, and adapting teaching methods to suit digital environments (Ross-Hellauer et al., 2020). Successful models of teacher training highlight the importance of emphasizing digital expertise as a core component of professional preparation (Wilichowski, Cobo, Patil, & Quota, 2021).

B. Adaptation of Teachers to Technology Use

Integrating technology into teaching is often fraught with challenges for educators, such as unfamiliarity with tools and resistance to change (Kaminskienė, Järvelä, & Lehtinen, 2022). This section explores some of the more common barriers that teachers encounter, including lack of training or resources, and strategies to overcome these barriers (Johnson, Jacovina, Russell, & Soto, 2016). Recommendations include targeted professional development, peer support networks, and access to user-friendly digital tools. Examples of teachers successfully adopting technology demonstrate how it can improve instruction and make learning more engaging (Attwell & Hughes, 2010).

C. Harmonious Integration of Traditional and Digital Teaching Approaches

Combining traditional methods of teaching with digital ones can create a balanced and efficient learning environment (Fawns, 2022). This section examines the ways in which educators can use face-to-face instruction integrated with digital resources to enhance student engagement and comprehension (Jin et

al., 2021). The blend will allow the teacher to sustain the benefits of the person-to-person interaction while taking on board the flexibility and novelty offered by the digital tools. But the key issue is that a teacher should not be entirely dependent on technology, but supplement it rather than replace traditional techniques (Fawns, 2022).

D. Professional Development Opportunities for Educators

Professional development is of vital importance for educators to become and stay familiar with recent digital developments continuously (Vaskovics & Smith, 2017). Opportunities such as workshops, conferences, online courses, and collaborative learning communities help teachers build and refine their digital skills (Lin & Wang, 2023). These initiatives provide educators with the tools and knowledge to adapt to evolving technologies and integrate them effectively into their teaching (Brindley & Walti, 2009). Continuous learning is critical for educators to remain responsive to the dynamic nature of digital education (Furr et al., 2022).

In conclusion, the role of educators in the digital era surpasses conventional teaching to encompass the mastering of digital tools and adapting to new pedagogical methods. It is only through developing the required competencies and embracing continuous professional development that teachers will be able to use technology effectively in their classrooms while preserving a balanced, student-centered approach to education.

Section VI. Assessment of Digital Transformation

The ongoing digital transformation in education has profoundly impacted assessment practices, requiring a detailed evaluation of its effects. This section examines the key dimensions of assessing digital transformation in educational contexts.

A. Role of Technology in Assessment Processes

Technology has fundamentally reshaped traditional assessment methods, transitioning from paper-based formats to digital approaches. This shift has brought benefits such as increased efficiency, consistency, and scalability, while also introducing challenges that must be addressed (Neumann, Anthony, Erazo, & Neumann, 2019). Automated assessment tools, for example, streamline grading processes and enhance objectivity. Artificial intelligence plays a critical role in providing personalized feedback and recommendations, helping to improve student learning outcomes (Kim et al., 2021).

Also, online proctoring technologies have enabled assessments to be taken from home while still maintaining academic integrity. Case studies also describe many of the tools and techniques being employed to support assessments in different contexts, and thus both the promise and limitations of technology in this area are illustrated. Examples include Kim et al. (2021); O'Donnell (2020).

B. Performance Indicators and Educational Impacts

Digital transformation has also influenced how student performance and learning outcomes are measured. Real-time data and learning analytics offer educators valuable insights into student engagement and achievement, enabling timely interventions for those who may be struggling (Zimmerman, 2019; Ifenthaler & Yau, 2020).

Traditional forms of assessment are transforming into more holistic approaches whereby quantitative measures of grades and test scores are incorporated with more qualitative measures that include higher-order thinking, creativity, and soft skills (Whitehurst, 2016). Nevertheless, automated systems also introduce challenges including biases that might affect performance. There is a great need for addressing such biases to assure fairness and accuracy in scoring (Lee et al., 2019).

C. Sustainability and Future Developments

Another critical factor in education is the sustainability of digital transformation. Greater dependence on technology calls for ecological concern, which could be countered by sustainable practice (Bates, 2019). The future of assessment may include adaptive testing and immersive technologies like virtual reality, potentially opening up new avenues for creating more engaging and personalized assessment experiences (Shute & Rahimi, 2017).

Ethical issues, especially with regard to data privacy and security, are critical in the development of the advanced assessment technologies (Slade & Prinsloo, 2013). Continuous assessment and lifelong learning become part and parcel of an emerging digital landscape, which underlines a continuous need for adaptability and innovation (Hart, 2014).

This section concludes by exploring the balance of challenges and opportunities presented by digital transformation. The future of assessment in education will depend on addressing these complexities while embracing advancements that enhance learning and fairness (Selwyn & Facer, 2013).

Section VII. Conclusion

In conclusion, this discussion has highlighted the significant impact of digital transformation on education. The ongoing interaction between technological innovations and teaching methods has created a complex and evolving educational landscape. As we navigate this digital shift, it is clear that the structure of education has been fundamentally changed (Timotheou et al., 2023).

A. Lasting Effects of Digital Transformation on Education

The effects of digital transformation on education are both visible and long-lasting. Traditional teaching methods have been combined with digital tools, reshaping how knowledge is shared and experienced (Timotheou et al., 2023). The widespread use of digital tools has made education more accessible, overcoming geographical barriers and providing more opportunities for marginalized students (Gegenfurtner et al., 2021). However, this positive shift is not without challenges, such as issues with student engagement in virtual settings (Morrison-Smith & Ruiz, 2020) and the need to protect privacy and secure digital environments (Balash et al., 2021).

B. Future Trends and Predictions in Education

The future of education will undeniably be reshaped by continuous digital transformation. The growth of technologies in AI, virtual reality, and augmented reality will revolutionize teaching and learning. Online learning platforms, hybrid models of education herald a new era in the field of education, where the concept of lifelong learning has become even more crucial (Mirata et al., 2020; Mohamed Hashim et al., 2022; Singh, 2022). However, this development is not without its challenges. There are the needs to adapt educational institutions in balance with digital learning to include traditional human-centered teaching, as noted by Mirata et al. (2020), García-Morales et al. (2021), and Veletsianos (2016).

Conclusion

The paper has discussed different issues that are related to or determine how digital transformation influences education. The key takeaway is the importance of adapting teaching methods to the changing digital landscape, while also recognizing the potential risks and benefits of this shift (Røe, Wojniusz, & Bjerke, 2022). As we stand at the intersection of tradition and innovation, it is clear that education will continue to evolve with the advancements in digital technology. It is critical that educators and learners be wise and thoughtful in navigating this change so that digital tools truly enhance the educational experience and live up to their transformative potential. Ari et al., 2022.

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Chapter 7

Transforming DaF Teacher Training: From Historical Foundations to Future Innovation

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Transforming DaF Teacher Training: From Historical Foundations to Future Innovation

Teacher training in German as a Foreign Language (DaF) didactics is a cornerstone of educational development, designed to improve pedagogical practices and elevate learning outcomes. Over the years, the field has evolved significantly, influenced by shifts in general didactics and emerging educational paradigms. From traditional content-centered approaches to learner-centered methodologies, DaF teacher training programs now emphasize adaptability and responsiveness to the multicultural and multilingual realities of contemporary classrooms. Below, key aspects of teacher training in this field are discussed, including challenges, innovative strategies, and future directions.

Teacher training in DaF must adapt to the unique challenges posed by various educational contexts. Teachers require robust linguistic and didactic competencies to address training gaps (Aarøe & Daryai, 2020). This teachers face unique challenges in early DaF instruction, requiring solutions that draw from both traditional didactics and emerging frameworks like Education for Sustainable Development (ESD) or instructional design principles. These include the demand for robust linguistic and didactic competencies and addressing significant gaps in training.

Similarly, in specialized settings like music conservatories, the limited availability of tailored teaching materials complicates teacher preparation, requiring innovative solutions to meet the unique needs of these environments (Julián, 2010). Moreover, in Spain, a dual training approach that combines linguistic and didactic elements has proven effective in increasing pre-service teachers' willingness to communicate, underlining the importance of integrated teacher education (Estrada-Chichón & Zayas-Martínez, 2022). However, bridging theoretical knowledge with practical application remains challenging, as in-service teachers often highlight the disparity between what is taught in training and what is needed in real-world classrooms (Pogranova, 2022).

The rise of digital teaching environments presents both opportunities and challenges for DaF teacher training. Online teacher education courses, while convenient and flexible, often limit nonverbal communication, which is crucial in teaching. Specific training is needed to navigate these constraints effectively while leveraging the potential of digital tools to create engaging and interactive learning experiences (Jensen & Zentner, 2020). Additionally, the use of technologies like corpus-based tools has been shown to enhance grammatical and lexical proficiency, though educators' attitudes toward these technologies play a critical role in their successful adoption (Mukhamadiarova, 2021; Valcke et al., 2010). Reflective practices are another crucial element of effective DaF

teacher training, serving as the foundation for lifelong learning and collaborative frameworks such as Professional Learning Communities (PLCs). By critically analyzing their teaching methods, educators align their strategies with broader goals like sustainable teaching practices and adaptive learning models. Such reflective practices foster better pedagogical relationships and encourage continual professional growth (Drăghicescu, Stăncescu, & Petrescu, 2019). Professional Learning Communities (PLCs) provide an ideal framework for this, enabling teachers to collaborate, share experiences, and collectively address challenges. The collaborative nature of these communities helps sustain motivation and drive innovation in teaching methodologies (Huang, 2023).

Evaluation and quality assurance are indispensable components of DaF teacher training. Consistent assessment of training programs, including the use of models like the Inverted Classroom, ensures the maintenance of high educational standards and highlights areas for improvement (Grein et al., 2020). These evaluations are particularly important in aligning training content with the evolving needs of teachers and students.

Future directions for DaF teacher training emphasize the need for a comprehensive and multifaceted approach. Lifelong learning must remain a core principle, with training programs designed to adapt to rapid societal and technological changes (Kazak & Bezliudna, 2022). Specialized training programs that address the challenges of multilingual classrooms have been shown to improve both teacher effectiveness and student outcomes (Amin et al., 2024). Furthermore, establishing robust support systems, including mentorship and peer collaboration, can bridge the gap between training and practical application, ensuring that educators feel supported in implementing new methodologies.

In conclusion, the future of teacher training in DaF lies in its ability to integrate instructional design, sustainability principles, and reflective practices into a cohesive framework. By leveraging digital tools and fostering interdisciplinary collaboration, these programs prepare educators to address the linguistic, cultural, and environmental complexities of modern classrooms. By integrating technology, fostering collaboration, and addressing specific challenges through reflective practices, teacher training programs can significantly improve the educational experience for both educators and learners. The future of DaF teacher training lies in its ability to remain adaptive, inclusive, and innovative, thereby contributing meaningfully to global language education.

Teacher Training in German as a Foreign Language (DaF): Historical and Contemporary Perspectives

Historically, pedagogical approaches in these fields have evolved from content-centered methods, emphasizing the transmission of knowledge, to learner-centered paradigms that prioritize active engagement and adaptability. These historical shifts set the stage for addressing contemporary challenges in DaF instruction, such as integrating digital tools and sustainability principles into learner-centered methodologies. This transition has profoundly shaped the strategies and frameworks employed in contemporary teacher training programs, particularly in the context of foreign language education.

Aspect	Traditional Model	Modern Model
Focus	Content-Centered	Learner-Centered
Methodology	Lecture-Based, Passive Learning	Collaborative, Active Learning
Technology Integration	Minimal	High (Digital Tolls, AI)
Inclusivity	Limited	High (Multicultural Classrooms)
Assessment	Summative (End of Terms)	Formative (Ongoing Feedback)
Sustainability Emphasis	Absent	Integrated into Curriculum

Table 1: Comperative Framework: Traditional versus Modern DaF Teacher Training Models

One of the pivotal shifts in teacher training has been the move towards learner-centered methodologies. Traditional approaches often relied heavily on delivering content with minimal interaction, which limited opportunities for students to actively engage with the material. However, contemporary models, such as the Inverted Classroom Model, have transformed this dynamic by emphasizing active learning and fostering student participation (Grein et al., 2020). Similarly, the integration of competence-oriented approaches and digital tools has further enhanced the interactive nature of language education, allowing for tailored instruction that meets the diverse needs of learners.

Another critical development in DaF teacher training is the incorporation of intercultural content into language instruction. Research highlights the importance of integrating historical and cultural topics into curricula, as these elements promote intercultural competence and enrich the learning experience. For instance, Karpiuk et al. (2023) emphasize that exploring historical German influences within language classes enhances students' understanding of cultural contexts, thereby increasing their engagement and motivation. Hamaniuk (2020) similarly underscores the value of cultural studies in building comparative skills and fostering a deeper appreciation of the German language and its heritage.

The influence of cognitive sciences on didactic practices has also been transformative. Advances in cognitive research have provided insights into how learners process and retain information, enabling the development of more effective teaching strategies. Ivanova et al. (2021) argue that these advancements underscore the necessity for teacher training programs to equip educators with an understanding of cognitive processes, ensuring that instruction aligns with the ways in which students learn most effectively. This cognitive-didactic approach is particularly relevant in foreign language education, where mastering complex linguistic structures requires thoughtful, evidence-based teaching methods.

Digital technologies have become a cornerstone of modern teacher training, offering innovative solutions for enhancing both teaching and learning experiences. The incorporation of tools such as language learning apps, virtual classrooms, and corpus-based resources has improved the efficiency and accessibility of language instruction (Karsenti et al., 2020; Mukhamadiarova, 2021). Moreover, the effective use of plain language, as exemplified by concepts like "Leichte Sprache" and "Einfache Sprache," ensures that materials are accessible to a wider range of learners, promoting inclusivity in DaF education (Pottmann, 2020). Reflective practice is another essential component of teacher training in DaF. Encouraging educators to critically analyze their teaching methods fosters continuous improvement and strengthens their pedagogical relationships with students. Drăghicescu et al. (2019) note that such practices are integral to adapting instructional strategies based on feedback and learning outcomes, ultimately leading to more effective teaching. The evolution of teacher training in DaF illustrates a significant shift towards methodologies that prioritize learner engagement, cultural understanding, and cognitive alignment. These advancements, supported by digital innovations and reflective practices, have transformed the field into one that equips educators to meet the complex demands of contemporary classrooms. By building on these foundations, teacher training programs in DaF can continue to enhance educational outcomes and foster meaningful learning experiences for students.

Early Foundations of General Didactics

General Didactics emerged as a foundational educational discipline grounded in the concept of Bildung, a philosophical framework emphasizing the cultivation of the mind through education. This approach prioritizes individual and societal development, seeing education as a transformative process rather than a mere transmission of knowledge. Early critiques of instructional design methodologies highlighted their tendency to focus on teaching methods at the

expense of learning outcomes, underscoring a gap in the broader educational discourse. Wolfgang Klafki's contributions in the mid-20th century transformed General Didactics by redefining the purpose of education and its role in fostering self-determination and societal solidarity. General Didactics, initially focused on Bildung, grappled with the tension between content-centric approaches and procedural instructional design. Early debates critiqued traditional frameworks for prioritizing methods over educational outcomes, failing to address the broader societal implications of education. Zierer and Seel (2012) observed that General Didactics' emphasis on Bildung was often at odds with instructional design models, which leaned toward methodical teaching practices without sufficiently linking them to individual and societal development. The work of Wolfgang Klafki marked a turning point in this field. His seminal articles in 1958 and 1962 laid the foundation for his bildungstheoretische Didaktik, a critical-constructive model that emphasized the significance of educational content as a medium for both personal growth and societal engagement. Klafki argued that education should empower learners to transcend institutional constraints, fostering critical thinking and solidarity (Zierer & Seel, 2012). This approach advocated for an educational system that was both reflective and responsive, linking theoretical knowledge with practical application.

Klafki's Concept of Bildung

Klafki's concept of Bildung integrates personal growth with societal responsibilities, addressing global issues like environmental crises, social inequities, and peacebuilding. It frames Bildung as a dynamic, relational process essential for fostering critical thinking, ethical responsibility, and active citizenship (Kvamme, 2021; Jobst, 2023). Klafki's approach redefined education as a means of empowering individuals to contribute meaningfully to their communities and the world. His models of categorical and critical-constructive didactics emphasized analyzing educational content for fundamental meanings and future relevance (Seungho, 2014; Meyer & Rakhkochkine, 2018). These principles, when applied to DaF teacher training, enable educators to address the complexities of multilingual and multicultural classrooms while fostering global citizenship. Klafki's holistic framework continues to influence educational discourse by linking theoretical knowledge to practical challenges. Klafki's relevance extends to integrating personal and social competencies into curricula. Studies by Hakimova (2023) and Sorensen (2022) highlighted Bildung's role in developing social skills and democratic citizenship. Applications in Finnish primary schools and comparative studies

(Mård & Hilli, 2020; Žana & Daliborka, 2016) demonstrate the adaptability of Klafki's principles in diverse educational contexts. In Germany, Klafki's ideas informed teacher education reforms and curriculum democratization, promoting critical thinking and societal engagement (Chen, 2019). Internationally, his work has been adapted to address global challenges, with notable applications in Russia (Meyer & Rakhkochkine, 2018). While some critique its abstract nature as a limitation in resource-constrained settings (Uljens, 2023), others defend its scientific rigor and practical potential (Rucker, 2020). Klafki's emphasis on holistic education and societal impact represents a paradigm shift in educational thought. Despite critiques, his framework continues to inspire meaningful learning experiences and remains a cornerstone of contemporary educational practices.

The Evolution and Impact of General Didactics: A Transatlantic Discourse in the 1960s and 1970s

The 1960s and 1970s were transformative for General Didactics, shaped by transatlantic discourse and the rise of curriculum studies. Societal upheavals, including civil rights and gender equality movements, necessitated a reevaluation of educational paradigms. Traditional frameworks—classical moral education and modernist cognitive approaches—were criticized for failing to address modern complexities and diverse learner needs (Dilekli, Tezci, & Yünkül, 2024).

Prominent critics like Saul B. Robinson and Joseph Schwab challenged the rigidity and irrelevance of General Didactics. Schwab described curriculum studies as "moribund," advocating for practical, content-focused approaches (Friesen, 2018). Similarly, scholars like Zierer and Seel highlighted the declining relevance of General Didactics in addressing contemporary challenges. These critiques spurred a crisis within the field, prompting the search for frameworks that accounted for the socio-political context of learning and the dynamic nature of knowledge (Künzli, 2013; Oliveira, 2018).

New pedagogical approaches emerged in response. Constructivist theories promoted active learning and co-construction of knowledge, while critical pedagogy, inspired by Paulo Freire, emphasized critical consciousness and questioning power dynamics (Freire, 1970). Post-structuralist perspectives further redefined curriculum as a discursive practice shaped by societal discourse (Oliveira, 2018). Despite the critiques, the foundational principles of General Didactics retain value when adapted to modern needs. Figures like Schwab and Robinson fostered a more inclusive and dynamic understanding of curriculum studies. The debates of the 1960s and 1970s laid the groundwork for

contemporary educational practices, emphasizing flexibility, inclusivity, and the integration of content with societal demands.

The Shift to Learning-Centered Didactics

Learning-centered didactics marks a transformative shift from teacher-centered methods to approaches emphasizing active learner engagement, individual responsibility, and societal relevance. Influenced by critical-constructive pedagogy and Frankfurt School theories, this paradigm addresses societal realities and fosters inclusive, socially relevant education (Sharma, 2023). Klafki's critical-constructive didactics and models like the "Berliner Modell" and "Hamburger Modell" highlight the move toward learner-centered methodologies. Instructional design has evolved to integrate societal dynamics and linguistic needs. Frameworks such as ADDIE in DaF instruction align linguistic goals with sustainability competencies, preparing learners for global challenges. Effective instructional design requires technical and interpersonal skills, as highlighted by Ritzhaupt and Kumar (2015), and promotes community engagement for societal change (Yusop & Correia, 2011). Central to learning-centered didactics is addressing individual student needs, enhancing intrinsic motivation and academic achievement (Wang, 2023). Task-based learning and intercultural competence in DaF methodologies prepare learners for linguistic and cultural complexities. Personalized learning fosters critical thinking and problem-solving, while technology and critical digital pedagogy encourage ethical digital tool use for collaboration and social justice (Koh, 2024). Universal Design for Learning (UDL) principles further support accessible and inclusive lessons (Rao, 2021).

Learning-centered approaches have diverse applications. In higher education, they emphasize self-directed learning but face challenges in content-heavy courses (Moate & Cox, 2015). Medical education adopts problem-based learning to build lifelong skills, while counselor education uses experiential learning to bridge theory and practice. These examples demonstrate the adaptability of learning-centered didactics in preparing students for complex, real-world scenarios..

Pedagogical Frameworks and Teacher Development

Frameworks like the ADDIE model exemplify systematic approaches to instructional design, enabling educators to create programs tailored to diverse learners. The ADDIE model is a systematic framework used in instructional design to create effective educational and training programs. It consists of five phases: Analysis, where learning goals and audience needs are identified;

Design, which involves planning instructional strategies and materials; Development, where the content and resources are created; Implementation, the delivery of the program to learners; and Evaluation, which assesses the program's effectiveness and identifies areas for improvement. This model ensures a structured and outcome-focused approach, making it adaptable to various learning contexts. The emphasis on reflective practice, as noted by East (2014), allows educators to continually refine their methods, ensuring they remain effective and relevant. Teacher professional development plays a critical role in this transformation, equipping educators with the digital literacy and pedagogical skills necessary to implement interactive and adaptive teaching methods (Žogla, 2018). This aligns with the principles of competency-based education, which prioritize critical thinking and problem-solving skills over rote memorization (Mara, 2017). While the benefits of learning-centered didactics are widely recognized, some educators argue for the continued value of traditional methods in structured environments that require foundational knowledge. Balancing these approaches necessitates a nuanced understanding of educational contexts and the specific needs of learners. Moreover, as instructional design education often prioritizes technical skills, there remains a need to address the broader civic responsibilities of designers (Yusop & Correia, 2011). The shift towards learning-centered didactics signifies a holistic rethinking of educational practices, driven by technological advancements, the demand for competency-based education, and the evolving role of teachers. By emphasizing student responsibility, collaborative learning, and flexible teaching methods, this approach enhances engagement and learning outcomes. As institutions continue to adopt these practices, they contribute to the development of autonomous, skilled learners capable of critical engagement with societal challenges.

Contemporary Perspectives on Teacher Training

Teacher training in DaF has evolved by integrating historical insights from General Didactics and Instructional Design with modern practices, emphasizing guided autonomous learning and holistic, interdisciplinary approaches. The didactic triangle remains central, fostering dynamic interplay between teacher, learner, and content, while linking historical and cultural contexts to enrich foreign language instruction (Zierer & Seel, 2012; Karpiuk et al., 2023).

Contemporary practices prioritize lifelong learning, professional development, and digital innovation. Guided autonomous learning enables educators to address diverse learner needs, aligning with advances in cognitive sciences and digital methodologies (Smirnova, 2021). ICT tools have

transformed teaching, necessitating in-service training to bridge knowledge gaps and equip teachers with digital and ethical competencies (ÜZÜM & Özbek, 2023). Cross-cultural experiences in training further enhance inclusivity and cultural awareness (Greene & Vázquez-Montilla, 2014). Competency-based frameworks emphasize critical skills like political, social, and multicultural competencies, complemented by reflective and inquiry-based methods that connect theory with practice (Tovkanets, 2022; Zeichner, 2012). Practice-based training, problem-based learning, and pedagogical workshops bridge theory with application, fostering innovative and collaborative approaches (Ball & Forzani, 2009; Anjos, 2021). Future-oriented training integrates instructional design, ESD frameworks, and digital transformation to prepare educators for diverse classrooms. This approach balances traditional methods with contemporary practices, ensuring DaF instruction fosters linguistic proficiency, intercultural understanding, and adaptability for future challenges (Sosnova, 2022; Lipovec & Tekavc, 2023).

Overview of Teacher Training Models

Teacher training models represent an essential framework designed to enhance educators' competencies, enabling them to meet the diverse needs of students while navigating the ever-evolving educational landscape. These models vary widely, incorporating methodologies that address teaching effectiveness, pedagogical innovations, and technological advancements. Continuous professional development is crucial to ensure that educators remain adept at implementing new strategies and technologies, ultimately leading to improved student outcomes and institutional success. The following hierarchy visualization presents a cohesive framework for teacher training models, emphasizing their categorization based on purpose and focus. At the center of the diagram lies the foundational concept of Teacher Training Models, serving as the anchor for all categories and practices. Surrounding this core are four main categories: Collaborative Development, Structured Approaches, Innovative Frameworks, and Diversity and Inclusivity. The category of Collaborative Development includes approaches such as Professional Learning Communities (PLCs), Coaching and Peer Observation, and Workshops and Conferences, all of which emphasize shared learning and mentorship to foster professional growth. Structured Approaches encompasses Curriculum-Based Development, Hybrid Models, and Context-Adaptive Models, ensuring alignment with institutional goals while maintaining adaptability to diverse teaching contexts. Innovative Frameworks highlight cutting-edge strategies such as the TPACK Framework, Research-Based Models, and Competence-

Based Models, integrating technology and evidence-based practices to enhance modern education. Finally, Diversity and Inclusivity centers on Training for Heterogeneous Environments, equipping educators to address diverse classroom needs with sensitivity and inclusivity. This radial hierarchy not only highlights the relationships between the central concept, categories, and individual models but also underscores their interconnectedness, presenting a holistic view of teacher training frameworks.

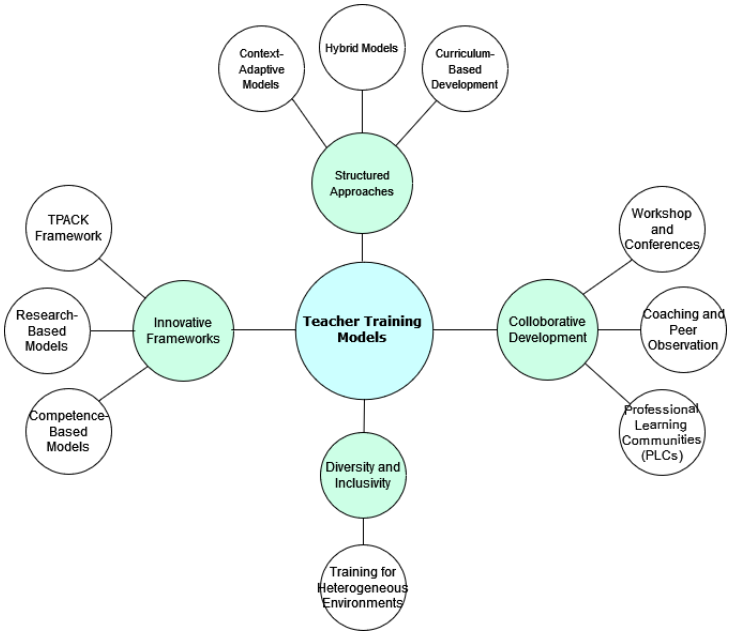

Figure 1. Radial hierarchy of teacher training models categorizing approaches by purpose and focus.

Diverse Approaches to Teacher Training

Teacher training encompasses diverse strategies to enhance educators' skills and adapt to various contexts. Professional Learning Communities (PLCs) foster collaboration, enabling teachers to exchange ideas, co-develop lesson plans, and grow professionally. Similarly, Curriculum-Based Professional Development aligns instructional practices with school goals, improving student outcomes. Coaching and Peer Observation offers mentorship and reflective feedback, while workshops and conferences introduce cutting-edge techniques and broaden pedagogical toolkits. Instructional methods range from traditional teacher-centered approaches to student-centered methodologies like inquiry-based learning, emphasizing engagement and autonomy. Hybrid models balance these methods, catering to diverse learner needs. Specialized frameworks like

Context-Adaptive Models integrate personalized learning and practical teaching experiences, exemplified by u-learning environments and the TPACK framework (Chen et al., 2017; Moreno et al., 2019). Research-Based Models and School-Based Training Models (SBTM) prepare educators for real-world challenges and address teacher shortages (Richter, 2016). Training in heterogeneous environments equips educators for culturally and linguistically diverse classrooms, using situational and longitudinal approaches (Pevzner, 2021). Digitalization has introduced virtual environments and automated assessments, fostering collaboration and creating interactive materials (Zimovetc & Abraukhova, 2023). Language teacher education emphasizes knowledge, skills, and awareness, supported by emotional intelligence (EI) training, which enhances teaching quality and classroom environments (Dolev & Leshem, 2017). Recent trends highlight online training programs and digital competency development, particularly after the COVID-19 pandemic. Active learning-focused professional development improves teaching effectiveness and organizational commitment, benefiting both educators and students (Nazim, 2024; Hye et al., 2024). Combining traditional and innovative methods, teacher training ensures educators are equipped to meet the evolving demands of diverse and dynamic classrooms.

Key Components of Effective Teacher Training

Effective teacher training is pivotal for enhancing educational quality and student outcomes, combining emotional intelligence, practical experience, mindfulness, technology, and collaborative learning. Successful programs align with teacher and school needs, fostering ownership and relevance by involving educators in the design process (Boer et al., 2014; Bayar, 2014). Active participation through role-playing, modeling, and coaching strengthens classroom application, while long-term engagement and follow-up sessions sustain improvements in teaching practices (Sloat et al., 1977; Saylor & Johnson, 2014). High-quality instructors and reflective practices further enhance teacher performance, enabling educators to connect theory to real-world challenges and foster intercultural competence (Arancibia et al., 2016). Emotional intelligence plays a vital role in creating supportive learning environments, with mindfulness practices enhancing resilience and adaptability in addressing sustainability education (Mérida-López & Extremera, 2020; Mahmud, 2022). Practical, hands-on experiences, such as lesson planning and teaching practice, build teacher confidence and efficacy, equipping educators to manage complex issues like bullying (Ruble et al., 2011; Midgett et al., 2017). Technology integration is indispensable in modern training, with ICT

supporting innovative, student-centered methods (Ros et al., 2021). Collaborative learning environments, mentorship programs, and structured feedback mechanisms promote lifelong learning and instructional effectiveness (Okwina, 2023; Ybnu et al., 2024). Tailored implementation is critical for ensuring consistency and adapting to local contexts. In-service programs, when effectively customized, significantly improve teaching quality and student outcomes (Afam et al., 2024). Reflective practices, subject-specific focus, and continuous support create a robust foundation for professional growth, enabling teachers to thrive in diverse, dynamic classrooms.

Challenges in Teacher Training

Teacher training programs are essential in enhancing educational quality, yet they encounter numerous challenges that can undermine their effectiveness in fostering professional development. These challenges broadly encompass variability in access to training, inconsistencies in the quality of training provided, and the difficulties in implementing learned strategies within classroom settings. Addressing these issues requires a multifaceted approach to ensure that teacher training programs are equitable, relevant, and impactful. Access to professional development is unevenly distributed, often shaped by geographical, institutional, and socio-economic factors. Addressing these disparities requires innovative solutions, such as leveraging digital technologies and ESD frameworks to make DaF teacher training more accessible and inclusive. By incorporating instructional design principles, training programs can be adapted to diverse contexts and resources, bridging gaps in equity and quality. Addressing these disparities requires innovative solutions, such as integrating ESD principles and digital platforms into DaF teacher training, ensuring that educators in under-resourced regions receive equitable opportunities for professional growth. Teachers in remote or underprivileged regions frequently face significant barriers, including limited resources, logistical difficulties, and insufficient policy support. For example, research indicates that disparities in access to continuous professional development (CPD) opportunities result in skill gaps among educators, particularly in underfunded schools (De Oliveira Alves Ribeiro & Nunes, 2022; Rauteda, 2023). Public policies aimed at reducing these inequities often lack robustness, leaving teachers without the necessary resources to engage in meaningful professional growth (La Velle, 2020). Furthermore, favoritism and political influences in selecting trainees exacerbate these disparities, highlighting the need for transparent and equitable selection processes (De Oliveira Alves Ribeiro & Nunes, 2022). Studies also reveal that the frequency and structure of

professional development sessions significantly impact their effectiveness. Teachers may receive training sporadically—ranging from weekly sessions to only a few times a year—resulting in inconsistent skill development across schools and districts (Shah et al., 2024). Such irregularities hinder professional growth, particularly in regions with limited educational resources. Additionally, while some programs focus on generic skills, they often fail to address subject-specific and pedagogical content knowledge, reducing their relevance and applicability (Kholis, 2022; Graça et al., 2021).

Quality of Training

The quality of teacher training significantly impacts its effectiveness. Well-designed programs focus on practical, applicable skills tailored to teachers' needs, emphasizing collaborative learning and customized pathways (Ybnu et al., 2024). Programs promoting higher-order thinking skills enhance teacher self-efficacy and improve student performance evaluation (Bolat, 2023). However, poorly structured sessions, irrelevant content, and unqualified facilitators often lead to disengagement (Dange & Siddaraju, 2020).

- Integration of Technology: ICT has transformative potential for teacher training but remains underutilized due to resource constraints and inadequate infrastructure (Nongni, 2021). Positive attitudes and personal resources can offset these challenges, but systemic reforms are necessary for effective digital integration (Graça et al., 2021).
- Interdisciplinary and Reflective Practices: Traditional prescriptive models fail to address modern teaching complexities, necessitating frameworks that promote agency and interdisciplinary collaboration (Lago et al., 2023). Incorporating digital resources, particularly in STEM subjects, enhances conceptual understanding and fosters innovation (Bolduc et al., 2020).
- Application Challenges: Teachers often struggle to apply learned strategies due to insufficient ongoing support, resources, and feedback mechanisms (Mahara, 2024). Without sustained support, initial enthusiasm from training fades, leading to poor long-term implementation (Bockrath et al., 2020). Creating reflective and collaborative environments is essential for bridging the gap between theory and practice (Zhang & Liang, 2023).
- Continuous Professional Development: Consolidating initial training with ongoing education ensures adaptability to evolving demands (De Souza, 2022). Structured opportunities for reflection and collaboration promote continuous learning, addressing the common challenge of time constraints for reflective practice (Graça et al., 2021).

To overcome these challenges, teacher training programs must focus on equitable resource distribution, effective ICT integration, and reflective practices. Robust public policies and sustained support can enhance teacher competencies and student outcomes, contributing to a more innovative and equitable educational system.

Traditional and Modern Pedagogical Approaches in DaF

Teaching German as a Foreign Language (DaF) requires a nuanced approach that integrates linguistic, cultural, and emotional elements to foster dynamic learning. Pedagogical approaches in DaF span teacher-centred, student-centred, and critical pedagogies, each offering distinct advantages. While teacher-centred methods ensure consistent content delivery, they often limit engagement and critical thinking. Student-centred approaches emphasize autonomy, fostering ownership and collaborative problem-solving, while critical pedagogy integrates principles of social justice, empowering learners to navigate societal norms through language and intercultural competence. The cornerstone of DaF instruction lies in integrating linguistic and cultural learning. Educational materials should combine grammar, vocabulary, and cultural narratives to promote intercultural competence (Zinkovskaya et al., 2021). Task-based learning (TBL) and content and language integrated learning (CLIL) are key strategies, engaging learners in real-world tasks and interdisciplinary content to enhance language proficiency and sustainability awareness. TBL encourages practical application, while CLIL fosters a holistic understanding by combining language learning with subjects like environmental studies. Innovative techniques, such as incorporating pop culture, further enrich DaF instruction. Using German television series and music enhances engagement and vocabulary retention (Abbasova, 2024). Additionally, business-oriented German with an emphasis on intercultural competence equips learners for professional communication in German-speaking contexts (Kristo, 2023). By adapting teaching methodologies to diverse learner needs, DaF education creates a meaningful, inclusive, and effective learning environment.

Intercultural Competence and Identity Formation

The development of intercultural competence is pivotal in DaF instruction. Language learning, as Constantinescu (2023) argues, is intrinsically tied to socialization and identity formation, underscoring the need for teacher training programs to incorporate reflective practices. These practices equip educators to design DaF lessons that seamlessly integrate cultural awareness with linguistic instruction, fostering both identity formation and intercultural understanding.

By including themes and activities that promote intercultural understanding, educators enable learners to connect language acquisition with cultural nuances. Qi (2024) and Chung (2024) both emphasize the importance of integrating intercultural content into textbooks and curricula, ensuring that students are equipped to navigate cultural differences effectively. Teachers play a critical role as cultural mediators, bridging linguistic instruction with cultural education. Simons (2014) highlights the necessity for future language educators to develop robust cultural content knowledge, enabling them to teach language and culture holistically. This dual focus not only fosters empathy and understanding but also prepares learners for real-world interactions in German-speaking contexts.

Technological Integration and Multimodal Feedback

Technological advancements have significantly enhanced language teaching methodologies. The use of digital tools and online platforms offers interactive resources that make language learning more accessible and engaging. Guo (2023) emphasizes the role of multimodal corrective feedback (MCF) in improving writing proficiency and addressing emotional challenges in language education. By incorporating MCF and other digital innovations, teacher training programs can prepare DaF educators to use technology effectively. This approach not only enhances student engagement but also aligns with sustainable teaching practices by promoting accessible and scalable digital solutions. Plain language techniques, such as Leichte Sprache and Einfache Sprache, are particularly effective for beginner learners. These simplified linguistic frameworks make German texts more accessible, facilitating easier comprehension and language acquisition (Pottmann, 2020).

Multilingualism and Translanguaging in DaF

Multilingualism and translanguaging are transformative approaches in language education. Leveraging students' existing linguistic resources, especially for those with limited formal education, fosters successful second-language learning. In DaF teacher training, integrating translanguaging strategies equips educators to build on learners' multilingual backgrounds, fostering an inclusive environment that bridges linguistic diversity and cultural understanding. To implement these strategies effectively, DaF teacher training must include modules on translanguaging, enabling educators to navigate and celebrate linguistic diversity in their classrooms. Maahs et al. (2022) highlight the potential of pedagogical translanguaging in building literacy skills and enhancing language acquisition by drawing on learners' multilingual capabilities.

The Cultural Dimension of DaF

The inseparable link between language and culture is a guiding principle in DaF Didaktik. Yuzmukhametov et al. (2020) advocate for the co-study of language and culture, emphasizing their historical and contextual interconnections. By embedding cultural narratives into language instruction, DaF teacher training programs can utilize instructional design frameworks to create culturally responsive curricula. This approach ensures that educators are equipped to teach language in a way that fosters both linguistic proficiency and cultural empathy, enriching the overall learning experience.. This ensures that DaF educators are equipped to integrate cultural values seamlessly into their teaching practices, enriching both language proficiency and cultural awareness. Chung (2024) and Ranabhat (2024) underline the challenges of grasping nuanced cultural expressions, which can be mitigated through targeted support and experiential learning. These efforts not only improve linguistic proficiency but also cultivate a broader appreciation for cultural diversity among learners. Effective DaF Didaktik integrates a variety of pedagogical approaches, from task-based and content-integrated learning to technological innovations and intercultural competence development. By addressing the emotional, cultural, and linguistic needs of learners, educators can create enriching and impactful language-learning experiences. This holistic framework not only enhances linguistic skills but also empowers learners to navigate the complexities of intercultural communication with confidence and empathy.

Teaching Contexts (TCs) and Education for Sustainable Development (ESD): A Transformative Framework in Teacher Training

Teaching contexts (TCs) have emerged as effective platforms for integrating Education for Sustainable Development (ESD) principles into DaF teacher training. By embedding sustainability and cultural learning into these contexts, educators can develop the competencies needed to address global challenges while fostering linguistic and cultural fluency in their students. By aligning sustainability competencies with instructional strategies in Deutsch als Fremdsprache (DaF), these contexts bridge theoretical frameworks with practical applications, addressing the dual goals of linguistic proficiency and sustainable teaching practices. These environments, characterized by structured, practical, and collaborative approaches, serve as incubators for innovative educational practices. Drawing from a diverse array of case studies and research, this comprehensive analysis underscores the transformative potential of TCs in shaping educators and fostering sustainability competencies.

A significant case study highlights the integration of ESD principles in

socio-economically disadvantaged STEM classrooms through collaborative efforts between educators and students. The project employed a Design-Based Research (DBR) methodology, emphasizing the "Recognize-Evaluate-Act" framework from the Orientation learning area "Global Development" (Vukić et al., 2021; Kioupi & Voulvoulis, 2022). This approach proved instrumental in identifying engaging learning indicators and enhancing lesson plans. By intertwining horizontal and vertical integration of sustainability concepts, the study fostered a comprehensive understanding of sustainable development among students (Vukić et al., 2021). Horizontal integration incorporated sustainability across multiple subjects, while vertical integration focused on dedicated sustainability curricula, addressing gaps in student motivation toward STEM careers (Vintere, 2020; Wiek et al., 2011). Beyond these pedagogical strategies, the Whole Institution Approach has been advocated for embedding sustainability in higher education. This policy underscores the importance of institutional support and contextual factors in promoting sustainability competencies, positioning higher education institutions (HEIs) as pivotal in generating new knowledge and fostering sustainability (Adomßent et al., 2014; Hammoud & Tarabay, 2019).

Research Competency Development in Teacher Education

Teaching contexts play a vital role in developing research competencies among future educators through methods like Project-Oriented Learning (POL) and Cooperative Inquiry. POL effectively integrates the Sustainable Development Goals (SDGs) into pre-service teacher training, fostering sustainability and research skills (Albareda-Tiana et al., 2018). Cooperative Inquiry strengthens community and enables educators to embed Education for Sustainable Development (ESD) into curricula (Summers & Turner, 2011). Experiential learning provides transformative experiences by engaging trainee teachers in local sustainability challenges (Singh-Pillay & Naidoo, 2024). Digital platforms like Ireland’s Teachers’ Research Exchange (T-REX) enhance research engagement, blending teaching and research in collaborative environments (Connolly et al., 2020). Research-oriented learning in European higher education institutions complements these efforts through active teaching methods such as workshops, simulations, and internships, enriching interdisciplinary dimensions and fostering advisor-led mentorship (Levrints et al., 2023). However, challenges in implementing ESD and research frameworks persist, particularly in aligning educational technology (EdTech) with pedagogical objectives. Successful adoption requires understanding educational frameworks and sustained institutional support (Beasy et al., 2024).

Collaborative professional development, involving principals, lead teachers, and researchers, further reinforces cohesive, research-based education (Bergmark, 2020). HEIs play a dual role in bridging theory and practice, emphasizing environmental factors that shape research competencies (Bukusheva et al., 2023). By serving as catalysts for sustainability and innovation, HEIs enable informed pedagogy that addresses global challenges (Mahmud, 2017; Ferguson & Roofe, 2020). Teaching contexts, leveraging collaborative learning, experiential methodologies, and institutional support, prepare educators to address sustainability challenges creatively. By aligning ESD and research competencies, these programs contribute to innovative, impactful teaching practices, supporting broader sustainable development goals.

Enhancing Instructional Design for Language Learning: Future Directions

The integration of instructional design principles into teacher training for Deutsch als Fremdsprache (DaF) represents a pivotal approach to modernizing educational practices. As the landscape of language learning evolves, it becomes increasingly essential to tailor training initiatives to address specific pedagogical challenges while incorporating technological advancements and collaborative strategies. This comprehensive approach not only enhances teaching efficacy but also aligns with the broader shifts towards student-centered and technology-enhanced education, particularly highlighted during the transition to emergency online learning in the COVID-19 era.

Instructional Design Principles and Technology Integration

Instructional design (ID) serves as a systematic framework for crafting effective educational programs, bridging themes like ESD, DaF-specific methodologies, and digital innovations. By embedding ID principles throughout teacher training, educators can create cohesive, student-centered approaches that address the diverse needs of modern classrooms. Models like ADDIE emphasize structured planning and evaluation, which are crucial in language pedagogy (Seel et al., 2017; Hosogoshi & Takahashi, 2019). By embedding these principles into DaF training programs, educators can create more impactful and engaging learning experiences. Moreover, the use of Programmed Instruction (PI), which breaks down complex concepts into manageable units, has proven effective in enhancing retention and engagement, accommodating diverse learning styles (C.T. & Ilankumaran, 2023). The integration of Information and Communication Technology (ICT) serves as a unifying element in modern teacher training, connecting instructional design, ESD

principles, and DaF didactics. By leveraging tools like mobile-assisted language learning (MALL) and corpus-based applications, educators can create immersive learning environments that foster both linguistic and sustainability competencies. Research highlights the role of mobile-assisted language learning (MALL) in crafting out-of-class experiences, enabling tailored learning opportunities based on student feedback (Solodka et al., 2022). Tools such as Large Language Models (LLMs) have also demonstrated promise in scaling instructional design expertise by generating personalized content and assessments (Yadav, 2023). These innovations foster dynamic, interactive environments that enhance both teacher and student performance.

Collaborative Learning and Professional Development

Collaborative learning emerges as a cornerstone of effective professional development for educators. Structured environments that facilitate the exchange of strategies and resources among teachers foster a culture of continuous improvement (Lin et al., 2023). Social and collaborative competencies are particularly vital in language instruction, as they promote real-world communication skills and peer interaction (Zheng-xia et al., 2022). Microlearning approaches, which focus on social interactions and collaborative tasks, further enrich this process by encouraging active participation and collective learning.

Programs emphasizing collaboration not only strengthen relationships among educators but also address the need for ongoing professional development in areas such as critical thinking (CT). Teachers equipped to cultivate CT skills in their students contribute to deeper engagement and analytical proficiency, essential in language education (Asgharheidari & Tahriri, 2015).

Explicit Instruction and Evaluation Strategies

Explicit instructional methods remain integral to language acquisition, with research underscoring their effectiveness in improving language production and comprehension (Sari, 2018). Approaches like content-based and task-based language teaching facilitate skill development through practical application, equipping educators with tools to design engaging and meaningful classroom experiences (Amat et al., 2022). These strategies, combined with comprehensive evaluation mechanisms, ensure that training programs align with institutional goals while continuously adapting to educator feedback and measurable outcomes.

Leveraging Technology for Enhanced Learning Experiences

Technology-enhanced learning (TEL) offers transformative opportunities in DaF teacher training, enabling seamless integration of sustainability-focused content and cultural narratives. Tools such as mobile-assisted language learning (MALL) and augmented reality (AR) create interactive, inclusive, and immersive learning environments. These technologies support adaptive pedagogies and enrich instructional design through simulation, gamification, and mobile learning, fostering personalized educational experiences (Choi-Lundberg et al., 2023; Jagušt & Botički, 2019). While TEL has immense potential, challenges remain. The COVID-19 pandemic highlighted the need for well-structured synchronous and asynchronous activities to address inflexibility in learning processes (Daniela, 2021). Additionally, the lack of a shared understanding of "enhanced" learning within TEL necessitates critical evaluation to ensure meaningful outcomes (Kirkwood & Price, 2014; Bayne, 2015). Future research should focus on leveraging learning analytics and educational data mining to refine technologies and address the digital divide. Integrating formative assessment and fostering collaborative and self-regulated learning are critical for advancing TEL (Duval et al., 2017). Institutions like Petroleum Development Oman (PDO) illustrate the effective use of AR and VR for skill development, emphasizing TEL's potential for continuous learning (Harthy, 2022). By synthesizing instructional design principles, Education for Sustainable Development (ESD), and digital innovations, DaF teacher training can address linguistic, cultural, and environmental complexities. This holistic approach equips educators to foster linguistic proficiency, intercultural competence, and sustainability awareness, preparing learners for the challenges of a globalized world.

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Chapter 8

From Task Correction to Lasting Knowledge: Investigating the Sustained Learning Effects of Video Feedback

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Abstract

While much research has been conducted on students' perceptions of video feedback and its immediate impact on feedback use, there is a notable lack of studies investigating how video feedback influences long-term learning and knowledge retention. This gap in the literature serves as the basis for the current study, which explores the effects of video feedback on student learning in a fully online Information Security and Ethics course. A total of 43 students participated in the 6-week intervention, with 23 students in the experimental group receiving video feedback on their weekly assignments and 20 students in the control group receiving written feedback. Although the experimental group demonstrated higher knowledge levels 10 weeks after the intervention, the difference was not statistically significant. This finding emphasizes the need for additional research to examine the long-term effects of video feedback on sustained learning and its potential to foster deeper retention and application of knowledge over time.

Keywords: feedback, video, video feedback, screencast feedback, learning, retention

1. Introduction

It is completely natural for students to make errors during their educational tasks, as mistakes are an essential and unavoidable aspect of the learning journey (Tulis, Steuer, & Dresel, 2016; Zhang & Fiorella, 2023). In such instances, it is the educators' responsibility to provide effective feedback that helps students identify and correct these errors. Feedback, which is the information given to students regarding their assignments by instructors or other relevant agents (Boud & Malloy, 2013; Dawson *et al.*, 2023), allows students to critically assess their current understanding and skills. Additionally, feedback plays a crucial role in addressing errors and deficiencies, particularly common during the initial stages of learning. By guiding students in correcting these mistakes, feedback helps improve the quality of their work, ensuring that it progresses toward the desired standard over time (Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006).

Feedback holds significant potential to enhance students' learning, but for this potential to be fully realized, it is crucial for learners to first develop a positive perception of the feedback and then actively engage with it (van der Kleij, 2019; Wood, 2021). However, traditional text-based feedback has been found to fall short in key areas that are vital for effective feedback use, such as clarity, detail, the establishment of an affective connection between the learner and instructor, and its usefulness in guiding revision (Máñez *et al*., 2024; Yiğit, 2024). In response to these challenges, technological innovations have led to the development of alternative feedback methods, including electronic text-based feedback, audio feedback, and, more recently, video feedback. Each new approach has been introduced to address the limitations of the previous ones, with video feedback emerging as a promising solution to enhance feedback quality and engagement.

Recent research on video feedback largely revolves around student opinions and perceptions (Yiğit, 2024). While studies of such nature, which primarily rely on self-reported data, offer valuable insights into comparison of video feedback and text-based feedback, they are not comprehensive enough to provide a thorough and accurate comparison of the effectiveness of these two methods. To fill this gap, studies have been conducted that gather objective data, moving beyond subjective perceptions to assess the actual impact of feedback on task revisions. These studies offer a stronger and more reliable basis for comparing video and text feedback formats (Bakla, 2020; Cavaleri *et al*., 2014; Cavaleri *et al*., 2019; Cunningham, 2019; Grigoryan, 2017; Özkul & Ortaçtepe, 2017; Yiğit & Seferoğlu, 2023). Nevertheless, it can be argued that further research is necessary to draw definitive conclusions regarding the

effectiveness of video feedback. In other words, while examining the impact of video feedback on revision performance provides valuable insights, it may not be sufficient to fully grasp its effectiveness.

The fundamental objective of effective feedback is not only to correct and improve the current learning task but also to ensure that its impact is sustained over the long term, enabling the student to succeed independently in similar future scenarios. In other words, the critical point of feedback is to help students reach a level where they can perform successfully without needing further feedback. This concept can be illustrated through the metaphor of training wheels on a bicycle. Just as training wheels initially assist in maintaining balance while learning to ride, but are eventually removed to allow the rider to develop the skill of balancing independently, feedback should initially provide support but gradually empower students to manage their own learning. Otherwise, if feedback remains a constant crutch, students may fail to develop the independence necessary for success without it, hindering their long-term learning progress.

As discussed, the ultimate goal of feedback should extend beyond merely guiding students to recognize and correct their mistakes; it should foster lasting learning that empowers students to independently avoid similar mistakes in the future. True learning is demonstrated when students can exhibit expected behaviors without requiring external guidance. For instance, watching a recipe video and successfully making a dish does not necessarily mean someone has truly learned how to cook it; they may only be temporarily imitating the steps. However, if that person can prepare the same dish without needing to consult the video, it indicates a deeper, more permanent learning. In this way, genuine learning is characterized by long-term retention and the independent application of acquired knowledge or skills.

As previously mentioned, assessing the effectiveness of a feedback intervention requires more than evaluating the immediate corrections students make after receiving feedback. While successfully making corrections can indicate responsiveness to feedback, it is not synonymous with true learning. In this regard, it is argued that simply correcting mistakes and revising work based on feedback may not necessarily mean that learning has occurred (Truscott & Hsu, 2008). In other words, students may improve their assignments through feedback, however this process alone does not guarantee that they have internalized the underlying concepts or gained a deeper understanding. To truly determine the effectiveness of feedback, it is essential to examine its long-term impact rather than its immediate outcomes. Therefore, it would be beneficial for studies on video feedback to focus on its lasting effects by adopting a

longitudinal approach, as recent calls in the literature have suggested (Cavaleri *et al*., 2019; Mahoney, Macfarlane, & Ajjawi, 2019; Özkul & Ortaçtepe, 2017). However, there are considerable gaps in this area of research. Most existing studies concentrate on the short-term effects of video feedback and whether it enhances task-specific performance. Relying solely on these immediate effects does not provide a sufficient basis to conclude that video feedback is more effective than traditional text-based feedback.

It is important to clarify that the above discussion does not diminish the value of studies focused on feedback use within video feedback research. Corrections made immediately after feedback are undoubtedly beneficial and essential within the learning process, serving as foundational steps toward actual learning. However, these corrections are more prerequisites for learning rather than the learning itself. Based on existing literature, only two studies examine the impact of video feedback on learning (Ali, 2016; Xie, Che, & Huang, 2022), both indicating that video feedback positively affects general writing skills. This study, therefore, aims to address a significant gap by investigating how video feedback influences knowledge acquisition and retention, specifically examining its long-term effects. By doing so, it is hoped this research will contribute to the limited literature in this area and provide insights into whether the benefits students gain through video feedback are sustained over time, advancing our understanding of its educational impact.

1.1. Purpose of the Study

The purpose of this study is to investigate the impact of video feedback on student learning and knowledge retention in an online Information Security and Ethics course. In line with this purpose, the following research question was explored:

- How does video feedback influence students' knowledge acquisition and retention?

2. Method

This study, which examines the impact of video feedback on knowledge acquisition and retention, utilized a true experimental design, specifically a post-test control group design, as described by Fraenkel and Wallen (2009). A schematic overview of this design is displayed in Table 1.

Table 1. Schematic Overview of the Research

Groups	R	X	O
Experimental	Random assignment	Experimental treatment: Video feedback	Post-test: Academic achievement test *(Ten weeks after the treatment)*
Control	Random assignment	Text feedback	Post-test: Academic achievement test *(Ten weeks after the treatment)*

2.1. Study Group

The study group comprises 43 undergraduate students enrolled in an Information Ethics and Security course at a state university. These students were randomly assigned to either the experimental group (23 students) or the control group (20 students). Due to this random assignment, it is assumed that the groups are equivalent in terms of academic achievement. This assumption is supported by the students' GPA data, which indicate no significant difference between the experimental and control groups (t=-.778; p>.05), suggesting that both groups are at comparable levels of academic performance.

2.2. Data Collection Tool

An academic achievement test was developed to measure the level of knowledge students gained on the assignment topics throughout the processes of assignment preparation, feedback reception, and revision. This test was designed based on content covering the three main assignment topics for which feedback was provided. Specifically, the first question addresses the concept of ethics and ethical theories, the second question examines privacy issues in the information age, and the third question focuses on accessibility issues in the information age. Table 2 provides further details on assignment topics and corresponding test questions. As illustrated in the table, while the test questions are not identical to the assignment topics, they are formulated in a closely similar manner to assess comparable knowledge.

The post-test comprises three open-ended questions. Both the test and the accompanying scoring rubric were developed with the guidance of two subject matter experts. The rubric follows a 4-point scale (0, 1, 2, 3), with distinct criteria specified for each open-ended question to ensure consistent assessment. Consequently, the lowest achievable score on the test is 0, while the highest is 3.

Table 2. Assignment Topics and Corresponding Open-Ended Questions in the Achievement Test

Assignment Topics	Achievement Test Questions
Define Utilitarian and Kantian ethical perspectives. Compare and contrast the features you find strong and those you criticize in both ethical approaches. Explain which approach you would adopt to resolve ethical issues, along with the reasons for your choice.	A company is facing financial difficulties. The management board has been presented with two proposed solutions to address these problems, and they must choose one. The first proposal suggests that all employees will retain their jobs, with no layoffs, but employee salaries will be reduced by 20% for six months. The second proposal ensures no salary cuts, but 5% of employees will be laid off. Define Utilitarian and Kantian ethical theories. In light of the above scenario, answer the following questions: 1- How would the proposed solutions be evaluated from a Utilitarian and Kantian perspective? 2- What aspects of the adopted ethical theory are considered in these evaluations? Discuss.
What issues does technology raise in relation to the privacy aspect of information ethics? What are the impacts of these issues on human life? What solutions can you propose for these problems?	Briefly explain the relationship between technological developments and privacy. Discuss the steps that can be taken to raise public awareness regarding privacy protection against technological threats.
What is the digital divide, and what are its causes? What measures can be taken to prevent the digital divide? By researching the FATİH project in education, discuss its relationship with the digital divide and its role in preventing it.	Define the concept of the digital divide. Explain its potential implications for education. Discuss possible solutions to address the issues caused by the digital divide in education.

2.3. Data Collection Process

In the first week of a six-week video feedback intervention within the Information Ethics and Security course, conducted fully online, students received an initial briefing on the video feedback process. Following this, students were randomly assigned to either the experimental or control group.

Throughout the intervention, students were tasked with completing open-ended assignments on the weekly topics and submitted their work via the course's learning management system (LMS). Students in the experimental group received video feedback on their assignments, while those in the control group received traditional text-based feedback. An example of the video

feedback is illustrated in Figure 1. In these videos, created using screencast software, the student's assignment is displayed in the center of the screen, instructor comments are shown on the right side, and the instructor's video appears in the lower-left corner, offering a more personalized approach. By contrast, text-based feedback was provided as annotations on the right side of the MS Word document, with instructor comments appearing solely in written form (see Figure 2).

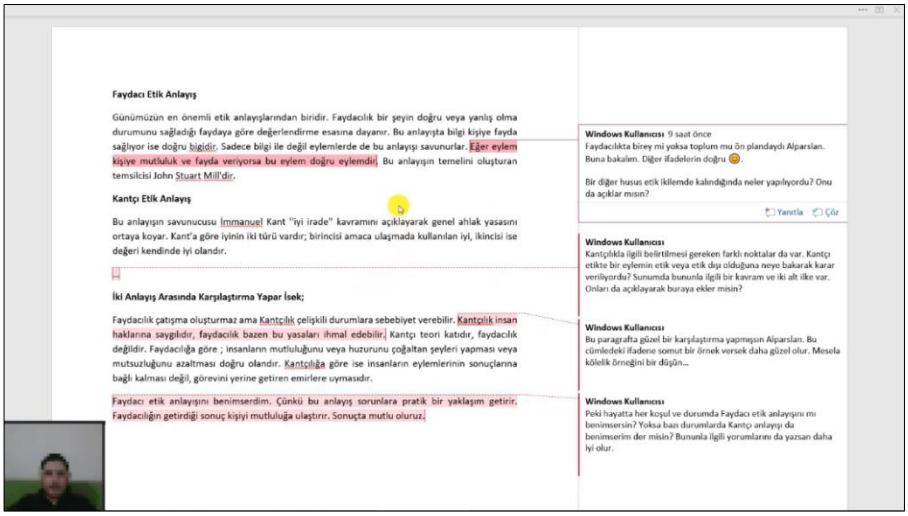

Figure 1. Example of a video feedback

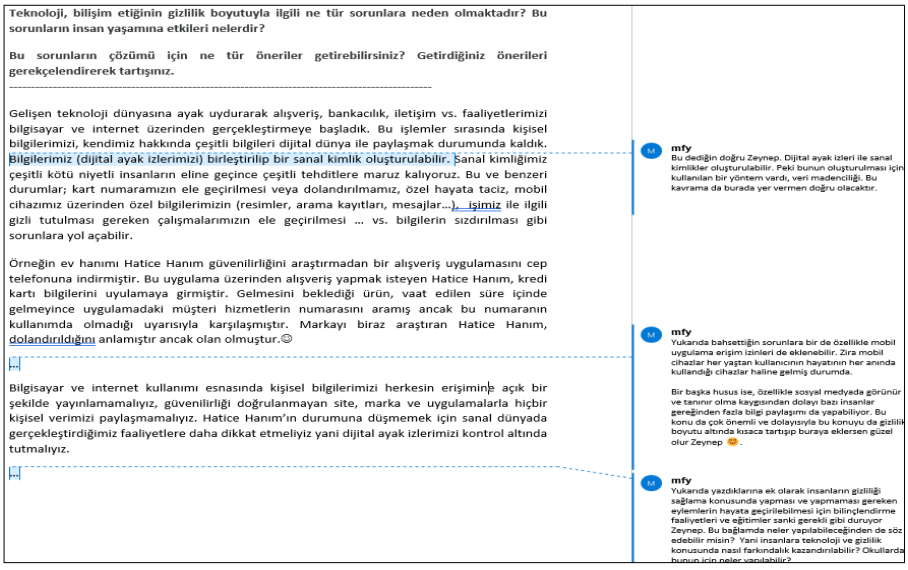

Figure 2. Example of a text feedback

After receiving feedback, students in both the experimental and control groups revised their assignments accordingly and submitted the updated versions back to the LMS. Ten weeks after completing the feedback intervention, which involved a total of three assignments, an online achievement test was administered. This post-intervention assessment aimed to evaluate the students' knowledge levels on the assignment topics and to measure knowledge retention, thereby concluding the data collection phase.

2.4. Data Analysis

In evaluating the achievement test, two subject matter experts scored the responses, and inter-rater reliability was calculated to ensure consistency in scoring. The results showed significant agreement between the raters (Cohen's κ=.624, p<.05) and a very strong correlation (r=.825, p<.05), demonstrating reliable scoring in line with established benchmarks (Evans, 1996; Landis & Koch, 1977). Following this, a normality test was conducted to identify the most suitable statistical methods for analyzing academic achievement. As the data were not normally distributed (p<.05), the Mann-Whitney U test was deemed appropriate for comparing the performance of the experimental and control groups (see Table 3).

Table 3. Normality Test Results for the Academic Achievement

Groups	N	$\bar{X}$	sd	Statistics	Shapiro-Wilk
Experimental	23	2.44	.37	.881	.011
Control	20	2.22	.45	.944	.284

3. Findings

In this study, the Mann-Whitney U test was used to compare the learning outcomes between the experimental group, which received video feedback, and the control group, which received text feedback, on the assignment topics. The findings related to this comparison are presented in Table 4.

Table 4. Mann-Whitney U Test Results for the Analysis of Academic Achievement

Groups	N	$\bar{X}$	sd	Mean Rank	U	p
Experimental	23	2.44	.37	25.07	159.50	.086
Control	20	2.22	.45	18.48		

Upon examining the analysis results for the academic achievement test, it is observed that the experimental group shows a higher mean score. However, the difference between the groups is not statistically significant (U=159.50; p>.05).

4. Discussion and Conclusion

The findings of this study contrast with two similar studies in the literature (Ali, 2016; Xie, Che, & Huang, 2022), as the video feedback intervention did not significantly influence students' learning of the assignment topics and the retention of related knowledge. In this context, while students who received feedback in video format demonstrated better retention of what they learned from their three assignments on information ethics and exhibited higher knowledge levels on these topics compared to those who received text-based feedback ten weeks after the treatment, this difference was not statistically significant.

The discrepancy between the findings of previous studies and this research, along with the absence of a significant effect of video feedback observed in this study, can be attributed to several factors. First, the study was conducted in a required course, which students were expected to complete successfully. The fact that students may not have had intrinsic motivation to engage deeply with the content could have influenced their learning outcomes (Lia, Ma, & Chen, 2024). Additionally, the online administration of the achievement test may have led students to seek assistance from course materials or peers during the exam. Thus, the lack of adequate monitoring and security in an online exam, compared to face-to-face settings, may have hindered the accurate reflection of students' true knowledge levels (Holden, Norris, & Kuhlmeier, 2021).

Although the results of this study did not show a clear, statistically significant difference between video feedback and text-based feedback in terms of learning and retention, the higher average score of the experimental group—approaching the significance threshold of 0.05—suggests that video feedback may still have potential in this regard. The multimodal nature of video feedback, which integrates both auditory and visual elements, likely played a key role in enhancing the feedback process. By appealing to multiple senses, video feedback may have provided a more effective learning experience, supporting better retention and recall. This is consistent with findings from numerous studies, which indicate that technologies engaging both visual and auditory channels promote better learning, increase retention, and facilitate easier recall (Chang, Tseng, & Tseng, 2011; Dale, 1969; Gasigijtamrong, 2013; Kozma, 1991; Kumar & Hema, 2017). This also aligns with Mayer’s (2009) multimedia principle, one of the principles of his multimedia design theory. Furthermore, some studies have shown that students perceive video feedback as promoting more lasting learning (Cunningham, 2019; Yiğit & Seferoğlu, 2021).

In addition, existing research indicates that video format is more effective in supporting the use of feedback compared to text format (Cavaleri *et al*., 2014;

Cavaleri *et al*., 2019; Grigoryan, 2017; Özkul & Ortaçtepe, 2017; Yiğit & Seferoğlu, 2023). Studies also report that students tend to spend more time engaging with video feedback, finding the process both enjoyable and motivating (Mahoney, 2019; West & Turner, 2016). These findings together highlight that overall engagement with video feedback is higher. Therefore, this higher level of engagement could be a key factor that, while not reaching statistical significance, may still contribute to better learning and retention of the information. In line with this, numerous studies have demonstrated a significant relationship between student engagement and learning outcomes (Gupta & Pandey, 2018; Ko *et al*., 2016; Lee, 2014; Wang, 2017).

5. Limitations and Future Directions

The findings of this study should be viewed in the light of certain limitations. First, the study was conducted in the context of a required course, which may have induced grade-related anxiety among students, potentially affecting their engagement with the feedback and their learning outcomes. To address this, future studies could be conducted in environments where such factors, like external pressures or mandatory course requirements, are minimized. Additionally, the online assessment process in this study was only partially controlled, which may have influenced the results. Given this, future research on the role of video feedback in online contexts should take caution and implement preventive measures to mitigate any potential issues, such as the lack of supervision or external assistance during assessments.

Furthermore, the test used to measure learning and retention in this study primarily assessed the recall of information learned during the assignment preparation and revision process. As such, the study was limited to evaluating only lower-level cognitive skills, as outlined in Bloom's cognitive taxonomy (Bloom *et al*., 1956). However, the ability to transfer learned knowledge is arguably as important, if not more so, than merely recalling information. Consequently, future research should focus on higher-level cognitive skills, particularly examining how well knowledge and skills acquired through the video feedback process can be transferred to new and diverse learning contexts. This shift toward evaluating the transfer of learning would provide a more comprehensive understanding of the long-term impact of video feedback on students' academic development.

In this study, the video feedback provided by the instructor was delivered as a one-way transmission of information to the student. While effective in some contexts, this traditional approach inherently limits interaction between the feedback provider and the receiver, creating several challenges in providing effective feedback (Carless *et al.*, 2011). For this reason, as Wood (2023)

suggests, transitioning to a new paradigm of dialogic video feedback could address this limitation by positioning the student as an active agent in the feedback process. Therefore, future research could investigate the long-term effects of such dialogic video feedback on learning and retention. Additionally, the potential of dialogic peer video feedback, explored by Wood (2024) in a previous study, also warrants exploration to understand its role in promoting collaborative learning and sustained knowledge acquisition. Furthermore, building on recent advancements, the role of synchronous video feedback, as discussed by Saeed and Abdullah Alharbi (2024), could be examined to determine its impact on long-term learning outcomes.

In summary, early research on video feedback has primarily concentrated on exploring students' perceptions and opinions, followed by studies examining its effects on feedback use. However, assessing not only the short-term effects of video feedback on individual learning tasks but also its long-term impact is a critical and valuable area of investigation. Currently, there are only two studies in the literature addressing this issue, and this study makes it three. To address this significant gap, future research on video feedback should prioritize the exploration of its effects on learning and retention, particularly over extended periods. This would provide deeper insights into the lasting benefits of video feedback.

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Chapter 9

Technostress in Education: Understanding Key Factors, Consequences, and Mitigation Strategies

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Abstract

One of the significant challenges arising from the pervasive use of technology in contemporary society is technostress. Defined as the psychological stress and discomfort resulting from an individual's interaction with technology, technostress has emerged as a critical issue across various domains, including education. Accordingly, this book chapter first provides a general discussion of the concept of technostress, followed by an in-depth examination of its manifestation in the context of education. Within this framework, the chapter systematically examines the key factors contributing to technostress in education, the adverse consequences it entails, and, finally, the strategies for mitigating its impact. By offering a comprehensive exploration of technostress specific to the education, the study aims to raise awareness about technostress in this field and offer practical guidance for managing this issue, ultimately helping both educators and students navigate the challenges associated with technology use in educational contexts.

Keywords: technostress, technology, education, key factors, consequences, mitigation strategies, educators, students.

1. Introduction

Over the years, human behavior has undergone significant changes in areas such as work, communication, learning, and everyday activities. This transformation is largely attributed to technology, which has become deeply embedded in modern life. In today's technology-driven world, digital tools and systems have become so pervasive and seamlessly integrated into daily routines that individuals now find it nearly impossible to accomplish most tasks without them (Chiapetta, 2017). The increasing presence of technology is evident in current data, which shows a rapid upward trend in its usage (STATISTA, 2024).

So why has technology become an indispensable tool in human life, to the point where life without it seems unimaginable? The deep integration of technology into human life can be linked to the myriad of benefits it offers in meeting needs and solving tasks across various domains—from education and business to healthcare and communication—by significantly saving time and energy while enhancing efficiency and productivity. Due to the countless advantages it provides, modern individuals perceive technology as a means to simplify life, prompting them to incorporate it into nearly every aspect of their lives, a trend that continues to grow.

While technology provides numerous benefits and conveniences, it also introduces a range of challenges. In other words, often referred to as a double-edged sword, technology presents both significant advantages and a darker, more problematic side (Qi, 2019; Tarafdar *et al.*, 2007; Verkijika, 2019). In this context, although the technical features of digital tools may initially seem advantageous—allowing tasks to be completed more effectively, efficiently, and easily—they can also lead to unintended drawbacks (Wang, Shu, & Tu, 2008). For instance, the enhanced capabilities of technology often raise expectations for users, pushing them to take on greater responsibilities, work harder, and deliver results more rapidly (Erdoğan & Akbaba, 2022). As a result, the increased functionality and accessibility of technology can foster the perception that individuals must perform at higher levels. On the other hand, individuals find themselves burdened with significant challenges, such as the need to use technology most effectively, adapt swiftly to changing and evolving digital systems, engage in continuous learning, and consistently improve their technical skills (Shu, Tu, & Wang, 2011). These pressures can contribute to adverse effects such as anxiety, burnout, and stress (Pagán-Garbín, Méndez, & Martínez-Ramón, 2024; Tarafdar *et al.*, 2007). Collectively, the challenges stemming from the responsibilities and expectations tied to technology use are recognized in the literature as "technostress" (Verkijika, 2019).

This book chapter offers an in-depth exploration of technostress, a significant and increasingly relevant issue in in today's context. It begins by presenting various definitions and perspectives on technostress to provide a foundational understanding of the concept. The focus then shifts to its critical role within the educational context, which serves as the chapter's primary emphasis. In this discussion, the chapter highlights why technostress deserves special attention in education, examining the key factors contributing to its emergence, its adverse effects on educators and students, and the mitigation strategies that can be employed to address it. By systematically analyzing these aspects, the chapter aims to shed light on the complexities of technostress in education and offer practical insights for its effective management.

2. What is Technostress?

Stress can arise in daily life for a variety of reasons, and its origins are often explained through the Person-Environment (P-E) Fit Theory. This theory suggests that stress occurs when there is a misalignment between the demands of the environment and an individual's capacity to meet those demands (Edwards & Cooper, 1990). In this view, stress is a psychological reaction triggered when individuals perceive that they lack the resources or abilities to cope with their circumstances (Tarafdar *et al.*, 2007). Therefore, this explanation highlights that stress is not solely the product of the individual or the environment; rather, it emerges from the degree of fit—or mismatch—between the two (Edwards, Caplan, & Harrison, 1998).

The digital age, characterized by rapid and continuous technological advancements, has brought about a new form of stress known as technostress. This concept was first introduced in 1984 by American clinical psychologist Craig Brod, who described it as a modern adaptation disorder arising from individuals' struggles to cope effectively with emerging computer technologies (Brod, 1984). In subsequent years, different researchers have defined technostress as a state of arousal observed in employees who are excessively dependent on computers in the workplace (Arnetz & Wiholm, 1997), or as any negative impact that technology has, either directly or indirectly, on an individual's attitudes, thoughts, behaviors, or physical well-being (Weil & Rosen, 1997).

Based on the definitions above, technostress can be succinctly described as the psychological stress and discomfort resulting from an individual's interaction with technology. The rapid pace of technological advancements has created a constant expectation for individuals to adapt to new innovations, learn complex systems, and keep up with frequent updates (Ragu-Nathan *et al.*, 2008; Wang, Shu, & Tu, 2008). Furthermore, in the hyper-connected world enabled by the

internet, the relentless stream of emails, notifications, and digital content has blurred the line between personal and professional life. Consequently, there is a pervasive expectation to remain online and connected at all times, creating an overwhelming flow of information that individuals must navigate—an additional challenge in modern life (Chiapetta, 2017; Ragu-Nathan *et al.*, 2008). These technology-related issues generate significant stress, pressure, tension, and fear among individuals. Many individuals also experience job insecurity, fearing they might fall behind colleagues or fail to meet the demands of technological competence, potentially jeopardizing their careers (Tarafdar *et al.*, 2007). Such challenges illustrate the darker side of technology, which can lead to anxiety and a host of negative psychological effects (Lee *et al.*, 2014). As a result, technostress has become a critical and widely discussed issue, attracting interest from researchers across disciplines such as psychology, information technology, business, and education (Wang & Yu, 2024).

3. Components of Technostress

Tarafdar *et al.* (2007) proposed a framework that outlines the components of technostress, identifying five main components: "techno-overload," "techno-invasion," "techno-complexity," "techno-insecurity," and "techno-uncertainty" (Figure 1). In this context, technology induces stress in users through these five pathways. Here's a breakdown of each component (Tarafdar *et al.* 2007):

Techno-overload refers to situations where information and communication technologies (ICT) push users to work faster and for extended periods. This continuous flow of excessive information and the constant expectation for rapid responses, can overwhelm users. Over time, these pressures contribute to feelings of burnout, heightened stress, and a diminished ability to manage tasks effectively.

Techno-invasion refers to the intrusive impact of information and communication technologies (ICT), where users feel compelled to be accessible at any time and maintain constant connectivity. Tools like email, messaging apps, and mobile phones blur the boundaries between personal and professional life, fostering an expectation of uninterrupted availability. This persistent connectivity often merges home and work responsibilities, leading to stress as individuals struggle to establish and maintain clear separations between the two spheres of their lives.

Techno-complexity arises when the intricate nature of ICT makes users feel that their skills are insufficient to effectively utilize these tools. As ICT systems grow more advanced, mastering them demands greater technical expertise, compelling individuals to invest significant time and effort in acquiring the

necessary knowledge. For those who struggle with these demands, feelings of inadequacy may emerge, intensifying the pressure to keep up. This cycle of learning and adaptation can amplify stress, particularly as the complexity of technology continues to evolve.

Techno-insecurity refers to the stress experienced by individuals who perceive a threat to their job security due to advancements in ICT. This fear stems from two main sources: the possibility of ICT tools automating their tasks and the presence of colleagues or competitors who are more proficient in using these technologies. The resulting sense of vulnerability can leave employees feeling insecure in their roles, as they worry about being replaced or rendered obsolete in a rapidly evolving technological landscape. This fear adds to the overall stress experienced in the workplace.

Techno-uncertainty describes the stress arising from the constant evolution and upgrading of ICT, which require users to continuously learn and adapt. Even when individuals possess the skills to use current tools effectively, the rapid pace of technological advancements renders those skills insufficient over time. This perpetual need to acquire new competencies with every update or innovation creates a sense of unpredictability and unease, as users face ongoing uncertainty about their ability to keep pace with ever-changing demands.

As highlighted, technology can induce stress in various ways, and this issue is particularly prevalent in fields like business, healthcare, and information systems (IS), which are frequently discussed in the literature on technostress (Khlaif, Sanmugam, & Ayyoub, 2023). However, with the rapid and widespread integration of technology in education, both students and educators are increasingly facing the negative consequences of technostress. In light of this, the following sections of this book will focus on technostress within the educational context, exploring the key factors that contribute to its emergence, its adverse effects on both students and educators, and potential strategies for mitigating its impact in educational settings.

4. Technostress in Educational Context

While technostress has been extensively studied in fields such as business, information systems (IS), and healthcare, its impact within the educational sector has often been overlooked (Qi, 2019). However, education, like many other fields, has been significantly affected by digitalization. In this context, educational environments have rapidly transformed, incorporating technological learning tools, digital course content, digital assessment methods, and online or hybrid learning models—trends that were particularly accelerated by the COVID-19 pandemic. Additionally, the presence of Generation Z students, who have

grown up in a digital environment, has made the use of technology-driven teaching methods essential to meet their needs (Arslan & Yiğit, 2024). As a result, there has been a shift in the competencies expected of both students and educators, with technological skills becoming increasingly vital (Joo, Lim, & Kim, 2016). Shortly, given the extensive use of technology in education, it is crucial to understand and address the issue of technostress, as both educators and students face exposure to these technologies (Li & Wang, 2021).

As technology becomes increasingly integrated into critical aspects of education—such as lesson delivery by instructors, student engagement with course material, communication between students and educators, and assessment methods—it also brings about the potential for technostress for both students and educators (Dong *et al.*, 2020; Li *et al.*, 2024). In educational settings, technostress often manifests as pressure and stress experienced by both groups as they struggle to keep pace with rapidly evolving ICT tools, platforms, and systems. This constant need to learn and adapt to new technologies can be overwhelming (Califf & Brooks, 2020; Qi, 2019). To explore how technostress specifically manifests in education, the following section will examine the key factors that contribute to its emergence in this field.

5. Key Factors Driving Technostress in Education

As in other fields, self-efficacy plays a crucial role in understanding the root causes of technostress in education. According to Bandura's (1986) Social Cognitive Theory, self-efficacy is defined as an individual's belief in their ability to successfully perform a specific task. This belief significantly impacts their emotional responses, thoughts, and behaviors during task execution. If a person has low self-efficacy, they are more likely to experience stress and anxiety while performing the task. When applied to the technological context, this concept gives rise to "computer self-efficacy," which refers to an individual's belief in their ability to use computers proficiently (Compeau & Higgins, 1995). Just as low general self-efficacy can lead to negative emotions such as stress, a low belief in one's computer skills can make tasks involving technology feel overwhelming and anxiety-inducing, contributing to technostress.

Building on the discussion above, one of the primary underlying causes of technostress among both students and educators in education is low computer self-efficacy. Studies support this view, showing a strong correlation between low computer self-efficacy and the experience of technostress (Al-Fudail & Mellar, 2008; Chou & Chou, 2021; Khlaif *et al.*, 2023). As outlined in the ISTE standards, 21st-century educators and students are expected to possess certain competencies in technology use for educational purposes (ISTE, 2024a, 2024b). Educators are

required to learn to use digital tools, integrate them into lessons, stay updated on new tools, manage online learning processes, and troubleshoot technical issues. For students, particularly in online and hybrid learning environments, there is an expectation to engage with technology and produce digital materials as part of their learning tasks. In both instances, beliefs in computer self-efficacy and digital competence are crucial (Li & Yu, 2024). When educators or students perceive their technical skills as insufficient to meet these expectations, feelings of inadequacy and failure arise, leading to technostress. Conversely, when educators and students have high computer self-efficacy, the likelihood of experiencing technostress decreases, as the fear of being unable to complete technological tasks is alleviated (Qi, 2019; Wang *et al.*, 2021).

Another key reason for the emergence of technostress in education is the rapid pace of technological change and the associated challenges of adapting to these shifts. Educators and students are already dedicating time and effort to learning and utilizing existing educational technologies. When new technologies are introduced, they are expected to quickly adapt, which demands additional time and resources (Li & Wang, 2021; Wang & Zhao, 2023). This constant pressure to keep up with new tools and systems becomes a significant stressor, as both educators and students are frequently faced with the need to learn and master new technologies, adding to their workload and stress levels (Joo, Lim, & Kim, 2016; Li *et al.*, 2024).

The usability and complexity of educational technologies also play a crucial role in the emergence of technostress (Ayyagari, Grover, & Purvis, 2011). Technologies that are difficult to use or have usability issues tend to increase technostress among users (Al-Fudail & Mellar, 2008). This is because when technologies are not user-friendly or are overly complex, learning how to navigate and use them becomes a more time-consuming and effort-intensive process. As a result, educators and students must invest significant time and energy into understanding these tools, which can be particularly stressful for those with limited technical skills (Khlaif *et al.*, 2023). This difficulty in using technology amplifies feelings of frustration and inadequacy, further contributing to the experience of technostress.

To effectively cope with technostress, both educators and students need to enhance their technical skills and receive adequate support from their educational institutions (Khlaif *et al.*, 2023). In this regard, when schools fail to provide necessary support—such as access to technology experts, training programs, or workshops designed to develop technical knowledge and skills—technostress tends to increase (Joo, Lim, & Kim, 2016). Furthermore, a lack of adequate

technological infrastructure within the school environment can exacerbate the issue.

An analysis of the literature highlights that the characteristics of mobile technologies, particularly their ability to eliminate spatial limitations, contribute significantly to technostress in education (Chiapetta, 2017). Specifically, the constant 24/7 accessibility provided by mobile technologies creates an expectation that educators should be available even outside of school hours, blurring the boundaries between their professional and personal lives (Qi, 2019). This "always-on" culture, where teachers are continuously exposed to emails, messages, and other forms of communication, leads to an overwhelming influx of information and requests, thereby intensifying stress levels (Chiapetta, 2017; Khlaif *et al.*, 2023).

6. The Consequences of Technostress in Education

The significance of technostress lies in the extensive negative effects it can have on individuals, which extend beyond specific professional or educational contexts. As both educators and students are individuals first, it is important to recognize the broader consequences of technostress before addressing its specific implications in education. Research highlights a wide range of adverse outcomes associated with technostress, including fatigue, anxiety, dissatisfaction, fear, hostility, frustration, irritation, annoyance, headaches, tiredness, poor sleep quality, depression, anger, and poor mental health (Al-Fudail & Mellar, 2008; Dragano & Lunau, 2020; Li & Yu, 2024; Shu, Tu, & Wang, 2011; Tarafdar *et al.*, 2007; Yao & Wang, 2023; Zhao *et al.*, 2022). These negative impacts can affect anyone who interacts with technology.

In addition to the general negative outcomes of technostress, its impact within the educational field reveals specific consequences that significantly affect both educators and students. One prominent effect is the reduction in their intention to use, acceptance of, and perceived usefulness of ICT (Chou & Chou, 2021). Research consistently demonstrates that educators experiencing technostress are less likely to integrate technological tools into their teaching, exhibit lower acceptance of these tools, and perceive them as less useful (Joo, Lim, & Kim, 2016; Khlaif, Sanmugam, & Ayyoub, 2023; Li & Yu, 2024; Marrinhas *et al.*, 2023; Niu *et al.*, 2022; Verkijika, 2019; Steelman & Soror, 2017; Wang & Yu, 2024). This trend is largely driven by the perception of technology as a source of stress, difficulty, and anxiety. Educators and students may associate the use of ICT with heightened exposure to these negative emotions, leading them to minimize their reliance on technology as a coping mechanism.

Another critical consequence of technostress in the educational context is reduced academic performance and productivity. Research has shown that both educators and students experience a decline in these areas due to the pressures of technostress (Amin *et al.*, 2024; Li & Yu, 2024; Niu *et al.*, 2022; Qi, 2019; Upadhyaya & Vrinda, 2021; Wang, Tan, & Li, 2020). Furthermore, technostress has been linked to a reduction in the overall quality of online education (Saleem, Chikhaoui, & Malik, 2024). The negative impact of technostress on academic outcomes can be attributed to its influence on cognitive and emotional states. Stress and anxiety associated with technostress deplete cognitive resources, making it harder for individuals to focus and process information effectively. For teachers, this can result in difficulties in preparing and delivering lessons effectively, while for students, it can hinder their ability to comprehend material, engage in learning activities, and maintain motivation. Collectively, these challenges contribute to diminished academic performance and productivity.

Among educators, technostress is a significant factor contributing to professional challenges such as burnout, low job satisfaction, and diminished organizational commitment. Numerous studies have emphasized how technostress creates barriers to the sustainable and effective continuation of the teaching profession (Cahapay & Bangoc, 2021; Califf & Brooks, 2020; Jena, 2015; Ragu-Nathan *et al.*, 2008; Wang *et al.*, 2021). In some cases, the negative experiences associated with technostress can escalate to the point where educators consider leaving the profession (Siddiqui, Arif, & Hinduja, 2023). The reasons for this are often linked to the excessive demands placed on educators, such as continuously learning and integrating new technologies into their teaching practices, coupled with inadequate institutional support. Over time, the accumulation of these negative experiences can push educators to contemplate more drastic scenarios, such as quitting the teaching profession (Maier *et al.*, 2019).

7. Mitigation Strategies for Technostress in Education

As noted earlier, the risk of technostress across various fields, including education, is strongly linked to an individual's technological self-efficacy and digital competence (Peng & Yu, 2022; Shu, Tu, & Wang, 2011). Negative emotions such as stress and anxiety often arise from fears of inadequacy in managing technology-related tasks. When individuals doubt their technical skills, they may perceive the process as daunting and stress-inducing. Conversely, confidence in one’s technological abilities transforms these interactions into less stressful and potentially enjoyable experiences. Therefore, one of the most effective strategies to prevent and mitigate technostress in education is for both

educators and students to enhance their computer skills and overall technology literacy. This proactive approach empowers individuals to feel more competent and confident in their ability to navigate technology, reducing feelings of inadequacy and fear of failure. Research supports this perspective, showing a negative correlation between computer self-efficacy and technostress (Dong *et al.*, 2020; Siddiqui & Hinduja, 2023). Educators and students with higher levels of self-efficacy in using technology are better equipped to adapt to technological changes and challenges with ease. This adaptability not only increases their confidence but also minimizes the likelihood of experiencing technostress (Shu, Tu, & Wang, 2011).

A notable source of technostress for educators is the difficulty in effectively integrating technology into their teaching practices. Beyond basic technical proficiency, educators must also integrate their technological knowledge with content knowledge and pedagogical strategies—a process conceptualized in the Technological Pedagogical Content Knowledge (TPACK) model developed by Koehler and Mishra (2005). The TPACK model emphasizes that successful technology integration depends on the interplay between three core domains: technological knowledge, content knowledge, and pedagogical knowledge. This framework suggests that educators need to determine not only how to use technology but also which technologies and teaching strategies are most suitable for delivering specific content effectively. When educators lack the ability to integrate these domains seamlessly, it can result in frustration and stress (Erdoğan & Akbaba, 2022). Thus, even educators with high technical skills may experience technostress if they struggle to align their technology use with appropriate content and pedagogical methods. Given this dynamic, educators' TPACK levels become a critical factor in mitigating technostress (Özgür, 2020). It is highlighted that improving teachers' TPACK levels reduces their likelihood of experiencing technology-related stress (Dong *et al.*, 2020; Hunutlu & Küçük, 2022).

To effectively reduce the impact of technostress in education, both educators and students must enhance their technological self-efficacy and strengthen their TPACK skills. However, this is not solely an individual responsibility. While personal growth in these areas is crucial, it is equally important for schools to provide institutional support. Educators and students may be motivated to improve their technological skills, but without adequate support, they may struggle to succeed on their own. At this point, institutional help and support are necessary to bridge the gap (Zhao *et al.*, 2022). Therefore, preventing technostress in education requires not only individual effort but also a collective approach. In this regard, schools must ensure that they offer the necessary resources, infrastructure, and support systems, such as training sessions,

workshops, and other professional development opportunities, to help educators and students improve their digital competence and TPACK levels (Ahmed Abdel-Al Ibrahim & Hashemifardnia, 2024; Dong *et al.*, 2020; Lin & Yu, 2024; Özgür, 2020; Pagán-Garbín, Méndez, & Martínez-Ramón, 2024). The significance of school support in alleviating technostress has been emphasized across various studies (Joo, Lim, & Kim, 2016; Khlaif, Sanmugam, & Ayyoub, 2023; Rafsanjani *et al.*, 2023; Wang & Zhao, 2023; Zhao *et al.*, 2022). Moreover, educational institutions can further contribute by fostering professional collaboration among teachers, encouraging the formation of learning groups, which can be an effective social strategy to reduce technostress (Dong *et al.*, 2020; Zheng *et al.*, 2024).

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