EXPLORING PRIVATE SCHOOL TEACHERS' DIGITAL COMPETENCIES: DESIGN AND IMPLEMENTATION OF A TARGETED PROFESSIONAL DEVELOPMENT PROGRAM

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DECLARATION ON ORIGINALITY

I, Nur Banu Çetinkaya, certify that

- I am the sole author of this thesis, and I have fully acknowledged and documented in my thesis all sources of ideas and words, including digital resources, which have been produced or published by another person or institution.
- This thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution.
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ABSTRACT

Exploring Private School Teachers' Digital Competencies: Design and Implementation of a Targeted Professional Development Program

This study aimed to investigate the various facets of teachers' digital competencies by identifying areas for improvement and examining the effectiveness of a professional development program, which is designed based on the DigCompEdu framework by Redecker and Punie (2017). A mixed methods research design was employed where the quantitative data were collected from 91 volunteers using an adapted version of the Digital Competence Self-Assessment Scale for Educators (DCSE) by Toker (2021). This scale was used both before (pre-DCSE) and after (post-DCSE) the professional development program. The participants in the study were private school teachers from five different private schools. The results of the pre-DCSE were also used to determine the content of the program. After the professional development program ended, post-DCSE of 15 participants and post-interviews of eight participants who completed the program were analyzed. Pretest-post-test analysis of DCSE revealed no significant difference in participants' digital competency levels; however, qualitative results indicated some positive outcomes after participating in the professional development program, such as a change in perspective, discovering new tools, increasing awareness, curiosity, and confidence about using digital tools. Most teachers in the program declared that they planned to integrate technology into their profession.

ÖZET

Özel Okul Öğretmenlerinin Dijital Yeterliklerinin İncelenmesi: Hedefe Yönelik Bir Mesleki Gelişim Programının Tasarımı ve Uygulanması

Bu çalışma, Redecker ve Punie (2017) tarafından ortaya konulan DigCompEdu çerçevesi temel alınarak tasarlanan mesleki gelişim programının etkliliğini inceleyerek iyileştirilecek alanları belirlemeyi ve öğretmenlerin dijital yeterliliklerinin çeşitli yönlerini araştırmayı amaçlamaktadır. Toker (2021) tarafından Türkçe'ye uyarlanan Eğitimciler için Dijital Yeterlilik Öz Değerlendirme Ölçeği (EDYÖDÖ) kullanılarak, beş farklı özel okulda görev yapmakta olan 91 gönüllüden nicel verilerin toplandığı karma yöntemli bir araştırma tasarımı kullanılmıştır. Bu ölçek, geliştirilen mesleki gelişim programının öncesinde (ön-EDYÖDÖ) ve sonrasında (son-EDYÖDÖ) kullanılmıştır. Aynı zamanda ön-EDYÖDÖ sonuçları, program içeriğinin belirlenmesinde de kullanılmıştır. Ön-EDYÖDÖ sonuçları, çoğu öğretmenin Bütünleştirici ve Uzman seviyelerinde olduğunu ortaya koymuştur. Ancak, ön görüşmeyi kabul eden 10 özel okul öğretmeninin dijital yeterlilik düzeyleri görüşmelerde farklılık göstermiştir. Mesleki gelişim programı sonrası, 15 katılımcının ön test-son test analizleri, dijital yeterlik düzeylerinde anlamlı bir farklılık olmadığını ortaya koymuştur. Ancak nitel veriler, mesleki gelişim programına katılımları sonrasında, katılımcıların bakış açısında değişim, yeni dijital araçların keşfi, farkındalık, merak ve özgüvende artış gibi bazı olumlu sonuçları olduğunu göstermiştir. Program sürecinde çoğu öğretmen, teknolojiyi mesleğine entegre etmeye yönelik planlar yaptığını belirtmiştir. Bununla birlikte, oturum zamanlamasının uygun olmaması, çevrim içi sunum biçiminden ve sınırlı uygulama fırsatlarından doğan bazı zorluklar da yaşanmıştır

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CHAPTER 1

INTRODUCTION

1.1 Significance of the study

Technology has invaded almost every aspect of people's lives in the contemporary world. Digital technologies have become an integral part of people's lives, from communication to accessing information. Especially during the COVID-19 pandemic, the integration of digital technologies into education has reshaped the learning environment (UNESCO, 2023). This invasion manifested itself inevitably in educational processes, emphasizing the significance of digital competencies for educators.

Educators' digital competence is significant since it is related to the educational practices used in the classroom. Enhancing teachers' digital competencies improves the overall quality of education. When educators are digitally competent, they can create student-centered learning environments, which leads to improved student outcomes (Valverde-Berrocoso et al., 2022). On the other hand, the lack of digital competence is also an obstacle to creating student-centered learning environments (Fernandez-Batanero, 2020).

The experience of emergency remote teaching during the COVID-19 pandemic further emphasized the importance of digital competencies for teachers and the need for in-service training or professional development in this domain. Educators faced various challenges integrating traditional classroom practices into online platforms (König et al., 2020). With the advances in digital technologies and after the experience of emergency remote teaching, it is increasingly essential for educators to adapt and develop their digital competencies, which involves an

interplay between technology, pedagogy, and content knowledge (Koehler & Mishra, 2009).

Studies suggest mixed results on the comparison of private and public school teachers' professional development and digital competencies. Daga and colleagues (2023) found that there are notable differences between private school and public school teachers regarding their digital competencies; private school teachers have higher competencies (Daga et al., 2023). Koç and Fidan (2022) compared public and private school teachers in Turkey during the COVID-19 pandemic. Their results revealed that private school teachers tried more to learn the skills needed to adapt to the emergency remote teaching period. Özkeskin and Yıldız (2024) also pointed out the private schools' use of professional development as a "tool to increase profitability". This may demonstrate the pressure on private school teachers to be digitally competent, since working with professionally competent teachers is significantly important in private schools.

However, in the context of this study, where all participants were middle school and high school teachers from different branches of the same private institution, the researcher's insider perspective helped to reveal a gap in digital competencies. Despite the assumptions in the literature suggesting that private school teachers are more digitally competent, the teachers who participated in this study experienced difficulties integrating e-portfolios into their teaching practice. This contradiction points to a need for professional development in teachers' digital competencies in this specific context.

This study aims to explore the various facets of teachers' digital competencies, identify areas for improvement, and examine the effectiveness of a professional development program, which is designed based on the DigCompEdu

framework by Redecker and Punie (2017). Compared to other frameworks, DigCompEdu stands out with its progression model in terms of professional development. The progression model helps to navigate between digital competency levels (Redecker & Punie, 2017). Besides the teachers' professional development, the framework can also facilitate the growth of educational institutions as learning organizations as a flexible tool (Redecker & Caena, 2019). It has been widely used in professional development programs (Lucas et al., 2021; Haşlaman et al., 2023; Johnson et al., 2024).

The findings of this research are valuable to stakeholders and policymakers seeking to develop in-service teacher professional development programs in a way that helps prepare teachers to fill gaps where they lack digital competence. The professional development program designed for the participants of this study is expected to help bridge these gaps and enable teachers' professional growth.

1.2 Purpose of the study

The purpose of this mixed-method study is twofold: (1) to investigate the current level of digital competencies among teachers from a total of five different private middle and high schools to identify the areas for improvement, and (2) to design and evaluate a professional development program on the identified areas.

1.3 Research questions

The overarching question that guides this study is: "How does a targeted PD program enhance the private school teachers' digital competency levels?"

The study addresses these research questions:

1. What are the private school teachers' levels of digital competencies before engaging in the PD program?
    a. What are the specific areas in which private school teachers need to improve their digital competencies?
    b. How do private school teachers perceive their digital competency levels before engaging in the PD program?
2. To what extent does implementing a professional development program based on the DigCompEdu Framework enhance private school teachers' digital competencies?
    a. Is there a significant difference in the digital competence proficiency levels of private school teachers before and after participating in the professional development program?
    b. How do participants evaluate the effectiveness of the PD program on their digital competency improvement?

1.4 Organization of the sections

In Chapter 2, the literature review on digital competency and professional development is presented. Chapter 3 covers the methods and explains the research method, research design, participants, data collection, and data analysis procedures in this study. Findings of the study are presented in Chapter 4, where these results are further discussed in Chapter 5.

CHAPTER 2

LITERATURE REVIEW

The recent global COVID-19 pandemic and the following emergency remote teaching experience have significantly accelerated the integration of digital technologies into education, highlighting the importance of teachers' digital competencies.

In this chapter, the digital competency frameworks for educators, as well as the DigCompEdu Framework and teachers' digital competencies, were discussed in terms of the relevant literature. The chapter then argues the effectiveness of professional development programs for developing digital competence.

2.1 Digital competency frameworks

There are several frameworks to define and analyze educators' digital competency levels. The UNESCO-UNEVOC website (UNESCO-UNEVOC, 2023) provides a list of competency frameworks, including DigCompEdu, TPACK, UNESCO ICT Competency Framework for Teachers (ICT-CFT), and ISTE, which have a distinct structure and set of features. In this section, the TPACK, ISTE, and ICT-CFT frameworks were summarized. DigCompEdu Framework was discussed in more detail in the following section.

TPACK (Technological Pedagogical Content Knowledge) framework, developed by Mishra and Koehler (2006), provides a model for the knowledge teachers need to integrate technology effectively into the classroom. There are three core knowledge domains: technological, pedagogical, and content knowledge. It also defines the intersections between them as pedagogical content knowledge (PCK),

technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPACK) (Mishra & Koehler, 2017).

Research demonstrates that educators also design PD programs for teachers' digital competencies by using TPACK-based professional development programs focusing on teacher training. For instance, Sun and colleagues (2023) designed and implemented a PD program to promote AI teaching to in-service K-12 computer science teachers. Their PD program is structured by the TPACK framework. Another instance of TPACK-based PD programs, researchers used the framework for examining science teachers' technological pedagogical content knowledge through an online PD intervention (Canbazoğlu Bilici et al., 2024).

The ISTE Standards for Educators were published by the International Society for Technology in Education in 2017. This framework provides a guide for technology integration for learning. The standards given by the framework are competency-based indicators designed to guide educators in using technology effectively. The ISTE Standards for Educators include seven roles: Learner, Leader, Citizen, Collaborator, Designer, Facilitator, and Analyst (ISTE, 2017).

Even though using ISTE as a framework for professional development programs for digital competencies of teachers is limited, there are some studies that have used the framework as a guide for assessment (Gomez et al., 2021; Michaeli et al., 2020). For instance, a mixed-method study examining Israeli elementary school teachers' technology use in terms of educational dashboards and professional development, researchers used ISTE as a framework to assess the teachers' professional development in relation to their use of educational dashboards (Michaeli et al., 2020).

Unlike TPACK, ISTE standards are action-oriented and can also be used as both a self-assessment and development tool. Educators and schools often use them for strategic planning and professional learning (Foulger et al., 2017). However, while ISTE Standards are clear and practical, they lack a detailed progression model

The ICT-CFT Framework is another tool recognized for guiding pre- and in-service teacher training in technology integration into educational settings. According to the framework's third version, there are 18 competencies across six domains (UNESCO,2018). These domains are structured around six aspects: understanding ICT in education, curriculum and assessment, pedagogy, application of digital skills, organization and administration, and teacher professional learning (UNESCO, 2018). These six aspects are discussed around three levels: knowledge acquisition, knowledge deepening, and knowledge creation (UNESCO,2018).

In practice, the ICT-CFT framework can be used to support teacher professional development. For instance, the earlier version of the framework used in Guyana's national teacher professional development strategy (Butcher et al., 2013). Guyana's initiative was successful in terms of its integration of OER (Open Educational Resources) to provide educational materials for teachers (Butcher et al., 2013). The framework was also used in a personalized OER for teachers by Dhahri and Khribi from Tunisia (2021). Their system focused on teachers' personal preferences and competency levels, which aimed to provide them with appropriate materials to increase their competencies.

As for the DigCompEdu framework, developed by the European Commission (Redecker, 2017), it defines six competency areas and six proficiency levels, making it highly adaptable for PD program design. While TPACK focuses on knowledge domains and ISTE outlines educator roles, DigCompEdu provides specific

behavioral indicators for each competency, aligned with teacher development pathways (Caena & Redecker, 2019).

Additionally, DigCompEdu focuses more on the educational contexts than ISTE and is more operationalizable than TPACK (Kampylis et al., 2019). Its evidence-based development and explicit links to professional development make it an appropriate framework for designing PD programs (Panskyi et al., 2022; Ghomi & Redecker, 2019).

In summary, this section presented an overview of digital competency frameworks for educators. The frameworks mentioned provide valuable insights into teachers' digital competencies. However, this study adopts the DigCompEdu Framework over other frameworks for its detailed proficiency levels with detailed behavioral descriptors, with its progression model. In the next section, the DigCompEdu Framework will be discussed in detail in the context of this study.

2.2 DigCompEdu framework

DigCompEdu provides a comprehensive framework that aims to provide a common language for enhancing the digital competencies of educators (Redecker & Punie, 2017). In this context, the framework not only focuses on the competencies used in the classroom, but it also pays attention to general professional development (Redecker & Punie, 2017).

Redecker and Punie (2017) created DigCompEdu, the European Framework for the Digital Competence of Educators, in response to the growing realization that teachers need specialized digital abilities to use technology to enhance and innovate teaching. Fissore et al. (2020) also observed that educators' digital competence aligns with the DigCompEdu framework's guidelines. The framework's significance lies in

its ability to provide instructors and policymakers with a manual on improving digital competencies and successfully using digital technology in the classroom.

According to the framework, 22 digital skills for educators are arranged into six domains (Ghomi & Redecker, 2019). These six areas that the framework focuses on are, respectively: (1) professional engagement, (2) digital resources, (3) teaching and learning, (4) assessment, (5) empowering learners, and (6) facilitating learners' digital competence. The framework considers not only the professional and pedagogical competencies of educators but also the learners' competencies. The areas of digital competence for educators are addressed, namely, educators' professional competencies, educators' pedagogic competencies, and learners' competencies. The corresponding sub-areas for these titles are presented in Figure 1.

Educators' digital competence is demonstrated by their proficiency in utilizing digital technologies to improve teaching and communicate professionally with colleagues, students, parents, and other stakeholders. It encompasses their personal professional growth and contribution to ongoing innovation within the organization and the teaching profession. Therefore, the first area of DigCompEdu, which is professional engagement, focuses on organizational communication, professional collaboration, reflective practice, and continuous professional development (Redecker, 2017).

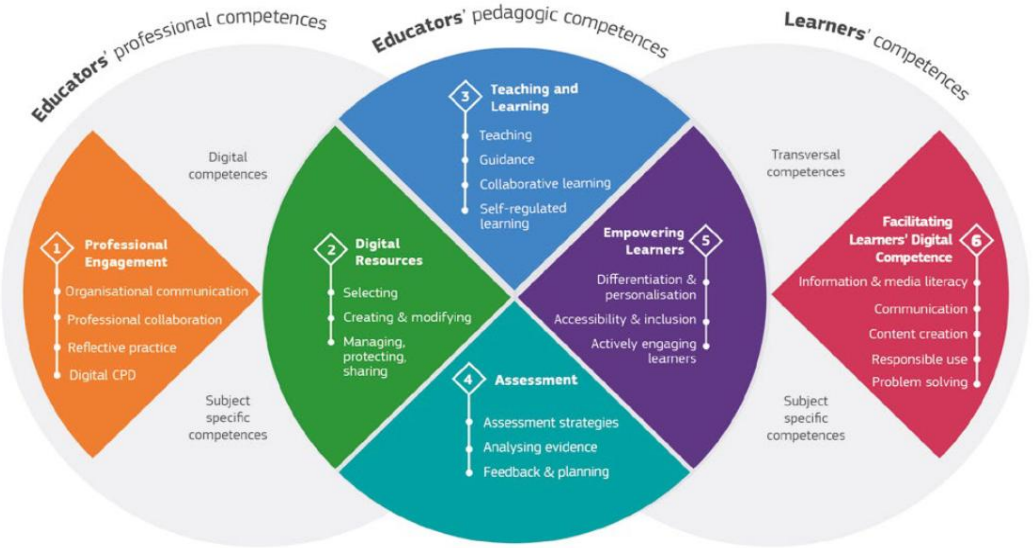

Figure 1. DigCompEdu framework (Redecker & Punie, 2017)

The second area refers to digital resources, which includes subareas of selecting digital resources, creating and modifying digital resources, and managing, protecting, and sharing digital resources. There is an abundance of digital resources available to teachers today. Accepting this diversity, effectively selecting resources that fit the learning goals, student profile, and teaching style, organizing materials, making connections, and creating and improving digital resources to bolster instruction are all crucial competencies for any educator to cultivate. Concurrently, they should know how to handle digital content carefully while using, altering, and sharing digital resources or protecting sensitive data (Redecker & Punie, 2017).

The third area, teaching and learning, deals with digital competence in the context of teaching, guidance, collaborative learning, and self-regulated learning. Digital technologies can be used in many ways to enhance and improve teaching and learning techniques. Nevertheless, regardless of the pedagogical method or approach used, the specific digital competency of the teacher is in the effective coordination of

the use of digital technologies in the various stages and contexts of the learning process (Redecker & Punie, 2017).

The fourth area, assessment in DigCompEdu, includes assessment strategies, analyzing evidence, and feedback and planning. When integrating digital technologies into education, using them to enhance and innovate assessment strategies is crucial. St-Onge et al. (2021) studied educators' adaptation of assessment practices in the COVID-19 pandemic. Their study highlighted the lack of preparedness in integrating technology into assessment processes. Integrating digital technologies into education involves using them not only to enhance and innovate assessment strategies but also to allow educators to adapt teaching methods and analyze extensive data on learner behaviors to improve decision-making and provide timely feedback (Redecker & Punie, 2017).

The fifth area, empowering learners, focuses on learner-centered pedagogic strategies. This area of digital competence includes accessibility and inclusion, differentiation and personalization, and actively engaging learners. By accessibility and inclusion, Redecker and Punie (2017) refer to equal access to learning materials and tasks and state the importance of considering the needs of all learners, including those with disabilities. For differentiation and personalization, the aim is to utilize digital technologies to cater to the varied learning requirements of learners. This involves enabling learners to progress at different levels and paces, and to pursue personalized learning paths and goals. (Redecker & Punie, 2017). The last sub-area focuses on utilizing digital technologies in order to encourage learners to actively and creatively engage with a particular subject matter which involves promoting the development of learners' cross-cutting skills, critical thinking, and artistic expression (Redecker & Punie, 2017).

The sixth area of DigCompEdu, facilitating learners' digital competence, includes five sub-areas: information and media literacy, digital communication and collaboration, digital content creation, responsible use, and digital problem-solving. In the first sub-area, information and media literacy, Redecker and Punie (2017) highlight the importance of integrating educational activities, forcing learners to express their information requirements, such as locating, organizing, and assessing the trustworthiness of digital information. The second sub-area, digital communication and collaboration, requires learners to be effective and responsible when communicating and collaborating with digital technologies (Redecker & Punie, 2017). As for digital content creation, the third sub-area aims to educate learners on applying copyright and licenses to digital content and instructing them on properly referencing it (Redecker & Punie, 2017). The fourth area, responsible use, is to equip learners with the ability to effectively handle risks and utilize digital technologies securely and responsibly (Redecker & Punie, 2017).

The DigCompEdu framework gives a progression model for developing educators' digital competencies. The purpose of the DigCompEdu progression model is to aid in the identification of teachers' strengths and weaknesses (Redecker & Punie, 2017). Redecker and Punie (2017) classify six levels of proficiency as follows: newcomer(A1), explorer (A2), integrator (B1), expert (B2), leader (C1), and pioneer (C2). Figure 2 shows the DigCompEdu Progression model. This model helps navigate where to design professional development for teachers.

DigCompEdu Progression Model uses the Common European Framework of Reference for Languages (CEFR) for convenience (Redecker & Punie, 2017). As in the CEFR taxonomy, DigCompEdu levels are also leveled from A1 to C2. The

DigCompEdu progression model provides valuable insights for professional development.

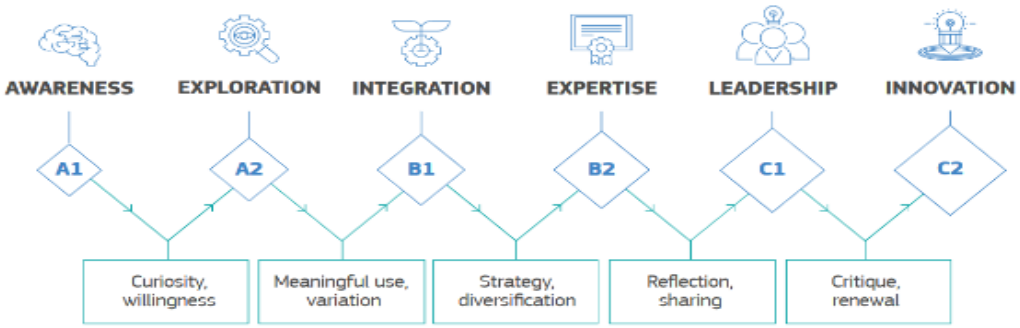

Figure 2. DigCompEdu progression model

2.3 Teachers' digital competencies

There is extensive research on teachers' digital competencies in education literature. This section focuses on the studies where the DigCompEdu framework is used to assess educators' digital competencies. DigCompEdu provides a standardized framework for evaluating and comparing educators' digital competence in different contexts.

Studies indicate that certain DigCompEdu areas were more challenging for teachers. One of those areas is Facilitating Learners' Digital Competencies. Rubio-Gragera and colleagues (2023) revealed such an example. Based on their study with 104 teachers who filled in the DigCompEdu check-in questionnaire, the lowest-scoring area was Area 6 (Facilitating Learners' Digital Competencies), followed by Assessment (Area 4). Momdjian et al. (2024), too, found that teachers are less able to help students develop digital skills (Area 6). These results also fit Cabero-Almenara et al. (2023), which also showed the lowest areas were Area 6, Digital Competencies of Learners, and Area 2, Digital Resources.

Bayrak Karslı and colleagues (2023) showed that teacher educators show higher competency levels in using digital assessment tools for feedback. When it comes to data analysis, they did, however, show less degrees of competency than required. Even though the study revealed that most of the respondents to the DigCompEdu assessment tool were regarded as competent overall, they still needed improvements in terms of protecting personal data (Area 1) and using digital tools for feedback (Area 4) (Muammar et al., 2023). Similarly, Amante et al. (2021) argued that while educators are familiar with digital assessment tools, there remains a significant need for further development in this area.

According to the systematic review by Aiastui et al. (2021) on the digital competencies defined by the DigCompEdu framework, the quality assessment process in universities often lacks evaluation of the teaching-learning practices using technological competencies, leading to a low level of university professors in the assessment area. The COVID-19 pandemic has highlighted the need for competence in the assessment area since cheating in online assessments is an essential problem (Aiastui et al., 2021).

Dias-Trindade and Moreira (2020) underline the necessity for focused development in certain areas of digital competence among high school teachers, emphasizing the importance of enhancing skills in assessment and learner empowerment (Dias-Trindade & Moreira, 2020). Their findings revealed that, on average, these teachers displayed a moderate level of digital competence. However, the study identified areas needing improvement. Within these, the subdimensions of assessment, empowering learners, and facilitating learners' digital competence were highlighted as the weakest areas. Of these, the assessment dimension, particularly the aspects of feedback and planning, was noted as needing the most attention.

A study by Çebi and Reisoğlu (2022) examined pre-service teachers' digital competence perceptions. According to their study, digitally competent teachers are considered productive and creative. Moreover, a digitally proficient teacher successfully solves issues and proposes alternatives (Çebi & Reisoğlu, 2022). Observing perceptions of constructs might also highlight some misconceptions, as this study shows that only a few pre-service teachers stressed communication and safety in digital competence (Çebi & Reisoğlu, 2022).

Studies done by researchers mainly focus on assessing the levels of the digital competencies of educators (Fernandez-Batanero, 2020). As one of these descriptive studies, Suzer and Koç (2024) investigated the digital competency levels of Turkish teachers according to the DigCompEdu framework. Using a cross-sectional survey approach, the participants were 368 teachers in K–12. The results revealed that the teachers were mostly at the integrator level. They found gender, subject taught, educational background, and number of owned digital devices as predictors of digital competency.

Recent studies also indicate that private school teachers sometimes demonstrate higher digital competency levels than teachers who work in public schools. For instance, Ali et al. (2020) discovered that private school teachers in Pakistan were better in terms of using digital media.

2.4 Teacher professional development frameworks

Professional development for teachers can be considered within the context of adult learning theory (Garavani, 2012; Gregson & Sturko, 2007). According to the andragogy in practice model (Knowles et al., 1998), the core adult learning principles are as follows: (1) a learner's need to know, (2) self-concept, (3) having prior

experience, (4) being ready to learn, (5) orientation to learning, and (6) motivation to learn.

The first principle of the model emphasizes that adult learners feel the need to understand why they are learning the content. The second principle addresses an important issue in adult learning: adult learners may find it difficult to accept externally imposed learning, and attention must be paid to this when working with them by giving credit to their decisions. In the third principle, it is noted that adults come to education with prior experiences, which makes the adult learner group more heterogeneous in terms of experiences compared to the younger ones. These experiences need to be considered. According to this principle, another important point is the recommendation of activities such as group discussions and peer-helping activities instead of transmittal techniques. The fourth principle states that readiness to learn is related to the degree to which real-life applicability of the learning, highlighting the importance of timing. The fifth principle suggests that learning should be task- or problem-centered rather than subject-oriented. Finally, the sixth principle acknowledges that while intrinsic motivation is important for adults, external factors can also motivate them. These principles can be considered when designing professional programs for teachers.

Desimone (2009) defines critical features for professional development as content focus, active learning, coherence duration, and collective participation. These features ensure that professional development should be aligned with needs and contextual demands. It is important to use appropriate evaluation methods to determine the effectiveness of the professional development program. Desimone (2009) also discusses the most commonly used data collection methods, such as observations, interviews, and surveys, while understanding the effectiveness of the

programs. Interviews are critiqued for being subject to bias; however, they are also considered appropriate for “capturing in-depth and nuanced constructs,” which can help provide detailed explanations, instances, and predictions (Desimone, 2009).

A key part of effective professional development is engaging in reflective tasks. Reflective practices of teachers are established that allow teachers to reflect on their own teaching methods and make decisions accordingly through transformation (Belvis et al., 2013). Reflection helps teachers reconsider what new digital skills could be used in their everyday teaching practices and where they need to work more. A corollary of this, as Finlay (2008) suggests, is that reflective practice empowers educators to gain insight into their professional growth and to incorporate new strategies effectively. Therefore, implementing professional development programs incorporating reflective practices can enhance educators' professional development.

There are also area-specific models available for creating initiatives for professional development (Hu, 2005; Loucks-Horsley, 2010). Emphasizing teachers' preparedness, Hu's (2005) framework investigates secondary English as a foreign language teachers' professional development in China. Moreover, Loucks-Horsley (2010) provides a structure for the professional growth of science and math teachers. Even though these area-specific frameworks might not work when designing a professional development program for teachers in various teaching areas, they can be insightful in some parts of the design process.

Adult learning principles serve as a critical starting point for teachers to engage in an effective learning experience as adult learners. The professional development frameworks designed for specific areas of teaching can also be insightful for designing some PD programs in general. However, the mode of

delivery should also be considered. Since online mode can be beneficial when the participants in the program are from different locations, the PD program for the current study is also designed as an online intensive in addition to asynchronous activities.

2.5 Need for professional development

The rapid development of digital technologies has completely changed the field of education. Thus, digital competency has become essential for teachers. Integrating digital tools in classrooms not only improves the learning process but also gets students ready for a society shaped by technology. However, inadequate training and support make many teachers unable to keep up with these technical developments. This gap highlights the need for professional development, providing teachers with the required digital skills to utilize contemporary teaching technologies effectively.

Avcı and Güven (2021) investigated the in-service training needs of teachers for online teaching. It is highlighted that teachers claim in-service training, especially on digital tools and content creation (Avcı & Güven, 2021). Fidan and Cura Yeleğen (2022) also showed a need for professional development on digital competencies for educators. In their study, they asked teachers' opinions about their digital competencies. The teachers' responses focused on the lack of application and practice, followed by digital software and program knowledge. They also emphasized the necessity for professional development programs that effectively teach digital competencies by not only teaching about the theory but also letting them practice (Fidan & Cura Yeleğen, 2022).

Addressing these concerns, there are also some studies that focus on improving teachers' digital competency levels by implementing professional

development programs or training. Using the DigCompEdu framework, Haşlaman et al. (2023) investigated the digital competencies of pre-service teachers in an “instructional course” at a private university in Turkey. The aim of this course was to improve teacher candidates’ digital competencies during the COVID-19 pandemic. Using their e-portfolio and reflection reports, the study evaluated the pre-service teachers' competencies in domains including digital resources, teaching and learning, and empowering learners, where they didn’t include the first and last areas of DigCompEdu.

When designing a professional development program, it is essential to understand the needs of teachers. Few studies discuss designing and implementing a professional development program to improve educators’ digital competencies tailored to their needs (Torre, 2019; Fidan & Cura Yeleğen, 2022; Morante et al., 2023; Suzer & Koç, 2024; Kuş & Mert, 2024). However, Fernandez-Batanero and colleagues (2020) stated in their systematic review that training regarding technology lacks pedagogical aspects. Developing digital competencies necessitates intervention tailored to the teachers' specific needs.

In their study, Kuş and Mert (2024) assess Turkish teachers’ digital competency. Using a mixed-method approach, the study gathers qualitative data via structured interviews and quantitative data via the DCSE, which is also used in this study. Results show a discrepancy between teachers' self-reported proficiency in digital tools, rated at an "expert" level in the quantitative data, and the "integrative" level noted in the qualitative data. The study advises improving development courses to assist in the creation of digital content and encouraging teacher cooperation to close these gaps. It is also emphasized that there is a need for focused professional

development in digital cooperation and content creation of the six competency areas of the DigCompEdu framework.

Similar to Kuş and Mert's (2023) findings, the discrepancy between self-reported and actual digital competencies is also addressed in several other studies. Maderick and colleagues (2016) demonstrated that preservice teachers often overestimate their levels of digital competencies when compared to their observed performance. Similarly, Mohammadpour and Maroofi (2024) noted that teachers tend to estimate their technological pedagogical knowledge higher on self-assessment tools than their practical applications. This gap may be explained by the complex nature of judging one's own capabilities, which can highlight the significance of self-awareness. Seifert and Lindmeier's (2024) emphasis on the limited metacognitive skills among teachers, which may lead to misjudgments about their capabilities, might support this explanation.

Similarly, studies demonstrated that short-term interventions may not always be effective in terms of improving the digital competencies of teachers. For instance, Romero-Tena et al. (2025) reported lower post-test scores among preservice teachers following a training focusing on digital skills. However, they suggested that the training increased the preservice teachers' awareness rather than their actual competence. In relation to these studies, Ortega et al. (2020, as cited in Alférez-Pastor et al., 2023) also found no statistically significant changes in competency levels after training. Therefore, they highlighted the importance of a more comprehensive and sustained approach.

Alférez-Pastor et al. (2023) further argued that deeper engagement is needed for effective professional development. Kraft et al. (2018) also emphasized the importance of ongoing, iterative training for effective professional development. As

another significant point, Amemasor and colleagues (2025) found that PD programs that facilitate collaborative tasks and peer learning environments are more effective. Delivery format is another significant factor for the effectiveness of the PD programs. Mulaimović et al. (2024) compared online and face-to-face PD formats and found that face-to-face sessions fostered stronger engagement and satisfaction. They suggested that the delivery mode is also a critical factor in program success.

Fernandez-Batanero and colleagues (2020), in their systematic review of the literature including studies from 2008 to 2018, revealed that digital competence is regarded as a critical factor not only in enhancing the teaching and learning processes of students but also in the professional development of educators. This also shows the importance of digital competencies in terms of continuous professional development.

This section provided a review of the literature on digital competencies and the professional development of teachers. After some of the digital competency frameworks were summarized, the DigCompEdu framework was examined in detail. Teacher professional development frameworks were also summarized. Subsequently, the review on teachers' digital competencies demonstrated the significance of teacher professional development.

CHAPTER 3

METHODS

The purpose of this study was to investigate the current level of digital competencies among teachers from a total of five different private middle and high schools, to identify the areas for improvement, design a professional development program on digital competencies for private school teachers, and evaluate the effectiveness of this program. In this section, the methodology adopted for this study was explained by giving details about the research design, the context, the data collection, and the analysis procedures.

3.1 Research design

This study employed an explanatory sequential mixed methods design. Mixed-methods research designs have the advantage of both quantitative and qualitative methods. While the quantitative data and results give the researcher a general idea of the research problem, collecting and analyzing qualitative data helps to refine and explain the problem in more detail (Creswell, 2014). Combining methodologies allows researchers to capitalize on the strengths and minimize the weaknesses of each approach (Johnson & Onwuegbuzie, 2004). In this context, by adopting the explanatory sequential design, quantitative data provided a more general overview and initial answers, such as participants' initial digital competency levels, while qualitative data gave deeper insights. In the explanatory sequential design, quantitative data is collected, analyzed, and used to inform qualitative data collection, and sampling occurs in both quantitative and qualitative phases (Creswell & Plano Clark, 2018).

The research design of this study has five phases, which are explained in this section. The procedure was represented in Figure 1.

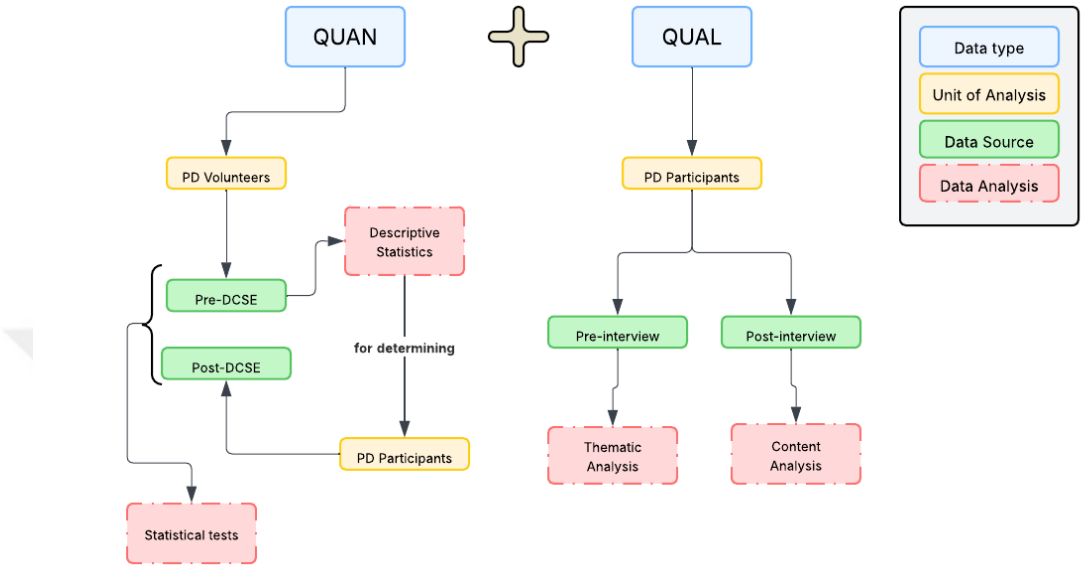

Figure 3. Research design

3.1.1 Phase 1: Initial quantitative data collection (Pre-Survey)

This phase began with collecting and analyzing quantitative data via the Digital Competency Scale for Educators (DCSE), translated by Toker et al. (2020). The survey was shared with private school teachers from five different schools as Google Forms with the added demographic information part (APPENDIX A). The Pre-survey data was used to determine the competency levels and areas that need development, and to determine the relationship between private school teachers' demographics and DigCompEdu levels. The results of this program were used to determine the objectives of the PD program in the second phase. The researcher also conducted semi-structured interviews with 10 private school teachers to further investigate the levels of private school teachers.

3.1.2 Phase 2: PD program design

In the second phase, an online targeted PD program is designed by taking the initial quantitative data analysis into consideration. The objectives and subareas to focus on are decided according to the least-scored areas of DigCompEdu (Table 1). The content of the online PD program was also planned in this phase (APPENDIX B). Online meetings were held on a platform that is already in use by all private school teachers. After pre-DCSE, the researcher conducted pre-interviews with 10 participants who participated in the program to further examine their initial digital competencies. Pre-interview questions are presented in Appendix C.

3.1.3 Phase 3: Post-intervention quantitative data collection

After the PD program was completed, the DCSE was shared again with the private school teachers who volunteered in the program (post-DCSE). The digital competency levels of the volunteers were re-evaluated. Thus, the impact of the program was analyzed through comparing the pre- and post-intervention.

3.1.4 Phase 4: Qualitative data collection

For the qualitative data collection phase, a subset of the PD program participants was interviewed (post-interviews). Post-interviews included both those who showed improvement after the program and those who did not. Post-interview questions focused on the experiences and the impact of the PD program (APPENDIX D). The interview data were analyzed through thematic analysis to explore the effectiveness of the PD program on their digital competency improvement. The analysis also identified the aspects of the PD program that may be improved.

3.1.5. Phase 5: Integration of quantitative and qualitative data

In the fifth phase, the quantitative and the qualitative data were summarized, compared, and synthesized. By synthesizing, the effectiveness of the PD program and the elements that affected its efficacy were shown.

3.2 Context and participants

This study aimed to explore private school teachers' digital competencies, identify areas for improvement, and examine the effectiveness of a professional development program. The need for improvement in the digital competencies of private school teachers was determined by analyzing the DCSE (Toker, 2021) scores of participants.

Volunteers among the teachers participated in the study's second phase in the professional development program designed for the lowest-scored areas. In the DCSE, teachers were asked whether they volunteered to participate in the study's second phase, the professional development program for digital competencies. The demographic information of private school teachers who participated is shown in Table 1. Out of 115 private school teachers who filled out the pre-DCSE, 91 agreed to participate in the online professional program, making up 79% of the total participants. PD volunteering percentages are similar between middle and high school private school teachers. Regarding volunteer private school teachers' genders, female private school teachers outnumber male private school teachers at both levels. All volunteer private school teachers were invited to the PD program.

Table 1. Demographic Information of Volunteers

Variable	n	%
Gender		
Male	19	21
Female	72	79
Age		
20-30	18	20
30-40	39	43
40-50	31	34
50-60	3	3
Years of teaching		
0-2 years	2	2
2-5 years	6	7
5-10 years	31	34
10-15 years	20	22
15-20 years	15	16
20 years and above	17	19
Level of Teaching		
Middle School	56	62
High School	35	38
Education		
Bachelor's Degree	71	78
Master's Degree	19	21
Doctoral Degree	1	1
Total	91	100

Private school teachers' DigCompEdu levels who volunteered in PD are shown in Table 2. Most of the PD volunteers are experts (B2), with a percentage of 42. Following them, 31% of the 91 PD volunteer teachers.

Table 2. Digital Competency Levels of Private School Teachers Volunteered in PD

DigCompEdu Levels	Male		Female		Total	
	n	%	n	%	n	%
Newcomer	1	5	2	3	3	3
Explorer	1	5	11	15	12	13
Integrator	7	37	21	29	28	31
Expert	8	42	30	42	38	42
Leader	2	11	6	8	8	9
Pioneer	0	0	2	3	2	2
Total	19	100	72	100	91	100

The areas of teaching of the private school teachers who volunteered in the PD program are presented in Table 3.

Table 3. Area of Teaching of PD Volunteers

Teaching Area	n	%
Biology	4	4
Geography	2	2
Philosophy (High School)	1	1
Philosophy (Middle School)	2	2
Science	8	9
Physics	4	4
English	22	24
Chemistry	5	5
Mathematics (High School)	8	9
Mathematics (Middle School)	12	13
Social Studies	6	7
History	3	3
Turkish Language and Literature	5	5
Turkish	9	10
Total	91	100

The details of the program were announced to all participants who volunteered in the online professional development program. The announcement was made via the school's mailing system. A total of 20 private school teachers agreed to participate in the program. During the program, 5 of them dropped the program due to busy school schedules or personal issues. The program ended with 15 participants. After the program ended, the DCSE was conducted again to analyze the improvement in private school teachers' digital competencies. To further understand the effectiveness of the PD program, the researcher conducted semi-structured post-interviews with 10 teachers. The Overall DCSE scores of the pre-interview participants were presented in Table 4.

Table 4. Overall DCSE Scores of the Pre-interview Participants

Participant	Area of Teaching	Level of Teaching	Gender	Education	Teaching experience	Age	Overall DCSE Scores
Teacher 1	Mathematics	Middle School	Female	Bachelor	5-10 years	40-50	Explorer
Teacher 2	Social Sciences	Middle School	Female	Doctorate	10-15 years	30-40	Integrator
Teacher 3	Turkish	Middle School	Female	Master	15-20 years	40-50	Leader
Teacher 4	Physics	Highschool	Female	Bachelor	5-10 years	30-40	Explorer
Teacher 5	Chemistry	Highschool	Female	Master	15-20 years	40-50	Expert
Teacher 6	Physics	Highschool	Female	Bachelor	5-10 years	30-40	Pioneer
Teacher 7	Mathematics	Middle School	Female	Bachelor	More than 20 years	40-50	Integrator
Teacher 8	Mathematics	Highschool	Female	Bachelor	More than 20 years	40-50	Expert
Teacher 9	Science	Middle School	Female	Bachelor	0-2 years	20-30	Explorer
Teacher 10	Mathematics	Highschool	Female	Master	15-20 years	30-40	Integrator

3.3 Instruments for data collection

The quantitative data collection process was started after ethical approval from the Ethics Committee in Social Sciences and Humanities of Boğaziçi University. As a quantitative data collection tool, the Turkish adaptation of the DCSE was used (Toker, 2021). The permission to use the scale can be viewed in Appendix E. The scale is shared via Google Forms for ease of use. Participants answered the questions without any time limitation. The link for the form was shared via e-mail, reminding participants of their rights and that participation is voluntary. Participants in the survey were asked whether they agreed to participate in the PD program. The teachers who agreed to participate in the program were contacted via their e-mails.

Pre-survey data was collected in the second half of the 2023-2024 academic year. The process took approximately one month.

The semi-structured pre-interviews were conducted right before the PD program. DCSE (Toker, 2021) was used both before and after the PD program to

analyze the effectiveness of the program. After the end of the program, the researcher conducted semi-structured post-interviews.

3.3.1 Digital competency scale for educators

The Digital Competency Scale for Educators (Redecker, 2017) is adapted into the Turkish language by Toker (2021). There are 22 items across six areas of the DigCompEdu framework. These areas include: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating digital competence. The validity and reliability of the adapted version of the scale were tested through 3140 teachers. They used confirmatory factor analysis to confirm the internal validity of the scale. Cronbach's Alpha coefficient was found .94, which confirms the internal validity of the adapted scale.

3.3.2 Pre-interview for initial digital competency levels of private school teachers

Qualitative data to further explore the private school teachers' initial digital competency levels were collected through pre-interviews. There were 14 main questions for the six areas of the DigCompEdu Framework. The pre-interview questions were developed based on the adapted version of the DCSE. The interviews were conducted via online meetings, approximately 30 minutes each.

3.3.2 Post-interview for understanding the effectiveness of the PD program

Qualitative data for understanding the effectiveness of the PD program were collected through post-interviews. The interview questions focused on teachers' views about the PD program. The interviews were conducted via online meetings, approximately 15 minutes each.

3.4 Data collection procedures

In the present study, the convenience sampling method is used. Participants were selected among the private school teachers who work in private schools that operate under an educational foundation based in Istanbul. The researcher works as a measurement and evaluation specialist in this foundation. Participants of this study are approximately 91 middle school and high school teachers employed in five different private schools. These schools operate under the same organization where the researcher works and has easy access. The age range is expected to be from 25 to 50. The ratio of women to men is higher, even though efforts were made to select participants equally. In the end, all participants were females. The data matrix is demonstrated in Table 5.

At the beginning of the study, participants in the survey were asked whether they agreed to participate in the PD program. The teachers who agreed to participate in the program were contacted via their e-mails later.

The real names and contact information of the participants were collected to be able to communicate throughout the process. This step was necessary to choose participants and do follow-ups between the pre- and post-program phases. But after the data was collected, all personal information was anonymized, and pseudonyms (e.g., Teacher 1) were used in the analysis and reporting phases. This anonymization protected the privacy of the participants and followed ethical research standards, as stated in the informed consent form.

Table 5. Data Matrix

Research Questions	Data Source					Data Analysis
	Pre-PD DCSE	Pre-Interviews	Post-session reflections	Post-PD DCSE	Post-Interviews	
1. What are the private school teachers' levels of digital competencies before engaging in the PD program?	X	X				Descriptive Statistics
1.a. What are the private school teachers' levels of digital competencies before engaging in the PD program?	X					Descriptive Statistics
1.b. How do private school teachers' self-perceptions of their digital competency levels before engaging in the PD program align with the quantitative assessment (DCSE) results?		X				Inductive Analysis
2. To what extent does implementing a professional development program based on the DigCompEdu Framework help educators enhance their digital competencies in areas needing improvement?				X	X	Inferential Statistics
2.a. Is there a statistically significant difference in the digital competence proficiency levels of private school teachers before and after participating in the professional development program?				X		Inferential Statistics
2.b. How do participants evaluate the effectiveness of the PD program on their digital competency improvement?			X		X	Content analysis

3.5 Design of the professional development program

A module for the lowest-scored sub-areas from the digital competence areas in DigCompEdu was designed to develop the private school teachers' digital competencies.

3.5.1 Design process

This professional development program aims to enhance private school teachers' digital competencies. The design process started when the DCSE scale was conducted and analyzed to decide the module's objectives and participants for the study.

Following the analysis, the module's objectives and schedule were considered. The first version of the PD program was reviewed by an expert in the subjects of instructional design and professional development of teachers. The PD program was refined in terms of theoretical foundation, instructional design and content, and evaluation strategies. First, the theoretical foundation was strengthened by replacing Desimone's framework with a more comprehensive one: the Effective Professional Development Framework by Darling-Hammond (2017). Second, there were also some revisions in terms of instructional design and content. For instance, for active learning, activities such as think-pair-share were added in the context of the online sessions. These activities were implemented by the breakout rooms feature on Microsoft Teams. Additionally, sessions are redesigned as asynchronous instructional videos and synchronous online meetings where collaborative activities and discussions were used.

After implementation, all data were analyzed to understand the effectiveness of the PD module and overall program.

The professional development program was conducted online in Microsoft Teams, which is a platform the teachers are already using in their schools and, therefore, familiar with. The program was planned according to the schools' academic calendars. The program was planned to cover 7 weeks and 10 sessions. However, due to events such as snow breaks and unexpected administrative meetings on campuses where the participants work. There are 7 synchronous and 3 asynchronous sessions. Synchronous sessions cover the subareas with the lowest scores. Asynchronous sessions are added to allow participants to reflect on the online sessions and practice what is discussed. It encourages participants to reflect on their current learning, identify improvement areas, and plan for their ongoing professional development. Synchronous sessions were planned approximately 60 minutes.

Darling-Hammond's framework for effective professional development for teachers is considered in this program. Design elements of effective professional development are categorized as (1) content focus, (2) active learning, (3) collaboration, (4) models and modeling, (5) coaching and expert support, (6) feedback and reflection, and (7) sustained duration (Darling-Hammond et al., 2017). Content focus is related to subject matter content. For the PD program, the content is DigCompEdu areas. Teachers are also encouraged to reflect on their teaching in their specific branches The program integrates active learning by applying collaborative activities, such as brainstorming, role-playing, and creating hands-on digital resources. As for the models and modeling, real-life scenarios and examples of tools and approaches are discussed in videos and applied in synchronous meetings. Expert support is provided through the program's designer as a facilitator. The program also includes feedback and reflection opportunities through structured activities, such as

asking participants to share their key takeaways and identify areas for improvement in their personal Teams notebooks. Effective PD is sustained over time to allow teachers to refine their practices. The overall time for each module (both synchronous and asynchronous sessions) is estimated as 90 minutes, totaling approximately nine hours for the program with six modules.

Kirkpatrick's Model has four levels: reaction, learning, behavior, and results. The first level is defined as "the degree to which participants find the program favorable, engaging, and relatable" (Kirkpatrick, 2006,). This was conducted by the Likert-type questionnaires asking participants after each session and also the overall program at the end. The second level is defined as "the degree to which participants acquire the intended knowledge, skills, attitude confidence and commitment based on their participation in the training" (Kirkpatrick, 2006). This phase is measured by the DCSE (Toker, 2021) where the results of DCSE before and after the program was analyzed. Also, post-interviews were analyzed to understand the program's impact and participants' experiences. The third level is "the degree to which participants apply what they learned during training when they are back on the job" (Kirkpatrick, 2006). The Last level, results, is defined as "the degree to which targeted outcomes occur as a result of the training and the support and accountability package" (Kirkpatrick, 2006). These two last levels are the most time-consuming levels of the model; therefore, this phase of the evaluation was out of the scope of this study. However, these phases were also planned and presented to the stakeholders so that they could investigate whether the desired results are met in the future.

3.5.2 Design decisions based on the pre-DCSE

After the pre-DCSE results were analyzed and the least scored areas were determined, PD sessions were designed. The least scored subareas determined the topics of the PD sessions. After sessions and learning activities are planned according to the analysis, the initial version of the program was reviewed by two experts: an expert teacher and coordinator in the same school, and an academic from the field. This feedback was used to improve the initial program by making some minor revisions.

The final program was planned to be implemented as a 10-session program over seven weeks, consisting of seven synchronous and three asynchronous video lesson sessions. However, due to external factors such as snow breaks and last-minute administrative meetings, the program schedule had to be revised. The content was condensed into five synchronous online meetings and three asynchronous video lessons. Asynchronous videos were designed to complement the synchronous live sessions by making participants ready for the discussions and group activities. Table 6 presents an overview of the synchronous sessions.

Table 6. Overview of the Synchronous Sessions

Date	Session Focus	DigCompEdu Areas	Activities	Duration
December 19, 2024	Introduction to the program and DigCompEdu	All areas	Reflection on digital competencies	60 minutes
January 2, 2025	Professional collaboration and reflective practice	Area 1	A case on how to use professional collaboration	60 minutes
January 9, 2025	Selecting digital resources, creating and modifying digital resources	Area 2	Group work on a lesson plan	60 minutes
February 20, 2025	Collaborative learning	Area 3	Lesson plan for collaborative learning	90 minutes
	Analyzing evidence	Area 4	Discussion: Which data counts as evidence in my classroom?	
February 27, 2025	Differentiation and personalization	Area 5	Discussion on three cases on differentiation	120 minutes
	Responsible use	Area 6	Group work on the three scenarios on responsible use	

The program started with an introductory session. In this introductory session, all teachers across the schools under the institution, where the researchers work as assessment and evaluation specialists, were invited. The session content focused on the DigCompEdu Framework. The researcher/educator introduced the DigCompEdu Framework and the plan of the program. The session was online and live on all the campuses of the institution. Volunteered teachers participated in an introductory activity about their digital competencies. In Padlet, they wrote down their reflections about digital competencies during and after the emergency remote teaching.

Subsequent sessions were focused on the six main areas of the DigCompEdu framework. Each session included interactive components such as case discussions,

groupworks on breakout rooms or Padlet, and scenario-based reflections, which were designed to foster collaboration and reflection.

The first session on the professional engagement area (Area 1) focused on professional collaboration and reflective practice. A case-based activity on Padlet was used as a discussion point. Second session focused on Area 2 (Digital Resources). Teachers shared their lesson plan ideas in Padlet. In breakout rooms, teachers with similar teaching areas discussed the digital resources they currently use and wrote down their initial lesson plan ideas. Also, they commented on other colleagues' ideas and shared their recommendations. Third session focused on Area 3 (Teaching and Learning) and Area 4 (Assessment). Participants developed lesson plans for collaborative learning and engaged in reflective discussions about evidence-based classroom data. The final session covered Area 5 (Empowering Learners) and Area 6 (Facilitating Learners' Digital Competence). This session included case-based discussions on breakout rooms on differentiation and scenario analysis on responsible use of technology, and was the longest session (120 minutes), allowing deeper engagement with the content.

3.6 Data analysis

The researcher used descriptive statistics to analyze private school teachers' levels of digital competencies. After the data collection from private school teachers using the (DCSE) (Toker et al., 2020) ended, it was organized to calculate the levels of digital competencies. After the multiple-choice items in the scale are converted into numeric values; the mean, the median, and the standard deviation were calculated to understand the participants' overall performance, besides their individual scores on the scale. Then, the competency levels were assigned. The research question (1a),

'What are the specific areas in which private school teachers need to improve their digital competencies?' were addressed through this analysis. Subarea scores were calculated to find the areas and subareas with the lowest score.

Another research question (1b) focuses on how private school teachers' self-perceptions of their digital competency levels before engaging in the PD program align with the quantitative assessment (DCSE) results. Before the PD program, the teachers who accepted to participate in the PD program were interviewed. The purpose of this analysis was to determine whether the DCSE levels.

Before the PD program, the participants were selected from those who accepted to attend the program. Therefore, when sending the DCSE to the participants, it was asked whether they agreed to participate in the professional development program. To address the question (2a), whether there is a statistically significant difference in private school teachers' digital competence proficiency levels before and after participating in the professional development program, participants in PD filled the DCSE again at the end of PD. The scores of private school teachers before and after PD were analyzed using a Wilcoxon Signed-Rank Test after analyzing the data for a normality test.

After implementing the professional development program, the participant private school teachers were interviewed about the program's effectiveness. With the interview analysis the question "How do participants evaluate the effectiveness of the PD program on their digital competency improvement?" was answered. A coding reliability approach was adopted for the intercoder reliability of the analysis. It highlights the importance of the agreement of multiple coders on the application of the codes (Morgan, 2022).

Overall, the study's results could provide insights into the professional development needs of private school teachers in the context of digital competencies. Participants could learn more about their digital competencies by answering questions on the DCSE. School administration had the opportunity to learn and be more aware of their teachers' needs for improvement. For the qualitative part, private school teachers with lower competencies had a chance to empower their digital competency by participating in online development. Overall, this study uncovers the needs regarding the digital competencies of the participants, as well as providing insights on the effectiveness of a professional development program on digital competency.

3.7 Trustworthiness

Lincoln and Guba (1985) define four criteria of trustworthiness as credibility, transferability, dependability, and confirmability. This definition guarantees the credibility of the qualitative components of this mixed-methods study.

Long-term participant engagement throughout the professional development (PD) program and iterative data collection techniques allowed a better knowledge of participant experiences, helping to build credibility. Pre- and post-interviews let triangulation of data sources enable a more complex picture of changes in digital competency.

Descriptions of the institutional background, participant demographics, and PD program implementation process helped to address transferability. This degree of detail enables readers to evaluate the applicability of the results to other professional development studies.

Reporting all major methodological decisions, such as participant selection, coding procedures, and theme development, contributes to both dependability and confirmability of the study. To reduce subjectivity and guarantee consistency in the data interpretation, inter-coder reliability checks were carried out alongside a second researcher.

Through honest recognition of my positionality and methodological transparency, I sought to show results based on the viewpoints of the participants rather than molded only by the lens of the researcher. These initiatives taken together help to ensure the general quality and trustworthiness of the qualitative dimension of the research.

3.8 Researcher's positionality

My professional background—that of a former physics teacher working in a private school and currently being an assessment and evaluation specialist—has greatly shaped my interest in teacher development and digital competences. Currently, I evaluate assessment data, translate findings into terms of student learning, and help to develop improvement plans. I have also guided initiatives to include digital tools in the systems of evaluation for schools. These twin positions have let me address this topic from a research-oriented standpoint as well as from the standpoint of a practitioner. I approached this subject from two angles: one based on experience, the other on research.

Knowing that the attendees were private school instructors from a network I know, I was cognizant of possible power relations and prejudices. All data were anonymized by giving pseudonyms to the participants. Participation was totally voluntary, and ethical permission was acquired.

CHAPTER 4

RESULTS

This study aimed to investigate the current level of digital competencies of private middle and high school teachers to identify the areas for improvement, design a professional development program on digital competencies for private school teachers, and evaluate the effectiveness of the PD program. In this chapter, the results of the study are presented.

4.1 Private school teachers' digital competencies before participating in the professional development program

In this section, the data collected before the implementation of the PD program was examined. The analysis aimed to determine the DigCompEdu areas that needed improvement and the participants' initial levels of digital competencies.

4.1.1 What are the specific areas in which private school teachers need to improve their digital competencies?

In the first phase of the study, the purpose of the data analysis was to determine the areas in need for improvement and answer the research question about the specific areas in which private school teachers need to improve their digital competencies (What are the specific areas in which private school teachers need to enhance their digital competencies?).

For this phase, an adapted version of the DCSE (Toker, 2021) was applied to 114 private school teachers. Out of 114 private school teachers, 91 agreed to participate in the PD program. To analyze the needs before the program, 91 volunteer

private school teachers' scores in the pre-DCSE was used. The content of the program was decided by the results of this first phase analysis. Table 7 presents the digital competency initial levels of 91 private school teachers in pre-DCSE. 73 % of the participants were either Integrators or Experts. Of the 91 volunteer teachers, 42% were Experts. Following them, 31% were Integrators. According to the DigCompEdu Progression level explanations, teachers in Integrator or Expert levels can apply diverse strategies and further reflect on their practices (Redecker, 2017).

Table 7. Initial Digital Competency Levels of Private School Teachers Volunteered in PD

DigCompEdu Levels	Male		Female		Total	
	n	%	n	%	n	%
Newcomer	1	5	2	3	3	3
Explorer	1	5	11	15	12	13
Integrator	7	37	21	29	28	31
Expert	8	42	30	42	38	42
Leader	2	11	6	8	8	9
Pioneer	0	0	2	3	2	2
Total	19	100	72	100	91	100

When deciding the subjects to cover in the PD program, 91 PD volunteers' responses to pre-DCSE were used. All six areas of DigCompEdu were analyzed by specifying the number of participants in each competency level in the area. Subsequently, DCSE item averages for all related subareas were specified. The objectives and strategies were decided by considering the least scored items. Tables regarding the subarea scores and levels are presented in Appendix F.

Area 1: Professional engagement. The average scores for each item on the pre-DCSE scale for the first area are presented in Figure 4. The teachers' average score for the Professional Engagement Area was 8,70, which indicates that the overall level in this area is *Integrator*. The competency percentage was calculated by dividing the area average by the possible full points. According to the results, the subareas to focus on for the PD program were professional collaboration (Q2) and reflective practice (Q3). The average corresponding answer for each item is presented as in Figure 4.

AREA 1: Professional Engagement Items		Sub-area	Average	Corresponding answer
Q1	I can systematically use various digital communication channels to improve communication with students, parents, and colleagues (e.g., email, blog, school website, apps, etc.).	Organizational communication	2,30	I use multiple digital communication tools in an integrated way (e.g., email, blogs, or school website).
Q2	I use digital technologies to collaborate with colleagues inside and outside the school.	Professional collaboration	1,95	I sometimes exchange materials with colleagues via email.
Q3	3I actively try to improve my digital teaching skills.	Reflective practice	2,19	I use various resources to develop my digital teaching skills.
Q4	I participate in online training (e.g., online courses, webinars, MOOC-based programs, etc.).	Digital Continous Professional Development (CPD)	2,27	I have participated in this kind of online training once or twice.

Figure 4. The average corresponding answers to pre-DCSE for area 1

Volunteer teachers' DigCompEdu levels for the professional engagement area were demonstrated in Table 8. *Integrators* comprised 42 percent of the 91 volunteer teachers, followed by *Experts* and *Explorers* at 24 percent and 23 percent, respectively. There were no pioneers in this area.

Table 8. PD Volunteer Teachers' Initial Levels in the Professional Engagement Area

DigCompEdu Levels	Male		Female		Total	
	n	%	n	%	n	%
Newcomer	1	5	6	8	7	8
Explorer	8	42	13	18	21	23
Integrator	3	16	35	49	38	42
Expert	6	32	16	22	22	24
Leader	1	5	2	3	3	3
Pioneer	0	0	0	0	0	0
Total	19	100	72	100	91	100

Area 2: Digital Resources. Average scores for the items related to digital resources area are shown in Figure 5. When the item average points were considered, "selecting digital resources" was the least scored subarea. The area average is 7,20 out of 12 points, which indicates that the average level of the area is *Expert.* According to the results, subareas to focus on are chosen as selecting digital resources (Q1) and creating and modifying digital resources (Q2). The average corresponding answer for each item is presented in Figure 5.

Volunteer teachers' initial levels for the second area are shown in Table 9. *Experts* make up 36 percent of the 91 volunteer teachers, followed by *Integrators* at 26 percent. There is one teacher at the pioneer level in the digital resources area.

AREA 2: Digital Resources Items		Sub-area	Average	Corresponding answer
Q1	I use different websites and search strategies to find and select various digital resources.	Selecting digital resources	2,16	I evaluate and select digital resources based on my students' levels.
Q2	I create my own digital resources and modify existing ones according to my needs.	Creating and modifying digital resources	2,33	I sometimes create digital presentations.
Q3	I effectively manage and protect sensitive content such as exams, student grades, and personal data.	Managing, protecting and sharing digital resources	2,70	I protect some personal data.

Figure 5. The average corresponding answers to pre-DCSE in area 2

Table 9. PD Volunteer Teachers' Initial Levels in the Digital Resources Area

DigCompEdu Levels	Male		Female		Total	
	n	%	n	%	n	%
Newcomer	1	5	5	7	6	7
Explorer	2	11	13	18	15	16
Integrator	9	47	15	21	24	26
Expert	3	16	30	42	33	36
Leader	3	16	9	13	12	13
Pioneer	1	5	0	0	1	1
Total	19	100	72	100	91	100

Area 3: Teaching and Learning. For the third area, average scores and average corresponding answers for each item are presented in Figure 6. The average of the area was 8,90 out of 16 points, which indicated that the average area level was *Integrator.* According to the results, the collaborative learning subarea was the focus of the professional development program for Area 3. The average corresponding answer for each item is presented in Figure 6.

AREA 3: Teaching and Learning Items		Sub-area	Average	Corresponding answer
Q1	I carefully consider how, when, and why to use digital technologies to ensure effective use in the classroom.	Teaching	2,22	I use a variety of digital resources and tools in my lessons.
Q2	I monitor my students' activities and interactions in collaborative online environments.	Guidance	2,23	I sometimes check my students' discussions and their work.
Q3	My students use digital technologies to produce and document learning outcomes when working in groups	Collaborative learning	2,37	I encourage my students to search for information online during group work and present their outcomes in digital format.
Q4	I use digital technologies to help students plan, document, and monitor their learning processes (e.g., self-assessment quizzes, documentation, e-portfolios).	Self-regulated learning	2,08	I sometimes conduct self-assessment activities using digital tools.

Figure 6. The average corresponding answers to pre-DCSE in area 3

Table 10 presents the volunteer teachers' DigCompEdu levels for the teaching and learning area. *Integrators* comprised 25% of the 91 volunteer teachers, followed by *Experts* and *Explorers* at 29% and 25%, respectively. There was one pioneer PD volunteer in this area.

Table 10. PD Volunteer Teachers' Initial Levels in the Teaching and Learning Area

DigCompEdu Levels	Male		Female		Total	
	n	%	n	%	n	%
Newcomer	2	11	8	11	10	11
Explorer	5	26	19	26	24	26
Integrator	4	21	19	26	23	25
Expert	7	37	19	26	26	29
Leader	1	5	6	8	7	8
Pioneer	0	0	1	1	1	1
Total	19	100	72	100	91	100

Area 4: Assessment. For the assessment area, average scores and average corresponding answers for each item are presented in Figure 7. The analyzing evidence was the least-scored subarea. The average of the area was 6,85, which indicated that the competency level was the *Integrator*.

AREA 4: Assessment Items		Sub-area	Average	Corresponding answer
Q1	I use digital assessment tools to monitor student progress	Assessment strategies	2,40	I sometimes use a digital tool to monitor student progress (e.g., an online quiz to track their learning).
Q2	I analyze all available data to identify students in need of additional support.	Analyzing evidence	2,18	I also consider data on students' activities and behaviors to identify those who need extra support.
Q3	I use digital technologies to provide effective feedback.	Feedback and planning	2,27	I sometimes use digital means to give feedback (e.g., automatic scoring in online quizzes, giving comments or "likes" in online platforms).

Figure 7. The average corresponding answers to pre-DCSE in area 4.

As for the DigCompEdu levels of volunteer teachers in the assessment area, 27 percent of the 91 teachers were experts in the assessment area, followed by Integrators and Explorers (Table 11).

Table 11. PD Volunteer Teachers' Initial Levels in the Assessment Area

DigCompEdu Levels	Male		Female		Total	
	n	%	n	%	n	%
Newcomer	2	11	5	7	7	8
Explorer	4	21	18	25	22	24
Integrator	6	32	19	26	25	27
Expert	4	21	19	26	23	25
Leader	2	11	7	10	9	10
Pioneer	1	5	4	6	5	5
Total	19	100	72	100	91	100

Area 5: Empowering Learners. Average scores and average corresponding answers for each item are presented in Figure 8. The least-scored item in the DCSE for the fifth area is differentiation and personalization. The average level for the area is the *integrator*. Of the 91 PD volunteers, 29 percent were at the expert level in the fifth area, with a percentage of 29, followed by integrators and explorers comprising 20

and 22 percent of the 91 volunteers, respectively. There were 4 pioneers in this area (Table 12).

AREA 5: Empowering Learners Items		Sub-area	Average	Corresponding answer
Q1	I consider potential digital barriers students may face when creating digital assignments (e.g., unequal access to devices and resources, collaboration issues, lack of digital skills).	Accessibility and inclusion	2,21	I adapt digital assignments to minimize the challenges my students may face.
Q2	I use digital technologies to provide personalized learning environments (e.g., assigning different digital tasks based on individual needs, interests, or preferences).	Differentiation and personalisation	2,01	I offer optional digital activities for students who are either advanced or need extra support.
Q3	I use digital technologies to support students' active engagement in class.	Actively engaging learners	2,47	I use motivating materials in my lessons (e.g., videos, animations, cartoons).

Figure 8. The average corresponding answers to pre-DCSE in area 5

Table 12. PD Volunteer Teachers' Initial Levels in the Empowering Learners Area

DigCompEdu Levels	Male		Female		Total	
	n	%	n	%	n	%
Newcomer	2	11	12	17	14	15
Explorer	7	37	13	18	20	22
Integrator	4	21	14	19	18	20
Expert	4	21	22	31	26	29
Leader	2	11	7	10	9	10
Pioneer	0	0	4	6	4	4
Total	19	100	72	100	91	100

Area 6: Facilitating Learners' Digital Competencies. The average scores and average corresponding answers for each item are presented in Figure 9. The least-scored items in DCSE correspond to the subareas of responsible use. The average level for the area was *integrator*.

AREA 6: Facilitating Learners' Digital Competencies Items		Sub-area	Average	Corresponding answer
Q1	I teach students how to evaluate the reliability of information, detect misinformation, and recognize bias	Information and media literacy	2,26	I teach them how to distinguish reliable and unreliable sources online.
Q2	I assign tasks that require students to use digital tools to communicate and collaborate with peers or their environment.	Digital communication & collaboration	2,16	My students communicate and collaborate digitally with one another.
Q3	I assign tasks that require students to create digital content.	Digital content creation	2,20	I sometimes implement this as a fun activity.
Q4	I teach students how to behave safely and responsibly on digital platforms	Responsible use	2,03	I explain the basic rules for safe and responsible behavior in online environments.
Q5	I encourage my students to use digital technologies creatively to solve concrete problems (e.g., overcoming obstacles or difficulties in the learning process).	Digital problem solving	2,08	Occasionally, when the opportunity arises, I encourage my students.

Figure 9. The average corresponding answers to pre-DCSE in area 6

For the last area, facilitating learners' digital competencies, 37 percent of the PD volunteers were at the integrator level. Following them, 27 percent were the experts. In addition, out of 91 PD volunteers, 21% were newcomers and 4% were pioneers (Table 13).

Table 13. PD Volunteer Teachers' Initial Levels in the Facilitating Learners' DC Area

DigCompEdu Levels	Male		Female		Total	
	n	%	n	%	n	%
Newcomer	4	21	15	21	19	21
Explorer	0	0	6	8	6	7
Integrator	9	47	25	35	34	37
Expert	4	21	21	29	25	27
Leader	1	5	2	3	3	3
Pioneer	1	5	3	4	4	4
Total	19	100	72	100	91	100

The results show that area 6, facilitating learners' digital competencies, has the highest number of newcomers, with 21%.

4.1.2 How do private school teachers perceive their digital competency levels before engaging in the PD program?

For the second phase of the analysis, the pre-interview results of the 10 private school teachers who also participated in the PD program were analyzed in detail to answer the research question of how private school teachers perceive their digital competency levels before engaging in the PD program. To further investigate predigital competency levels of the participants, the researcher conducted semi-structured interviews with 10 private school teachers with different pre-DigCompEdu levels before implementing the PD program.

The interviews were analyzed through deductive thematic analysis using DigCompEdu proficiency progression labels (Redecker, 2017) as the predetermined themes (Table 14).

In the professional engagement area, the DCSE levels in comparison to the pre-interview analysis were presented in Table 15. There were five participants who demonstrated lower proficiency levels for the professional engagement area (Area 1) in the pre-interview. Out of the 10 participants, two of them demonstrated higher proficiency levels. Three participants had matching results in the two assessments.

Table 14. DigCompEdu Proficiency Progression Labels (Redecker, 2017)

Level	Professional Engagement	Digital Resources	Teaching and Learning	Assessment	Empowering Learners	Facilitating Learners' Digital Competence
A1 (Newcomer)	Awareness; Uncertainty; Basic Use	Awareness; Uncertainty; Basic Use	Awareness; Uncertainty; Basic Use	Awareness; Uncertainty; Basic Use	Awareness; Uncertainty; Basic Use	Awareness; Uncertainty; Basic Use
A2 (Explorer)	Exploring Digital Options	Exploring Digital Resources	Exploring Digital Teaching & Learning Strategies	Exploring Digital Assessment Strategies	Exploring Learner-Centered Strategies	Encouraging Learners to Use Digital Technologies
B1 (Integrator)	Expanding Professional Practice	Fitting Digital Resources to the Learning Context	Meaningfully Integrating Digital Technologies	Enhancing Traditional Assessment Approaches	Addressing Learner Empowerment	Implementing Activities to Foster Learners' Digital Competence
B2 (Expert)	Enhancing Professional Practice	Strategically Using Interactive Resources	Enhancing Teaching & Learning Activities	Strategic and Effective Use of Digital Assessment	Strategically Using a Range of Tools to Empower	Strategically Fostering Learners' Digital Competence
C1 (Leader)	Discussing and Renewing Professional Practice	Comprehensively Using Advanced Strategies & Resources	Strategically and Purposefully Renewing Teaching Practice	Critically Reflecting on Digital Assessment Strategies	Holistically Empowering Learners	Comprehensively & Critically Fostering Learners' Digital Competence
C2 (Pioneer)	Innovating Professional Practice	Promoting the Use of Digital Resources	Innovating Teaching	Innovating Assessment	Innovating Learner Involvement	Using Innovative Formats to Foster Learners' Digital Competence

Table 15. The Differences in Proficiency Levels in the Professional Engagement Area

Participant	Pre-DCSE	Pre-interview	Difference
Teacher 1	Integrator	Explorer	Lower than pre- DCSE.
Teacher 2	Explorer	Integrator	Lower than pre-DCSE
Teacher 3	Integrator	Explorer	Same
Teacher 4	Newcomer	Newcomer	Same
Teacher 5	Integrator	Leader	Higher than pre-DCSE
Teacher 6	Expert	Integrator	Lower than pre-DCSE
Teacher 7	Integrator	Explorer	Lower than pre-DCSE
Teacher 8	Leader	Integrator	Lower than pre-DCSE
Teacher 9	Explorer	Explorer	Same
Teacher 10	Explorer	Integrator	Higher than pre-DCSE

For the second area (Digital Resources) of the DigCompEdu Framework, out of 10 participants, six of them had matching results. The rest of the participants (4 participants) demonstrated lower proficiency levels according to the initial DCSE levels. These results are presented in Table 16.

Table 16. The Differences in Proficiency Levels in The Digital Resources Area

Participant	Pre-DCSE	Pre-interview	Difference
Teacher 1	Explorer	Explorer	Same
Teacher 2	Integrator	Integrator	Same
Teacher 3	Pioneer	Expert	Lower than pre-DCSE.
Teacher 4	Newcomer	Newcomer	Same
Teacher 5	Expert	Expert	Same
Teacher 6	Leader	Newcomer	Lower than pre-DCSE.
Teacher 7	Newcomer	Newcomer	Same
Teacher 8	Integrator	Integrator	Same
Teacher 9	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 10	Explorer	Newcomer	Lower than pre-DCSE.

In the teaching and learning area (Area 2), five out of 10 participants showed higher proficiency levels where two participants demonstrated lower levels. Three of the participants had matching results (Table 17).

Table 17. The Differences in Proficiency Levels in The Teaching and Learning Area

Participant	Pre-DCSE	Pre-interview	Difference
Teacher 1	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 2	Explorer	Integrator	Higher than pre-DCSE
Teacher 3	Expert	Expert	Same
Teacher 4	Newcomer	Newcomer	Same
Teacher 5	Explorer	Expert	Higher than pre-DCSE
Teacher 6	Leader	Integrator	Lower than pre-DCSE.
Teacher 7	Explorer	Integrator	Higher than pre-DCSE
Teacher 8	Integrator	Expert	Higher than pre-DCSE
Teacher 9	Newcomer	Newcomer	Same
Teacher 10	Explorer	Integrator	Higher than pre-DCSE

In the assessment area (Area 4), seven teachers demonstrated lower proficiency levels, where only 3 of them had matching results (Table 18).

Table 18. The Differences in Proficiency Levels in the Assessment Area

Participant	Pre-DCSE	Pre-interview	Difference
Teacher 1	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 2	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 3	Leader	Newcomer	Lower than pre-DCSE.
Teacher 4	Newcomer	Newcomer	Same
Teacher 5	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 6	Pioneer	Newcomer	Lower than pre-DCSE.
Teacher 7	Integrator	Newcomer	Lower than pre-DCSE.
Teacher 8	Expert	Expert	Same
Teacher 9	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 10	Newcomer	Newcomer	Same

In the empowering learners area (Area 5), seven teachers demonstrated lower proficiency levels. Two teachers had matching results while one teacher demonstrated higher proficiency levels (Table 19).

Table 19. The Differences in Proficiency Levels in the Empowering Learners

Participant	Pre-DCSE	Pre-interview	Difference
Teacher 1	Newcomer	Newcomer	Same
Teacher 2	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 3	Leader	Explorer	Lower than DCSE.
Teacher 4	Newcomer	Newcomer	Same
Teacher 5	Integrator	Newcomer	Lower than pre-DCSE.
Teacher 6	Pioneer	Integrator	Lower than pre-DCSE.
Teacher 7	Explorer	Integrator	Higher than pre-DCSE
Teacher 8	Expert	Newcomer	Lower than pre-DCSE.
Teacher 9	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 10	Integrator	Newcomer	Lower than pre-DCSE.

In the sixth area (Facilitating Learners' Digital Competence), seven teachers demonstrated lower proficiency levels. Two teachers had matching results while one teacher demonstrated higher proficiency levels (Table 20).

Table 20. The Differences in Proficiency Levels in the Facilitating Learners' Digital Competence Area

Participant	Pre-DCSE	Pre-interview	Difference
Teacher 1	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 2	Expert	Newcomer	Lower than pre-DCSE.
Teacher 3	Expert	Explorer	Lower than pre-DCSE.
Teacher 4	Explorer	Newcomer	Lower than pre-DCSE.
Teacher 5	Integrator	Pioneer	Higher than pre-DCSE
Teacher 6	Pioneer	Newcomer	Lower than pre-DCSE.
Teacher 7	Newcomer	Newcomer	Same
Teacher 8	Expert	Explorer	Lower than pre-DCSE.
Teacher 9	Newcomer	Newcomer	Same
Teacher 10	Expert	Explorer	Lower than pre-DCSE.

Overall differences in the proficiency levels in pre-interviews with respect to DCSE results were presented in Table 21. Participants had the greatest number of matching results in the Digital Resources area (six participants). The areas of Assessment, Empowering Learners, and Facilitating Learners' Digital Competencies had the greatest number of participants (seven participants each) who demonstrated lower proficiency levels than their DCSE results. In total, the number of participants who showed higher proficiency in the pre-interview was relatively lower. These discrepancies between private school teachers pre-DCSE and interview results were further explored under the integration of findings section.

Table 21. Overall Differences in the Proficiency Levels in Pre-Interviews with Respect to DCSE Results

DigCompEdu Areas	Higher than pre-DCSE	Lower than pre-DCSE	Same
1.Professional Engagement	2	5	3
2.Digital Resources	-	4	6
3.Learning and Teaching	5	2	3
4.Assessment	-	7	3
5.Empowering Learners	1	7	2
6.Facilitating Learners' Digital Competencies	1	7	2

4.2 Private school teachers' digital competency levels after participating in the professional development program

The PD program started with 20 participants. However, a total of five participants could not continue, of whom three stated they could not participate due to a heavy workload. Two of them did not declare any reasons for their absence. Participants were asked to retake the DSCE after the PD program as a completion requirement. After the collection of data, post-DCSE scores from 15 participants were analyzed. A

descriptive summary of the post-DCSE results is presented in Table 22. The levels of participants after the PD program are presented in Table 23.

Table 22. Summary of the Post-DCSE Results

Areas	N	M	SD	Min	Max
Professional Engagement	15	9,07	2,99	5,00	14,00
Digital Resources	15	6,80	3,41	1,00	10,00
Teaching and Learning	15	8,13	3,74	2,00	15,00
Assessment	15	6,20	2,08	2,00	10,00
Empowering Learners	15	6,53	2,72	2,00	12,00
Facilitating Learners' Digital Competencies	15	10,60	3,96	1,00	17,00
Total	15	47,33	16,64	19,00	75,00

Table 23. Participants' Digital Competency Levels After the PD Program

Level	Newcomer	Explorer	Integrator	Expert	Leader	Pioneer
Professional Engagement	-	4	4	5	1	-
Digital Resources	3	2	9	-	-	-
Teaching and Learning	2	4	4	3	1	-
Assessment	-	5	4	4	1	-
Empowering Learners	-	6	3	3	1	1
Facilitating Learners' Digital Competencies	1	2	6	4	1	-
Overall	-	3	2	8	1	-

To explore the effectiveness of the PD program, participants' DCSE scores were gathered before and after the PD program. The results of DCSE were compared for each area of DigCompEdu. The following subsection presents the difference between pretest and posttest scores.

4.2.1 Is there a statistically significant difference in the digital competence proficiency levels of private school teachers before and after participating in the professional development program?

Before the pre-DCSE scores were compared with the post-DCSE scores, the researcher tested the normality of the two measures. For the pre-DCSE scores in each area of DigCompEdu, the Shapiro-Wilk test results demonstrated no significant deviation from normality ($p > .05$). Table 24 presents the results of the Shapiro-Wilk test for the pre-DCSE scores. As for the post-DCSE scores, the Shapiro-Wilk Test demonstrated no significant deviation from normality ($p > .05$), except for Area 2 ($p < .05$), as presented in Table 25.

Table 24. Shapiro-Wilk Results of Pre-DCSE

DigCompEdu Areas	Statistic	df	Sig.
Area 1: Professional Engagement	.928	14	.289
Area 2: Digital Resources	.946	14	.495
Area 3: Teaching and Learning	.892	14	.087
Area 4:Assessment	.891	14	.085
Area 5: Empowering Learners	.966	14	.824
Area 6: Facilitating Learners' Digital Competencies	.969	14	.860

Table 25. Shapiro-Wilk Results of Post-DCSE

DigCompEdu Areas	Statistic	df	Sig.
Area 1: Professional Engagement	.936	14	.365
Area 2: Digital Resources	.799	14	.005
Area 3: Teaching and Learning	.951	14	.572
Area 4: Assessment	.934	14	.345
Area 5: Empowering Learners	.903	14	.125
Area 6: Facilitating Learners' Digital Competencies	.936	14	.375

According to the normality tests and considering the relatively small sample size (N = 15), a nonparametric test, the Wilcoxon signed-rank test, was conducted to compare each area's pretest and posttest scores. The Wilcoxon signed-rank test results each area were presented in Table 26. The results indicated no statistically significant improvement for any area ($p > .05$).

Table 26. Wilcoxon Signed-Rank Test Results of Pre- and Post-DCSE

DigCompEdu Areas	Z	p
Area 1: Professional Engagement	-0,87	0,384
Area 2: Digital Resources	-0,42	0,673
Area 3: Teaching and Learning	-1,28	0,199
Area 4: Assessment	-1,66	0,098
Area 5: Empowering Learners	-1,03	0,303
Area 6: Facilitating Learners' Digital Competencies	-1,07	0,284
Overall scores of DCSE	-1.91	.057

As for the total scores on post-DCSE, the results ($p < .05$) indicated that the DCSE scores had a significant deviation from normality. Therefore, a non-parametric (Wilcoxon Signed-Rank Test) was conducted. According to the Wilcoxon Signed-Rank Test, the result was not statistically different ($p > .05$).

4.2.2. How do participants evaluate the effectiveness of the PD program on their digital competency improvement?

After the PD program, the researcher conducted interviews with 8 participants. The interview data were analyzed using an inductive analysis. The post-interview analysis aimed to discover how the participants of the PD program evaluate the effectiveness of the program on their digital competency improvement. A summary

of the categories and codes from the analysis of post-interviews is presented in Table 27.

Table 27. Frequency of Codes by Category

Category	Codes	Frequency
Challenges Encountered during the PD Process	Inconvenient session timing	4
	Delivery format	3
	Limited practice opportunities	2
Gains From PD	Change in perspective	5
	Discovering new tools	4
	Increased awareness	4
	Increased curiosity	4
	Increase in confidence	3
Plans & experience for Technology Integration	Specific integration plan	6
	General intention	3
	Integration of new tools	3
Positive Aspects of PD	Collaborative design	8
	Content quality	2
Suggestions for the PD Program	Delivery format	5
	Hands-on practice	5

4.2.2.1 Positive aspects of the PD program. In this category, participants are asked about the most effective parts of the PD program. All participants highlighted some positive aspects of the program. According to the analysis of the post-interviews, the positive aspects of the program were collaborative design and the content quality

Four participants pointed out that the collaborative design was effective. Teacher 1 also mentioned collaboration as a positive aspect of the PD program as follows:

> The collaboration aspect was important for me—the part where we shared, where we focused on specific topics together. Moving into those rooms, chatting, then returning… That part evoked a sense of face-to-face interaction and working in small groups. I think that was the most valuable aspect. (Teacher 1, post-interview)

Regarding the collaborative aspect of the PD program, another participant expressed that the collaborative design of the PD program was beneficial, especially with colleagues with the same subject.

> The sessions where we were split into groups and given space to talk… those were really helpful, especially when done with colleagues from the same subject area. (Teacher 7, post-interview)

Teacher 6 mentioned that learning encouraged her to take similar actions in her teaching by stating: "Learning from others is nice… It made me think that I could do something like that too."

Content quality was mentioned by two participants. Teacher 1 stated as follows:

> In general, the content of the training was very systematic and well-organized. It was a very well-prepared presentation… Besides that, I'll repeat: the flow being systematic and the presentation being systematic were very important to me. (Teacher 1, post-interview)

4.2.2.2 Participant gains from the PD program. All eight participants reported at least one gain from the program. According to the post-interview analysis, the gains from the PD program were a change in perspective, discovering new tools, increased awareness, increased curiosity, and increased confidence.

The most prominent gain from the PD program was "change in perspective" as five out of eight teachers mentioned a change in their perspective regarding using digital tools in their profession. Teacher 6, who was not open to using digital tools in the classroom before, expressed that her view on digital tools had changed by stating as follows:

> …my perspective really changed. I had told you before that I wasn't very open to using digital tools in math. But preparing these presentations, especially assigning homework, really changed my point of view. (Teacher 6, post-interview)

Teacher 4 also stated this change in her as follows:

> Right now, I feel like, “Actually, this can be done.” Before, I used to think, “Maybe these things aren't for me. Maybe it's better if we just stick with the model we've always used.” I used to believe that would benefit the student more. But now, I don’t think that way anymore. (Teacher 4, post-interview)

Discovering new tools, increased awareness, and increased curiosity were also significant gains from the PD, as four participants for each mentioned these aspects.

As for discovering new tools, Teacher 5 stated that “I learned about different platforms I hadn’t encountered before,” such as Teacher 2, who declared that “I guess it was again about gaining experience with tools I didn’t know before… I can say it was beneficial.”

With regard to increased awareness, Teacher 1 expressed her realization about her digital tool usage by stating that “I realized that I hadn’t been using many tools for a long time, even though I knew them—I just hadn’t been putting them into practice.” Likewise, Teacher 3 stated their increase in awareness as follows:

> You mentioned something like: “Don’t use it just for the sake of using it. Think about whether it’s really necessary, and plan accordingly.” After that, I stopped using tools just because they came to mind. I realized there were other activities more suitable to the purpose. I became more mindful of that. (Teacher 3, post-interview)

In terms of increased curiosity, Teacher 8 mentioned that “I can say that it (referring to the PD program) sparked my curiosity and I was wondering if there are any other examples apart from the tools you shared.” Similarly, Teacher 3 stated as follows:

> For example, even when an ad pops up somewhere, I look it up—what is this app, could it be useful for me? It catches my attention. It created a different kind of selective perception. (Teacher 3, post-interview)

Three participants reported an increase in their confidence. Teacher 2 mentioned their increase in confidence stating that:

> I think what I gained was this: not giving up, playing around with the tool, tinkering with it, continuing without quitting. Sometimes you feel overwhelmed and think, “This will do, I’ll just use one or two tools I know.” But I guess now I feel like: “No, this can be done too, that can be explored too—it’s not that hard.” (Teacher 2, post-interview)

Regarding increased confidence, Teacher 7 mentioned that in a probable future pandemic, it would be easier to adapt:

> For example, if we had known these (like breakout rooms on Teams) during the pandemic, we could have used them much more actively. We weren’t prepared at the time. Now, if something like that happened again, we would adapt much more easily. I think it would be more beneficial. (Teacher 7, post-interview)

4.2.2.3 Plans and experience for technology integration. All eight participants stated plans or recent attempts for technology integration inspired by the PD program.

A total of six out of eight participants gave details about their specific integration plans. Teacher 5 mentioned her plans by saying: “I’m thinking of integrating things like opening an activity on Padlet and asking students to write their responses.” Likewise, Teacher 3 stated as follows:

> After the training with you, I started thinking that I could do more things, especially in the high school levels I teach. At the very least, I can create environments where students can debate ideas. I haven't officially planned this yet, but I'm considering organizing a debate activity. I might use Padlet or other tools for it. (Teacher 3, post-interview)

Teacher 6 also mentioned her plan on integrating presentations to her traditional methods of instruction:

> First, I teach the lesson on a whiteboard. Then, instead of repeating, I’d like to use a presentation I prepare and then move into solving questions from the course material. That’s the plan. I haven’t integrated it yet, but still. (Teacher 6, post-interview)

She (Teacher 6) also stated that she was working with another teacher on how to integrate digital tools into their classroom: “I have a colleague in my subject group who is very knowledgeable about these tools… we’ll be working together.”

In addition to these specific plans for integration, three teachers (Teacher 4, Teacher 6,and Teacher 8) also stated their general intentions of integrating technology into their classrooms after the PD program.

Three teachers mentioned their attempt to integrate a new digital tool. Teacher 6 mentioned her experience with Canva after PD program: “I didn’t use Canva much before, but now I’ve started doing things with it.” Teacher 7 also mentioned her first use of Padlet in the classroom:

> I hadn’t used Padlet much before. It’s a great tool. For example, we asked students to share their thoughts there and they posted them like reflections on the wall. We even wrote messages there. I actually used it for the first time with you. (Teacher 7, post-interview)

Teacher 4 also mentioned that she observed a positive impact of her integration of instructional videos in the classroom: “Even a student who normally never participates in class was able to make comments. It grabbed their attention.”

4.2.2.4 Challenges encountered during the PD program. Seven out of eight participants mentioned challenges faced during the PD program. These challenges included inconvenient session timing, the delivery format, and limited practice opportunities.

Scheduling issues were the most prevalent challenge mentioned by the participants. Four participants pointed out the challenges around the time of the PD program sessions.

Three teachers reported the delivery format of the PD sessions being online as a challenge. A preference for face-to-face programs was stated as one of the teachers put it as: “Just sitting in front of a screen and following the session wasn’t really a suitable learning method for me.” Another teacher pointed out the importance of physical presence:

> I feel like there's still a need to be physically present. Experiencing one or more programs in the same environment—playing around with them, so to speak—and producing something as a group is important to me. (Teacher 1, post-interview)

Teacher 8 also stated similar opinions, focusing on the physical distance caused by the delivery format:

> You know, other teachers joined this activity from completely different places. It was hard to consult with anyone. (Teacher 8, post-interview)

4.2.2.5 Suggestions for the PD program. All eight participants suggested at least one recommendation for the improvement of the PD program. The most significant suggestions were about delivery format and the need for more hands-on practice. The need for hands-on practice as a suggestion to improve the program was mentioned by five participants. Teacher 7 suggested that adding a special hands-on session to the program could be beneficial:

> To support our development, maybe you could include hands-on workshops like this in our future training sessions. That would be really nice. (Teacher 7, post-interview)

Teacher 1 also pointed out the need for experimenting with the digital tools by stating, "I think what teachers need most in the field is time to experience and experiment with all these programs mentioned."

Another one of the most significant suggestions was about changing the delivery format. Teacher 8 reported their preference for face-to-face over online professional development programs by stating, "It would be much, much better if it were face-to-face." Teacher 5 also stated their suggestion regarding the delivery format as:

> Actually, your content is really good, but perhaps one suggestion would be to redesign it as an in-person experience instead of being fully online. That could be an area to improve. (Teacher 5, post-interview)

One participant also suggested reconsidering the schedule of the overall program, as it was at the end of the work hours, which was tiring to attend.

4.3 Integration of findings

4.3.1 Research question 1: What are the private school teachers' levels of digital competencies before engaging in the PD program?

The first research question aimed to investigate the initial digital competency levels before participating in the PD program to specify the needs for improvement. To answer this research question, pre-DCSE scores were analyzed. After pre-DCSE analysis, the researcher conducted semi-structured pre-interviews with 10 teachers who were confirmed to participate in the PD program. The purpose of the pre-interviews was to discover any possible discrepancy between DCSE results and teachers' actual initial digital competency levels.

According to pre-DCSE results, the majority of 91 PD volunteers were Experts (42%) and Integrators (31%). This result indicated that the PD volunteer teachers' initial digital competency levels were moderate. According to the DigCompEdu Framework (Redecker, 2017), integrators and experts "apply, further expand and reflect on their digital practices". However, pre-interview analysis of 10 PD volunteers indicated that there was a discrepancy between perceived initial digital competencies and the pre-interviews.

Pre-interviews with ten PD volunteers demonstrated that the areas that demonstrated the greatest number of inconsistencies were assessment, empowering learners, and facilitating learners' digital competencies. In these areas, seven out of ten PD volunteers demonstrated lower levels of initial digital competencies compared to pre-DCSE results. In contrast, PD volunteers demonstrated higher

digital competency levels in the digital resources area. Six out of ten PD volunteers had higher levels than their initial digital competency levels determined by their pre-DCSE results.

These findings suggest that PD volunteers might be more cautious or modest in terms of self-assessing their digital competencies. Also, the results from self-report scales such as pre-DCSE may not fully demonstrate the actual digital competencies, since these results manifest only the perceived digital competencies. Another reason for this discrepancy might stem from the interview setting. PD volunteers may have felt the need for a deeper reflection when asked to explain in their own words rather than to select from multiple-choice answers.

4.3.2 Research question 2: To what extent does implementing a professional development program based on the DigCompEdu Framework enhance private school teachers' digital competencies?

The second research question aimed to examine the effectiveness of the professional development program. To answer the second research question, DCSE (Toker, 2021) was conducted again after the PD program. The purpose of the post-DCSE analysis was to reveal the difference between the initial and final digital competency levels. According to Wilcoxon Signed-Rank Test results, there was no statistically significant difference between pre- and post-DCSE scores. In fact, some teachers among the 15 PD participants demonstrated lower final digital competency levels in the post-DCSE.

The qualitative results from post-interviews with the eight PD participants showed that participants reported positive changes in their digital competencies, such as increased confidence, awareness, curiosity, and a change in perspective towards

using digital tools in their profession. These gains reported by the eight PD participants suggest that the PD program had, in fact, an impact, even though the quantitative results demonstrated no significant improvement in digital competencies.

CHAPTER 5

DISCUSSION AND CONCLUSION

This mixed-methods study aimed to investigate the digital competencies of private school teachers, design a professional development program based on the improvement needs, and evaluate the program's effectiveness. Quantitative data were collected through DCSE (Toker et al., 2021) before and after the PD program. Qualitative data were collected through semi-structured interviews before and after the PD program.

In the following sections, the findings related to each research question are discussed concerning the existing literature, followed by the study's recommendations for future research and practice, and an overview of its limitations.

5.1 Digital competency levels of private school teachers

The first research question aims to explore the private school teachers' initial digital competencies. To achieve this, the data from DCSE (Toker et al., 2021) was collected before the professional development program (pre-DCSE). The purpose of the pre-DCSE was to determine the initial digital competency levels of private school teachers to identify the DigCompEdu areas for improvement. In order to design a targeted professional development program for private school teachers, the results of the pre-DCSE were used.

According to the DigCompEdu Framework, teachers' digital competency levels are measured with the DigCompEdu Progression Model. DigCompEdu Progression Model has six stages from Newcomer (A1) to Pioneer (C2), which can be categorized into three as low, intermediate, upper. Teachers whose digital

competency levels are at the first two stages, namely Newcomer (A1) and Explorer (A2), “assimilate new information and develop basic digital practices” (Redecker, 2017). In Integrator (B1) and Expert (B2) levels, according to the DigCompEdu Framework, “educators apply, further expand and reflect on their digital practices” (Redecker, 2017). As for the Leader (C1) and Pioneer (C2) levels, teachers “pass on their knowledge, critique existing practice and develop new practices” (Redecker, 2017).

The current study, pre-DCSE analysis revealed that the majority of participants were in the intermediate levels: Experts (41%), followed by the Integrators (31%). Similarly, Garcia-Delgado and colleagues (2023) also demonstrated that the levels of teachers are at Integrator and Expert levels on average, with a difference such that there were more integrators than experts in their study — out of 101 teachers, 39% were integrators and 26% were experts. A previous study by Suzer and Koç (2024) also revealed that teachers who work in public schools were, on average, at the integrator level, in which the adapted version of DCSE by Toker (2021) was used. This result may be due to the fact that the participants in the current study were private school teachers, since some studies have shown that private school teachers have higher digital competency levels (Kumar & Sharma, 2024; Daga et al.,2023).

Studies show that teachers were struggling more with some specific DigCompEdu areas especially with facilitating learners’ digital competencies. Such an instance was shown by Rubio-Gragera and colleagues (2023). According to their study with 104 teachers who filled in the DigCompEdu check-in questionnaire, the lowest-scoring area was Area 6 (Facilitating Learners’ Digital Competencies), followed by Assessment (Area 4). Similarly, Momdjian et al. (2024) also suggest that

teachers are less competent in facilitating learners' digital competencies (Area 6). These findings align with the study of Cabero-Almenara et al. (2023), where they also found that the lowest areas were Facilitating Learners' Digital Competencies (Area 6), along with the Digital Resources (Area 2).

However, as for the specific areas in which private school teachers need to improve in the current study, the analysis of the pre-DCSE scores of the 91 private school teachers demonstrated that the average level for all areas was at the Integrator level. Since the digital competency levels in all the areas were close to each other, the PD program was designed for all areas of the DigCompEdu Framework. Under all the areas, the researcher chose the subareas that had the lowest scores in pre-DCSE.

To further investigate the levels of digital competencies of private school teachers, pre-interviews were conducted with 10 private school teachers who participated in the pre-DCSE. The analysis revealed that there were some differences between pre-DCSE and pre-interview results. There was a discrepancy between teachers' pre-DCSE levels and the digital competency levels demonstrated in pre-interviews. The majority of teachers were found to exhibit lower levels of DigCompEdu than their pre-DCSE results.

The discrepancy between pre-DCSE and pre-interviews may stem from the gap between teachers' self-perceived digital competencies and their actual demonstrated skills, since the DCSE relies on self-reported data. Studies have shown that self-perceived competencies may be underestimated or overestimated by the teachers. Maderick and colleagues (2016) found that preservice teachers tend to overestimate their digital competency levels. Mohammadpour and Maroofi (2024) also pointed out such a discrepancy in their study, where teachers rated their

technological pedagogical knowledge much higher on self-assessment surveys, compared to their performance-based tasks. According to the relevant literature, there are some explanations for the misalignment of teachers' actual digital competencies and their self-assessed levels. One of them is that teachers lack self-awareness because of the complex nature of the technology integration into teaching (Mohammadpour & Maroofi, 2024). Another reason for the miscalibration between self-assessed levels and the actual levels of digital competencies may also stem from a lack of metacognitive skills (Kruger & Dunning, 1999), as Seifert and Lindmeier (2024) also mentioned in their study.

In the areas of assessment, empowering learners and facilitating learners' digital competencies were higher in terms of differences. Seven out of 10 teachers were exhibiting lower levels of digital competencies than their pre-DCSE results in these areas. In the professional engagement area, five teachers are found to exhibit lower levels than their pre-DCSE results. Likewise, for the digital resources area, four teachers had lower levels according to pre-interviews, and six demonstrated no difference. The only area where teachers exhibited higher levels of DigCompEdu was learning and teaching; five out of 10 teachers were at higher levels than their pre-DCSE. The reason for the teaching and learning area being higher than the other areas may be a result of the teachers' confidence in this area. Rubio-Gragera and colleagues (2024) discussed the increase in teachers' confidence in using information and communication technology after the COVID-19 pandemic.

5.2 Effectiveness of the professional development program

In order to explore the effectiveness of the professional development program, a quantitative analysis was conducted to compare pre- and post-DCSE scores of 15

teachers who completed the program. The results of the Wilcoxon signed-rank tests demonstrated no statistically significant differences ($p > .05$). After examining the PD participants' pre-DCSE and post-DCSE scores, some participants were observed to have lower scores in the post-DCSE. Taking into consideration the fact that post-interview results also demonstrated an increased awareness after participating in the PD program, this may suggest that the PD program contributed to an increased self-awareness of participants regarding their actual digital competency levels. This is also evident in the relevant literature. For instance, Romero-Tena et al. (2025) studied pre-service teachers ' digital teaching competencies with the DigCompEdu questionnaire, where they found that the post-test scores after the training were lower.

Ortega et al. (2020) also found that there was no significant change after training (as cited in Alférez-Pastor et al., 2023). They concluded that there may be a need for "more comprehensive training programs that address all facets of digital competences (Ortega et al., 2020, as cited in Alférez-Pastor et al., 2023). Research also emphasizes that effective improvements in digital skills usually require sustained, iterative training rather than a single short program (Kraft et al., 2018). The program had to be completed in four weeks (except for the introductory session), in contrast to the initial plan of a seven-week schedule. Such as snow breaks or an administrative meeting at the last minute, interrupted the schedule and forced the researcher to reschedule and condense the last four sessions into two sessions. All in all, in the current study, even though the PD program was comprehensive in terms of its coverage of all domains of the DigCompEdu, the time restrictions may have been a reason for that there was no significant change in terms of quantitative analysis.

Even though quantitative results indicated that there were no significant improvements in private school teachers' digital competencies after the PD program, the post interviews revealed some positive outcomes of the program. In this study, participants reported some positive outcomes after PD, such as a change in perspective, greater awareness and curiosity of digital competencies, and discovering new digital tools. Studies have also shown improvements in teachers' perspectives about technology integration after participation in PD (Amemasor et al., 2025; Phan et al., 2021).

Post-interviews also revealed that teachers found the collaborative design of the program effective; four out of eight teachers mentioned collaborative aspects of the PD program in this regard. Amemasor and colleagues (2025) examined the effect of teacher PD programs on digital instructional integration in their systematic review. They found that PD designs that integrate collaborative learning are effective which corresponds with the results of this study.

Peer learning was also found to be an effective aspect of the PD program,which is also prominent in the literature (Amemasor, 2025). All eight participants stated their intentions about technology integration. Six of them gave specific plans by mentioning a subject or a digital tool. These findings highlighted the significant role of professional development programs in not only raising awareness but also encouraging peer learning for acquiring digital competency skills.

Analysis of the post-interviews revealed that there were also some challenges encountered during the PD process. The schedule of the online PD sessions was found inconvenient by half of the interview participants. PD sessions were held after teachers' work hours. This challenge was also observed during the PD sessions by the researcher. Jati (2023) also pointed out the challenges such as time management

and issues regarding internet connection. This was also prominent in this study. In the PD program, teachers stated that their busy schedules made it difficult for some of the pariticipants to keep up with the program.

Some teachers also complained about the delivery format, as they prefer face-to-face sessions over online. This point lso came as a suggestion, as five out of eight teachers suggested a change in the delivery format. Aligning with this result, Mulaimovic et al. (2024) investigated the difference between online and face-to-face PD programs in terms of engagement and quality. They found that even though online PD programs can be potentially effective, engagement and quality of online PD programs were rated lower by the teachers, which indicates a preference for the face-to-face format of delivery.

5.3 Recommendations for future research and practice

In this study, even though the number of participants in the quantitative part was adequate, the participants of the PD program were only 15. Also, all the participants in this study's qualitative phases were female, whereas only a small number of male participants were in the pre-DCSE. Therefore, future studies should aim to include a greater number of participants, considering the male-female ratio.

This study focused exclusively on private school teachers and implemented the professional development program within that specific context. As another recommendation for future research, private school teachers should be compared with public school teachers in terms of their digital competency levels to present a more generalizable view. Previous research suggests that there might be differences between private and public schools in terms of access to technological resources, institutional support, and expectations around technology integration (Daga et al.,

2023; Kumar & Sharma, 2024). Exploring these differences in a comparative approach could provide deeper insights. Furthermore, such comparisons would inform policymakers and stakeholders in designing more tailored PD programs that consider the challenges and opportunities specific to each school type. Future studies may also consider analyzing how factors such as school culture, leadership, and infrastructure have an impact on professional development initiatives.

This study relied on self-perceptions of their digital competencies, which were gathered by self-assessment instruments and interviews. Even though self-perception tools can provide valuable insights about teachers' understandings of their own digital competencies, they also have some limitations. Also prominent in this study, over- or underestimation of skills and a poor reflection of the actual classroom activities are some of those significant limitations (Maderick et al., 2016; Mohammadpour & Maroofi, 2024). Therefore, future studies may consider integrating other methods of describing the competency levels, such as classroom observations, performance-based assessments, or e-portfolio evaluations.

The PD program designed for this study was delivered through online sessions. Even though this format provided flexibility and accessibility, it also created some challenges. Research also supports this finding. For instance, Mulaimović et al. (2024) found that teachers who participated in face-to-face professional development sessions were more engaged, worked together more, and were more satisfied than those who went to online programs. Considering the preferences of PD participants in the post-interviews in this study, the face-to-face or blended delivery methods may be more satisfactory for the participants of professional development programs.

The current PD program was implemented in a relatively short period of time due to some constraints, such as the academic calendar and institutional interruptions. Future programs may be implemented over an extended duration to give teachers more time to reflect and practice.

5.4 Limitations

Even though the study provides some valuable insights about the digital competencies of private school teachers, there are several limitations of this study. The first limitation to be acknowledged was the small sample size of 15 participants in the PD program. The fact that all participants were from private schools was also a limitation. There weren't any public-school teachers in the sample. Another limitation of the sample was the fact that all the teachers who participated in the PD program were females. There were only 19 male teachers in the pre-DCSE, which corresponds to approximately 21% of the total 91 participants.

The fact that the data collected through DCSE (Toker, 2021) provided the self-perceived levels of teachers' digital competency was another limitation for the study. The content of the PD program was decided after pre-DCSE only. Determining the content after the pre-interview analysis could have been a more effective approach. However, due to time restrictions, this approach couldn't be adopted.

There were also limitations regarding the implementation of the PD Program. There were several disruptions during the program, including snow breaks, last-minute school-wide meetings, and other conflicting programs administered by the individual campuses. These interruptions could affect some of the participants ' experience with the program. Also, the fact that there were teachers from different

schools participating in the program may have made it challenging for participants to engage in the program on equal terms.

Another limitation of this study is that pre-interview data were not used for PD design due to time constraints. Only pre-DCSE results were used for the content of the PD program. The pre-interviews were implemented after the design process. As a result, the program design didn't include qualitative analysis about teachers' initial digital competencies. In addition to the quantitative analysis, considering the qualitative data analysis could have facilitated the process of determining the content for the program more effectively.

APPENDIX A

DIGITAL COMPETENCY SCALE FOR EDUCATORS

Dear Teacher,

Nur Banu Çetinkaya, a graduate student in the Department of Educational Technology at Boğaziçi University, is conducting a research study titled *"Investigating Teachers' Digital Competencies Based on the DigCompEdu Framework: A Mixed Methods Study."* The aim of this study is to identify teachers' levels of digital competence, determine the areas that need improvement, and develop a professional development program to improve digital competencies. The findings of this study are expected to contribute to the development of strategies for improving participants' digital competencies.

We invite you to participate in this research. Before you make a decision, we would like to share the details of the study with you.

This research involves two stages in which your participation may be requested. In the first stage, you will be asked to complete a questionnaire designed to assess your level of digital competence. Upon completion, you will receive feedback about your current digital competence level. Based on your participation in the first stage, you may be contacted for the second stage. If you agree to continue, you will be asked to participate in an online digital competence training module. This module will consist of 8 sessions in total—5 synchronous and 3 asynchronous. Synchronous sessions will be conducted online via Microsoft Teams, each lasting approximately one hour. The asynchronous sessions, which you may complete at your own pace, will include tasks such as exploring digital tools, designing sample classroom activities, and sharing your reflections on various topics.

At the end of the module, a short follow-up interview (approximately 30 minutes) will be scheduled with all participants. The purpose of this interview is to gather feedback about your experience with the training program.

This research is conducted for scientific purposes. All personal data and information will remain strictly confidential. Collected data will not be shared with anyone outside the research team. All digital records will be stored in the researcher's password-protected cloud account and personal computer during the study and will be permanently deleted after the study is completed. If you choose to withdraw from the study for any reason, any data collected from you will be destroyed immediately. Teaching materials or products shared by the participants may be included in the scientific report of the study, provided that personal information remains anonymous. Your participation in this study is completely voluntary. You may withdraw from the study at any time and without providing any justification. If you would like further information about the study, please contact the thesis supervisor. For any questions regarding your rights as a participant, you may also contact the Boğaziçi University Social and Human Sciences Research Ethics Committee (Email: sbinarek@bogazici.edu.tr).

Demographic Information

1. Name Surname: …

2. School where you are currently working:…

3. Subject area: …

4. Grade level you teach …

5. Gender:

□ Male

□ Female

6. Graduation

□ Bachelor

□ Master's Degree

□ Doctoral Degree

7. Teaching experience

□ 0-2 years

□ 2-5 years

□ 5-10 years

□ 10-15 years

□ 15-20 years

□ Over 20 years

8. Range of age

□ 20-30

□ 30-40

□ 40-50

□ 50-60

□ 60-70

9. I agree to participate in the online digital competency program.

□ Evet

□ Hayır

Area 1: Professional Engagement

1. I systematically use different digital channels to enhance communication with students and fellow academics (e.g., emails, blogs, the department's website, Apps)

□ I rarely use digital communication channels

□ I use basic digital communication channels (e.g., e-mail)

□ I combine different communication channels (e.g., e-mail and class blog or the department's website)

□ I systematically select, adjust and combine different digital solutions to communicate effectively

□ I reflect on, discuss and proactively develop my communication strategies

2. I use digital technologies to work together with colleagues inside and outside my educational organization

□ I rarely have the opportunity to collaborate with other academics

□ Sometimes I exchange materials with colleagues (e.g., via e-mail)

□ Among colleagues, we work together in collaborative environments or use shared drives

□ I exchange ideas and materials, also with academics outside my organization, (e.g., in an online professional network)

□ I jointly create materials with other academics in an online network

3. I actively develop my digital teaching skills

□ I rarely have the time to work on my digital teaching skills

□ I improve my skills through reflection and experimentation

□ I use a range of resources to develop my digital teaching skills

□ I discuss with peers how to use digital technologies to innovate and improve educational practice.

□ I help colleagues in developing their digital teaching strategies.

4. I participate in online training opportunities (e.g., online courses, MOOCs, webinars, virtual conferences)

□ This is a new area that I have not yet considered

□ Not yet, but I am definitely interested

□ I have participated in online training once or twice

□ I have tried out various different online training opportunities

□ I frequently participate in all kinds of online training

Area 2: Digital Resources

1.I use different internet sites and search strategies to find and select a range of different digital resources

□ I only rarely use the internet to find resources

□ I use search engines and resource platforms to find relevant resources

□ I evaluate and select resources on the basis of their suitability for my learner group

□ I compare resources using a range of relevant criteria (e.g., reliability, quality, fit, design, interactivity, appeal)

□ I advise colleagues on suitable resources and search strategies

2. I create my own digital resources and modify existing ones to adapt them to my needs

□ I do not create my own digital resources

□ I do create lecture notes or reading lists with a computer, but then I print them

□ I create digital presentations, but not much more

□ I create and modify different types of resources

□ I set up and adapt complex, interactive resources

3. I effectively protect sensitive content (e.g., exams, students' grades, personal data)

□ I do not need to do that, because the department takes care of this

□ I avoid storing personal data electronically

□ I protect some personal data

□ I password protect files with personal data

□ I comprehensively protect personal data (e.g., combining hard-to-guess passwords with encryption and frequent software updates)

Area 3: Teaching and Learning

1. I carefully consider how, when and why to use digital technologies in teaching, to ensure that they are used with added value

□ I do not or only rarely use technology in class

□ I make basic use of available equipment (e.g., digital whiteboards or projectors)

□ I use a variety of digital strategies in my teaching

□ I use digital tools to systematically enhance teaching

□ I use digital tools to implement innovative pedagogic strategies

2. I monitor my students' activities and interactions in the collaborative online environments we use

□ I do not use digital environments with my students

□ I do not monitor student activity in the online environments we use

□ I occasionally check on them and their discussions

□ I regularly monitor and analyze my students' online activity

□ I regularly intervene with motivating or corrective comments

3. When my students work in groups or teams, they use digital technologies to acquire and document evidence

□ My students do not work in groups

□ It is not possible for me to integrate digital technologies into group work

□ I encourage students working in groups to search for information online or to present their results in digital format

□ I require students working in teams to use the internet to find information and present their results in a digital format

□ My students exchange evidence and jointly create knowledge in a collaborative online space

4. I use digital technologies to allow students to plan, document and monitor their learning themselves (e.g., quizzes for self-assessment, ePortfolios for documentation and showcasing, online diaries/blogs for reflection)

□ Not possible in my work environment

□ My students do reflect on their learning, but not with digital technologies □ Sometimes I use, for example, quizzes for self-assessment

□ I use a variety of digital tools to allow learners to plan, document or reflect on their learning

□ I systematically integrate different digital tools to allow learners to plan, monitor and reflect on their progress

Area 4: Assessment

1. I use digital assessment formats to monitor student progress

□ I do not monitor students' progress

□ I do monitor students' progress regularly, but not with digital means

□ Sometimes I use a digital tool (e.g., a quiz, to check on students' progress)

□ I use a variety of digital tools to monitor student progress

□ I systematically use a variety of digital tools to monitor student progress

2. I analyze all data available to me to timely identify students who need additional support "Data" includes students' engagement, performance, grades, attendance; activities and social interactions in (online) environments; "Students who need additional support" are students who are at risk of dropping out or underperforming; students who have learning disorders or specific learning needs, students who lack transversal skills, e.g. social, verbal or study skills.

□ These data are not available and/or it is not my responsibility to analyze them

□ I only analyze academically relevant data (e.g., performance and grades)

□ I also consider data on student activity and behavior to identify students who need additional support

□ I regularly screen all available evidence to identify students who need additional support

□ I systematically analyze data and intervene in a timely manner

3. I use digital technologies to provide effective feedback

□ Feedback is not necessary in my work environment

□ I do provide feedback to students, but not in digital format

□ Sometimes I use digital ways of providing feedback (e.g., automatic scores in online quizzes, comments or “likes” in online environments)

□ I use a variety of digital ways of providing feedback

□ I systematically use digital approaches to provide feedback

Area 5: Empowering Learners

1. When I create digital assignments for students I consider and address potential digital problems (e.g., equal access to digital devices and resources; interoperability and conversion problems; lack of digital skills)

□ I do not create digital assignments

□ My students do not have problems with using digital technology

□ I adapt the task so as to minimize difficulties

□ I discuss possible obstacles with students and outline solutions

□ I allow for variety, e.g. I adapt the task, discuss solutions, and provide alternative ways for completing the task

2. I use digital technologies to offer students personalized learning opportunities (e.g., I give different students different digital tasks to address individual learning needs, preferences, and interests)

□ In my work environment, all students are required to do the same activities, irrespective of their level

□ I do provide students with recommendations for additional resources

□ I provide optional digital activities for those who are advanced or lagging behind

□ Whenever possible, I use digital technologies to offer differentiated learning opportunities

□ I systematically adapt my teaching to link to students' individual learning needs, preferences, and interests

3. I use digital technologies for students to actively participate in classes

□ In my work environment it is not possible to actively involve students in class

□ I do involve students actively, but not with digital technologies

□ When instructing, I use motivating stimuli (e.g., videos, animations, cartoons)

□ My students engage with digital media in my classes (e.g., electronic worksheets, games, quizzes)

□ My students systematically use digital technologies to investigate, discuss and create knowledge

Area 6: Facilitating Learners' Digital Competence

1. I teach students how to assess the reliability of information and to identify misinformation and bias

□ This is not possible in my subject or work environment

□ I occasionally remind them that not all online information is reliable

□ I teach them how to discern reliable and unreliable sources

□ I discuss with students how to verify the accuracy of information

□ We comprehensively discuss how information is generated and can be distorted

2. I set up assignments which require students to use digital means to communicate and collaborate with each other or with an outside audience

□ This is not possible in my subject or work environment

□ Only on rare occasions are my students required to communicate or collaborate online

□ My students use digital communication and cooperation mainly among each other

□ My students use digital ways to communicate and to cooperate with each other and with an external audience

□ I systematically set assignments that allow students to slowly expand their skills

3. I set up assignments which require students to create digital content (e.g., videos, audios, photos, digital presentations, blogs, wikis)

□ This is not possible in my subject or work environment

□ This is difficult to implement with my students

□ Sometimes, for diversion and motivation

□ My students create digital content as integral part of their study

□ This is an integral part of their learning and I systematically increase the level of difficulty to further develop their skills

4. I teach students how to behave safely and responsibly online

□ This is not possible in my subject or work environment

□ I inform them that they have to be careful with relaying personal information online

□ I explain the basic rules for safely and responsibly acting in online environments

□ We discuss and agree on rules of conduct

□ I systematically develop my students' use of social rules in the different digital environments we use

5. I encourage students to use digital technologies creatively to solve concrete problems (e.g., to overcome obstacles or challenges emerging in the learning process)

□ This is not possible with my students, in my work environment

□ I rarely have the opportunity to foster students' digital problem solving

□ Occasionally, whenever an opportunity arises

□ We often experiment with technological solutions to problems

□ I systematically integrate opportunities for creative digital problem solving

APPENDIX B

THE CONTENT OF THE PROFESSIONAL DEVELOPMENT PROGRAM

The program is planned according to the schools' academic calendars. The program is planned to end right before the semester break (20.01.2025). The weekly schedule, areas, subjects to focus on, and activities are presented in the tables below. The program will be covered in 7 weeks and 10 sessions. There are 7 synchronous and 3 asynchronous sessions. Synchronous sessions will cover the subareas with the lowest scores. Asynchronous sessions are added to allow participants to reflect on the online sessions and practice what is discussed.

1. Objectives

The overall objectives are as follows:

- To enhance teachers' skills in professional collaboration using digital tools to facilitate communication and teamwork with other colleagues (Area 1)
- To foster a culture of reflection where teachers critically assess and adapt their technology use practices (Area 1)
- To enable teachers to effectively choose and alter digital materials to fit various needs (Area 2)
- To equip teachers with tools to run successful digital collaborative learning environments to support student involvement and interaction (Area 3)
- To encourage the use of digital tools to support group projects in the classroom (Area 3)

- To encourage the use of formative assessments to guide decisions for instruction (Area 4)
- To enable teachers to analyze data for instructional decisions effectively (Area 4)
- To improve teachers' ability to create individualized learning plans using digital tools to maximize student participation and performance (Area 5)
- To improve teachers' ability to help their students' use digital technologies responsibly and ethically, managing their digital identity, digital footprint and digital reputation (Area 6)
- To encourage teachers to consider their experiences and learning throughout the program for future improvement (Reflections)

2. The Content

The content of the program is decided according to the analysis of DCSE. The summary of the session activities and focus areas is presented in Table 1. A detailed plan of the sessions is also provided in the next parts. The program is designed by taking the MOOC (Unlocking Power of Teachers' Digital Competence) in EU Academy as a guiding example.

2.1 Session 1 (Synchronous) For Area 1: Professional Engagement

Focus	Professional collaboration and reflective practice
Objectives	· To enhance teachers' skills in professional collaboration using digital tools to facilitate communication and teamwork with other colleagues (Area 1) · To foster a culture of reflection where teachers critically assess and adapt their technology use practices (Area 1)

Platform and Materials	Microsoft Teams Mentimeter Google Forms
Session Structure (60 min)	*Welcome and overview (10 min)* Participants will be welcomed, and a quick overview of the program and DigCompEdu Framework and progression levels will be discussed. The teams collaborative space and personal notebooks will be explained. The overview of the first session will be provided. Teachers create their first note on their personal notebook: ● My Goals for Professional Development *Introduction (10 min)* Mentimeter activity: Q1: What are the 3 words that come to your mind when professional collaboration is mentioned? Q2: Do you use digital tools for collaboration with colleagues? a) Yes b) No Q3: If yes, which tools do you use for digital collaboration?

Session Structure (60 min)	*Professional collaboration (20 min)* Definition and an example will be discussed: Teacher Labs from Edutopia. After showing the video, teachers are asked about their thoughts such as: brainstorming on benefits and barriers to professional collaboration and how to provide constructive feedback. Approaches (PLC, Common Planning) and tools (Teams, Google Docs, Padlet etc.) for Professional collaboration and tools is briefly mentioned. *Reflective Practice (15 min)* A question asked for a big group discussion: *What do you understand from reflective practice?* (Its importance in terms of Continuous Professional Development is also discussed here) After participants give their answers through the messages in Teams meeting, the definition of reflective practice is discussed. Gibbs Reflective Cycle is mentioned. *Closure and about the next session (5 min)* Participants encouraged to create their personal PD goals and share them in their Personal Teams Notebook after the session. The teachers will be informed about that presentation and more resources are shared in Teams channel where they can access and download. Participants will be informed about the next session. They will be informed about the Google Forms questionnaire.

Feedback	They will send a Google Forms questionnaire about the overall experience with the session: 1. What was the most useful piece of information or skill you learned during this session? 2. What could we have done differently to make the session more effective?

2.2 Session 2 (Synchronous) For Area 2: Digital Resources

Focus	Selecting, creating and modifying digital resources
Objectives	· To enable teachers to effectively choose and alter digital materials to fit various needs (Area 2)
Platform and Materials	Microsoft Teams Mentimeter
Session Structure (60 min)	*Introduction (5 min)* Mentimeter activity: *What do you understand when we mention digital resources?* Which tools do you use? "Digital resources" will be defined as the *materials that have been conceived and created digitally or by converting analogue materials to a digital format*. This definition is compared with the answers. *Types of digital resources (10 min)* Participants are asked about what the types of digital resources are, and they answer through the teams messages. The types of resources are discussed with their available examples: Multimedia content (Khan Academy), applications (Wakelet etc.), Productivity tools (lesson plan example in Notion).

Session Structure (60 min)	*Selecting digital resources (15 min)* The table from EU Academy is shown and discussed. Mentimeter activity: *What criteria can we use for selecting digital resources?* After answers, the criteria is decided. *Modifying and creating digital resources (25 min)* Participants are asked what their experiences are about creating their own digital resources (types of digital resources will be reminded here). Images (Canva), games (Kahoot) , collaborative documents (Google Docs or Teams Collaboration space), Interactive videos (Edpuzzle) are discussed Examples of each will be shown. Discussion: *On which teaching scenarios do you prefer to use these types?* Question: *What should teachers pay attention when they are creating or modifying digital resources for their classrooms?* After a small discussion, together they create their own list of steps when creating resources on teams collaboration space. List is likely to have these steps: - Analyzing student data - Curriculum review - Identifying students' needs - Learning objectives - Collaborative feedback from fellow teachers - Student feedback

Session Structure (60 min)	*Closure (5 min)* Participants will be informed about the next session (asynchroneous).
Feedback	They will send a Google Forms questionnaire about the overall experience with the session: 1. What was the most useful piece of information or skill you learned during this session? 2. What could we have done differently to make the session more effective?

2.3. Synch. Session 3 (Area 3): Teaching and Learning

Focus	Collaborative learning
Objectives	· To equip teachers with tools to run successful digital collaborative learning environments to support student involvement and interaction · To encourage the use of digital tools to support group projects in the classroom
Platform and Materials	Microsoft Teams Mentimeter Teachers are advised to join the session with a laptop or tablet.
Session Structure (60 min)	*Introduction (5 min)* Overview of the session

Session Structure (60 min)	*Collaborative learning (10 min)* Through teams messages: *What are the first three words that come into your mind when you think about collaborative learning?* After answers are read, the discussion is directed towards to the question of whether creating only group activities is enough for collaboration. Skills to have for collaborative learning is mentioned. Group dynamics and how to establish agreement in the group is discussed. Teaching students how to listen is also important. Mentimeter: *What strategies do you use for collaborative learning in your classroom? (answer as: strategy/field)* Some discussion strategies is discussed as examples: Think-pair share and Save the Last Word for Me. These strategies help students practice being both active speakers and active listeners in a group conversation.

Session Structure (60 min)	*Digital tools for collaborative learning (40 min)* Discussion. (10 min) Which digital collaboration tools did you use in your classroom or would like to try? Some examples etwinnig, padlet, teams, google drive are discussed. Activity: Think-pair-share. (30 min) Activity is explained. *THINK.* Teachers first answer questions below in their private notebooks to organize their thinking. (10 min) · *Can you use digital technologies for collaborative learning in the context of your level of teaching and area?* o *If yes, how do you use it, face-to-face or at home?* o *If no, briefly explain why you do not or cannot use the digital technologies for collaboration in the classroom.* · *What are the benefits and barriers for collaborative learning in your context?* PAIR. Breakout rooms for 2-4 teachers are created. Teachers discuss the collaboration tools such as: eTwinning, Microsoft teams, Padlet etc. They first chose a tool and discuss how can they plan a lesson around this tool. (10 min) SHARE. Participants discuss their thoughts with the whole group. (10 min) *Closure (5 min)* Participants will be informed about the next session (synchronous). (They will be also informed about the asynchronous session where they plan a lesson for collaborative learning.)

Feedback	They will send a Google Forms questionnaire about the overall experience with the session: 1. What was the most useful piece of information or skill you learned during this session? 2. What could we have done differently to make the session more effective?

1.4. Synch. Session 4 (Area 4): Assessment

Focus	Analyzing evidence
Objectives	● To encourage the use of formative assessments to guide decisions for instruction ● To enable teachers to analyze data for instructional decisions effectively
Platform and Materials	Microsoft Teams Padlet
Session Structure (60 min)	*Overview of the session (5 min)* Importance of data and evidence in improving teaching *Analyzing Evidence (10 min)* Padlet: *"With one or two words, what does 'analyzing evidence' in education mean to you?"* *"What types of data do you analyze in your classroom?"* Answers are discussed. Assessment in the context of the new curriculum is also discussed. *Tools for analyzing evidence (20 min)* Tools such as e-portfolios (via Google Sites or Teams notebooks) are discussed. Tools for peer assessment and self-assessment are explained. Examples for each will be shown.

Session Structure (60 min)	*Group activity (20 min)* Teachers are grouped into breakout rooms randomly for each group containing 4-5 people. Groups discuss: Discussion Prompt: *Choose one digital tool (e.g., e-portfolios, peer-assessment rubrics) and discuss how you could implement it to analyze evidence in your classroom. What data would you collect? How would this help in improving teaching or student learning?* Group Share (5 min): After breakout rooms, teachers reconvene and one member from each group shares their ideas with the larger group. *Closure (5 min)* A summary and key point of the session will be shown. I will emphasize the importance of evidence-based teaching. Participants will be informed about the next session (asynch) and reminded about the feedback questionnaire.
Feedback	They will send a Google Forms questionnaire about the overall experience with the session: 1. What was the most useful piece of information or skill you learned during this session? What could we have done differently to make the session more effective?

1.5 Synch. Session 5 (Area 5): Empowering Learners. Assessment

Focus	Differentiation and personalization
Objectives	· To improve teachers' ability to create individualized learning plans using digital tools to maximize student participation and performance
Platform and Materials	Microsoft Teams
Session Structure (60 min)	*Overview of the session (5 min)* *Difference between differentiation and personalization (15 min)* Think and note on personal space on Teams: What do you think personalization and differentiation mean? The comparison is discussed as in the table: PDI Chart by Kathleen McClaskey. (The permission is taken for using the table for educational purposes.) *Personalized learning and digital tools (20 min)* By asking participants how we can identify specific need of each student, the importance of self-assessment and ownership of learning will be mentioned. Question: How can we plan our instruction to provide their needs? The use of Digital Tools is discussed. Nearpod, Microsoft Teams, Edpuzzle, Khan Academy, Padlet examples will be shown/discussed. Benefits and limits are discussed.

Feedback	They will send a Google Forms questionnaire about the overall experience with the session: 1. What was the most useful piece of information or skill you learned during this session? 2. What could we have done differently to make the session more effective?

1.6. Synch. Session 6 (Area 6): Facilitating Learners' Digital Competence

Focus	Responsible use Digital problem solving
Objectives	To improve teachers' ability to of make their students' use digital technologies responsibly and ethically, managing their digital identity, digital footprint and digital reputation
Platform and Materials	Microsoft Teams
Session Structure (60 min)	*Overview (5 min)* A brief overview of the session and objectives will be provided. *Introduction (10 min)* I will explain the importance of teaching students to use digital technologies responsibly. The definitions of Digital Identity, Digital Footprint, and Digital Reputation will be discussed.

Session Structure (60 min)	Responsible and Ethical Use of Technology (15 min) Mentimeter Activity: *What does "responsible use of technology" mean to you? (*Teachers share 1-2 words describing their understanding.) Discussion: the concepts of ethical use and social well-being in the digital environment will be explored. Question: What are the challenges in terms of ethical use and social well-being you face when integrating technology in your classroom? Common challenges such as cyberbullying, oversharing, and managing privacy will be discussed. Design Learning Example: Showcase how teachers can integrate responsible digital behavior in lessons: Case study: Discuss a real-life scenario of a student's misuse of social media and the consequences for their digital reputation. Reflection: Ask teachers to think of ways to prevent such situations and promote positive behavior. Design learning to help students develop strategies of responsible and ethical use of technologies, to safeguard their reputation, and promote social well-being, Design learning to provide opportunities for students to manage their digital identities and reputation Managing Digital Identity, Footprint, and Reputation (15 min) Presentation & Discussion: Digital identity, digital footprint, and digital reputation are defined. Activity: Teachers discuss strategies to help students understand their digital footprint: ● How can students audit their online presence? ● What steps can they take to protect their reputation? ● Introduce simple steps for students to control their privacy settings and curate their online profiles responsibly.

Session Structure (60 min)	Group Activity: Designing Learning Experiences (20 min) Teachers are divided into breakout rooms (4-5 per group). They will have 15 minutes. Task: Design a classroom activity that encourages students to develop responsible digital habits. The activity should address one of the following areas: ● Managing digital identities (e.g., creating responsible social media profiles). ● Safeguarding digital footprints (e.g., evaluating what is appropriate to share online). ● Promoting ethical use of technology (e.g., addressing plagiarism or cyberbullying). Questions as a roadmap: How can we teach students to assess the risks and benefits of their online behavior? How can we promote positive online interactions and social well-being? Lastly, each group presents their designed activity to the larger group, highlighting the key strategies they incorporated. (5 min) *Closure (5 min)* The summary and key takeaways.
Feedback	They will send a Google Forms questionnaire about the overall experience with the session: 1. What was the most useful piece of information or skill you learned during this session? 2. What could we have done differently to make the session more effective?

APPENDIX C

SEMI-STRUCTURED INTERVIEW PROTOCOL

Date:

Time:

Interviewer:

Turkish Version	English Translation
Merhaba Ben Nurbanu Çetinkaya. Öncelikle bu görüşmeye katılmayı kabul ettiğiniz için çok teşekkür ederim. Geçtiğimiz eğitim öğretim dönemi içinde, yüksek lisans tezim kapsamında *Eğitimciler için Dijital Yeterlilik Ölçeğini* cevaplamıştınız. Bu görüşmede de yine aynı kapsamda size dijital yeterlilikleriniz bağlamında bazı sorular yönelteceğim. Görüşmemiz yaklaşık 30 dakika sürecek. Bu görüşme kapsamında kişisel bilgileriniz ve paylaştıklarınız araştırma ekibi hariç hiç kimse ile paylaşılmayacaktır. Araştırma raporlarında sunulurken de takma isimler kullanılacaktır.Bu görüşme esnasında ses kaydı da almak istiyorum, bu sizin için uygun mudur?	Hello, I am Nur Banu Çetinkaya. FİRst of all, I'd like to thank you for accepting to pariticipate in theis interview. Last year you had filled a scale titled as Digital Competency Scale for Educators. In this interview, I will be asking you some similar questions about your digital competencies. This interview will be approximately 30 minutes. Within the scope of this interview, your personal information and any content you share will not be shared to anyone outside the research team. In the research reports your names will be confidential and changed with psedo names. Is it convenient for you I would like to record our interview?
1. Öncelikle, kısaca kendinizi tanıtabilir misiniz? Eğitim durumunuz, öğretmenlik yaptığınız branş, sınıf seviyesi Kaç yıldır öğretmenlik yapıyorsunuz?	1. First, could you briefly introduce yourself? What is your educational background, the subject you teach, and the grade level? How many years have you been teaching?
2. Dijital iletişim kanallarını öğrenciler, veliler ve meslektaşlarınızla olan profesyonel etkileşiminizi geliştirmek için kullanıyor musunuz? Nasıl? (Alan 1)	2. Do you use digital communication channels to improve your professional engagements with students, parents, and colleagues? How? (Area 1)
3. Profesyonel gelişiminiz için dijital teknolojileri kullanıyor musunuz? (Alan 1) • Çevrimiçi eğitimlere (online kurslar, webinarlar, MOOC tabanlı eğitimler vb.) katılır	3. Do you use digital technologies for your professional development? (Area 1) • Do you participate in online training (such as online courses, webinars, MOOC-based

mısınız? Ne sıklıkta ve hangi konularda? 4. Derslerinizde dijital teknolojilerden/araçlardan faydalanıyor musunuz? (Alan 2) • Kendi dijital kaynaklarınızı mı oluşturuyorsunuz yoksa hazır kaynaklara mı başvuruyorsunuz? (Sunum, çalışma sayfaları, etkileşimli dijital kaynaklar vb.) (Alan 2) • Kendi dijital kaynaklarınızı oluştururken/mevcut kaynakları kullanımı nasıl bir yöntem izliyorsunuz? (İnternette araştırmak, yapay zeka araçlarına başvurmak, tasarımına göre seçmek) (Alan 2) 5. Öğrencileriniz tasarladığınız aktivitelerde dijital teknolojileri kullanıyor mu? (Alan 3) • Hangi amaçla kullanıyorsunuz? (Grup çalışmaları, özdeğerlendirme için sınavlar, e-portfolyolar ve benzeri) (Alan 3) 6. Sınavlar, öğrenci notları ve diğer hassas içerikleri nasıl yönetiyorsunuz/koruyorsunuz? (Alan 2) 7. Ölçme ve değerlendirme süreçlerinde dijital teknolojileri kullanıyor musunuz? (Alan 4) • Bu teknolojileri hangi amaçla kullanıyorsunuz, bir örnek verebilir misiniz? (formatif, summatif değerlendirme, geribildirim gibi) ? 8. Derslerinizde öğrencilerin daha aktif katılım göstermesi için dijital teknolojilerden faydalanıyor musunuz? (Alan 5) • Bu teknolojileri, ders aktivitelerini öğrencilerin ilgi alanlarına ve ihtiyaçlarına göre	training, etc.)? How frequently, and on what topics? 4. Do you utilize digital technologies/tools in your lessons? (Area 2) • Do you create your own digital resources, or do you rely on pre-existing materials? (e.g., presentations, worksheets, interactive digital resources) (Area 2) • When creating your own digital resources or using existing ones, what approach do you follow? (e.g., conducting online research, using AI tools, selecting based on design) (Area 2) 5. Do your students use digital technologies in the activities you design? (Area 3) • For what purposes do you use them? (e.g., group work, self-assessment tests, e-portfolios, etc.) (Area 3) 6. How do you manage/protect exams, student grades, and other sensitive content? (Area 2) 7. Do you use digital technologies in assessment and evaluation processes? (Area 4) • For what purposes do you use these technologies? Can you provide an example? (e.g., formative, summative assessment, feedback, etc.) 8. Do you use digital technologies to encourage student participation more actively in your lessons? (Area 5) • Do you use these technologies to tailor lesson activities to students' interests and needs? 9. What do you do to enhance your students' digital competencies? Can you give a brief example? (Area 6)

uyarlamak için kullanıyor musunuz? 9. Öğrencilerinizin dijital yeterliklerini geliştirmek için neler yapıyorsunuz? Kısa bir örnek verebilir misiniz? (Area 6) Sormak istediklerim bu kadardı.Bundan sonraki süreç ile ilgili sizinle tekrar iletişime geçeceğim. Zaman ayırdığınız için teşekkür ederim.	My questions en at this point. I will contact you in the future for the following process of the program. Thank you for your time.

APPENDIX D

POST-INTERVIEW QUESTIONS

Turkish Version	English Translation
1. Katıldığınız profesyonel gelişim programının dijital yeterlilikleriniz gelişmesine katkısı oldu mu? a. Katılımınız sonrasında dijital becerilerinizde ne gibi değişiklikler fark ettiniz?	1. Did the professional development program you attended contribute to the improvement of your digital competencies? a. What kind of changes have you noticed in your digital skills after participating in the program?
2. Program süresince en etkili olduğunu düşündüğünüz çalışmalar nelerdir?	2. Which activities or components of the program did you find most effective during the process?
3. Programda geliştirilebilir olduğunu düşündüğünüz yönleri hakkında eleştiri ve önerileriniz nelerdir?	3. What are your criticisms or suggestions regarding the aspects of the program that you believe could be improved?
4. Profesyonel gelişim programı boyunca öğrendiklerinizi kendi öğretim pratiklerinize nasıl entegre ettiniz veya entegre etmeyi planlıyorsunuz?	4. How have you integrated—or do you plan to integrate—what you learned during the professional development program into your own teaching practices?
5. Program sonrasında bir dijital aracı kullanırken karşılaştığınız zorlukların üstesinden gelmek için kullanacağınız stratejilerde bir değişiklik oldu mu?	5. Has there been any change in the strategies you use to overcome difficulties when using a digital tool after completing the program?

APPENDIX E

SCALE OWNERS' PERMISSION TO USE THE SCALE



Eğitimciler İçin Dijital Yeterlilik Ölçeği Kullanım İzni Gelen Kutusu ×

4 Mar Pzt 10:34 (1 gün önce)

Merhaba Hocam,
Boğaziçi Üniversitesi Eğitim Teknolojisi Yüksek Lisans programında öğrenciyim. Aynı zamanda \ Ölçme Değerlendirme Biriminde ölçme değerlendirme uzmanı olarak çalışmaktayım. Tez çalışmamda "Eğitimciler İçin Dijital Yeterlilik Ölçeği"nizi çalıştığım kurumda, araştırma ve etik ilkeleri çerçevesinde, kullanmak üzere izninizi istiyorum.
Saygılarımla,
Nur Banu Çetinkaya.

4 Mar Pzt 17:44 (18 saat önce)

Merhaba,
Ölçeği kullanabilirsiniz.
Teşekkür ederim.
Türker

APPENDIX F

AREAS AND CORRESPONDING SUBAREAS FOCUSED IN PD PROGRAM

Area 1: Professional Engagement	Q1	Q2	Q3	Q4	Sub-areas to Focus
Item Average	2,30	1,95	2,19	2,27	Professional collaboration Reflective practice
Area Total Average	8,70				
Full Points	16				
Level	Integrator				
Competency Percentage	54				
Area 2: Digital Resources	**Q1**	**Q2**	**Q3**		**Sub-areas to Focus**
Item Average	2,16	2,33	2,70		Selecting digital resources Creating and modifying digital resources
Area Average	7,20				
Full Points	12				
Level	Integrator				
Competency Percentage	60				
Area 3: Teaching and Learning	**Q1**	**Q2**	**Q3**	**Q4**	**Sub-areas to Focus**
Item Average	2,22	2,23	2,37	2,08	Collaborative learning
Area Average	8,90				
Full Points	16				
Level	Integrator				
Competency Percentage	56				

Area 4: Assessment	Q1	Q2	Q3			Sub-areas to Focus
Item Average	2,4	2,18	2,27			Analyzing evidence
Area Average	6,85					
Full Points	12					
Level	Integrator					
Competency Percentage	57					
Area 5: Empowering Learners	Q1	Q2	Q3			Sub-areas to Focus
Item Average	2,21	2,01	2,47			Differentiation and personalization
Area Average	6,69					
Full Points	12					
Level	Integrator					
Competency Percentage	56					
Area 6: Facilitating Learners' Digital Competencies	Q1	Q2	Q3	Q4	Q5	Sub-areas to Focus
Item Average	2,26	2,16	2,2	2,03	2,08	Responsible use Digital problem solving
Area Average	10,74					
Full Points	20					
Level	Integrator					
Competency Percentage	54					

APPENDIX G

CONSENT FORM

Araştırmayı Destekleyen Kurum: Boğaziçi Üniversitesi

Araştırma Başlığı: Öğretmenlerin Dijital Yeterliliklerinin DigCompEdu Çerçevesine Göre Araştırılması: Karma Yöntemli Bir Çalışma

Sayın Öğretmen,

Boğaziçi Üniversitesi Eğitim Teknolojisi Bölümü Yüksek Lisans öğrencisi Nur Banu Çetinkaya "Öğretmenlerin Dijital Yeterliliklerinin DigCompEdu Çerçevesine Göre Araştırılması: Karma Yöntemli Bir Çalışma" başlıklı bir araştırma yürütmektedir. Çalışmanın amacı öğretmenlerin dijital yeterlilik seviyelerinin belirlenmesi, geliştirilmesi gereken alanların tespit edilmesi ve mesleki gelişimi destekleyen bir modül oluşturulmasıdır. Çalışmanın sonuçları, katılımcıların dijital yeterliliklerini geliştirmelerine yönelik stratejilerin oluşturulmasına katkı sağlayacaktır. Bu araştırmaya katılmanız için sizin davet ediyoruz. Karar vermeden önce araştırma ile ilgili detayları sizinle paylaşmak istiyoruz.

Bu araştırmada iki farklı aşamaya katılımınız istenebilir. Birinci aşama olarak dijital yeterlilik seviyesini ölçen bir anketi doldurmanız beklenmektedir. Bu ölçme aracı sonucunda, dijital yeterlilik seviyeniz hakkında bilgi edinmiş olacaksınız. Birinci aşamaya katılmanız halinde, ikinci aşama için sizinle iletişime geçilebilir. İkinci aşamaya katılmayı kabul ettiğiniz takdirde ise, çevrimiçi dijital yeterlilik modülü uygulaması gerçekleştirilecek. Bu uygulama 7 senkron ve 3 asenkron olmak üzere 10 seanstan oluşacaktır. Senkron seanslar Microsoft Teams uygulaması kullanılarak çevrimiçi yapılacaktır ve her seansın yaklaşık 1 saat sürmesi

beklenmektedir. Kendinize en uygun zamanda tamamlayacağınız asenkron seanslarda ise farklı teknolojik araçların incelenmesi, örnek sınıf içi etkinlik hazırlanması ve belli konular hakkında görüşlerin paylaşılması gibi görevler istenebilir. Uygulama bittiğinde, katılımcıların tamamı ile yaklaşık 30 dakika sürmesi öngörülen bir görüşme planlanmaktadır. Görüşmede genel olarak katılımcıların uygulama ile ilgili değerlendirmeleri alınacaktır.

Araştırma bilimsel amaçla yapılmaktadır. Katılımcıların bilgisi gizli tutulacaktır. Toplanan veriler hiç kimseyle paylaşılmayacaktır. Kayıtlar araştırma süresince araştırmacının şifreli bulut hesabında ve kişisel bilgisayarında tutulacak ve araştırma tamamlandığında tümüyle silinecektir. Katılımcı herhangi bir sebeple araştırmadan çekilmeyi seçerse toplanmış verileri imha edilecektir.

Öğretmenlerin paylaştıkları ürünler kişisel bilgiler gizli tutularak bilimsel çalışma metninde paylaşılabilir.

Bu araştırmaya katılım tamamen gönüllülük esasına dayanmaktadır. Katılmanız durumunda, çalışmanın herhangi bir aşamasında herhangi bir gerekçe göstermeksizin onayınızı geri çekme hakkına da sahipsiniz. Araştırma projesi hakkında ek bilgi almak isterseniz tez danışmanı ile iletişime geçiniz. Ayrıca bu çalışmadaki haklarınızla ilgili olarak Boğaziçi Üniversitesi Sosyal ve Beşeri Bilimler İnsan Araştırmaları Etik Kurulu'na danışabilirsiniz.

Ben, (katılımcının adı) .... yukarıdaki metni okudum ve katılmam istenen çalışmanın kapsamını, amacını ve gönüllü olarak sorumluluklarımı tam olarak anladım. Çalışmayla ilgili soru sorma fırsatım oldu. Çalışmadan istediğim zaman ve herhangi bir sebep belirtmeye gerek kalmadan ayrılabileceğimi, ayrılırsam herhangi bir olumsuz sonuçla karşılaşmayacağımı

anladım. Bu durumlarda, söz konusu araştırmaya herhangi bir baskı veya zorlama olmaksızın gönüllü olarak katılmayı kabul ediyorum.

Formun bir örneğini aldım/almak istemiyorum (bu durumda bu kopya araştırmacıda kalır).

Katılımcı İsim-Soyisim: ……. Ankete katılmayı kabul ediyorum. ☐ Seçildiğim takdirde çevrimiçi profesyonel gelişim programına ve mülakata katılmayı kabul ediyorum. ☐ Tarih (gün/ay/yıl):...../...../.....	Araştırmacı İsim-Soyisim: Nur Banu Çetinkaya Tarih (gün/ay/yıl):...../...../.....

APPENDIX H

TURKISH VERSION OF THE DIGITAL COMPETENCY SCALE FOR EDUCATORS

Sayın Öğretmen,

Boğaziçi Üniversitesi Eğitim Teknolojisi Bölümü Yüksek Lisans öğrencisi Nur Banu Çetinkaya "Öğretmenlerin Dijital Yeterliliklerinin DigCompEdu Çerçevesine Göre Araştırılması: Karma Yöntemli Bir Çalışma" başlıklı bir araştırma yürütmektedir. Çalışmanın amacı öğretmenlerin dijital yeterlilik seviyelerinin belirlenmesi, geliştirilmesi gereken alanların tespit edilmesi ve mesleki gelişimi destekleyen bir modül oluşturulmasıdır. Çalışmanın sonuçları, katılımcıların dijital yeterliliklerini geliştirmelerine yönelik stratejilerin oluşturulmasına katkı sağlayacaktır. Bu araştırmaya katılmanız için sizin davet ediyoruz. Karar vermeden önce araştırma ile ilgili detayları sizinle paylaşmak istiyoruz.

Bu araştırmada iki farklı aşamaya katılımınız istenebilir. Birinci aşama olarak dijital yeterlilik seviyesini ölçen bir anketi doldurmanız beklenmektedir. Bu ölçme aracı sonucunda, dijital yeterlilik seviyeniz hakkında bilgi edinmiş olacaksınız. Birinci aşamaya katılmanız halinde, ikinci aşama için sizinle iletişime geçilebilir. İkinci aşamaya katılmayı kabul ettiğiniz takdirde ise, çevrimiçi dijital yeterlilik modülü uygulaması gerçekleştirilecektir. Bu uygulama, 5 senkron ve 3 asenkron olmak üzere 8 seanstan oluşacaktır. Senkron seanslar Microsoft Teams uygulaması kullanılarak çevrimiçi yapılacaktır ve her seansın yaklaşık 1 saat sürmesi beklenmektedir. Kendinize en uygun zamanda tamamlayacağınız asenkron seanslarda ise farklı teknolojik araçların incelenmesi, örnek sınıf içi etkinlik hazırlanması ve belli konular hakkında görüşlerin paylaşılması gibi görevler istenebilir. Uygulama bittiğinde,

katılımcıların tamamı ile yaklaşık 30 dakika sürmesi öngörülen bir görüşme planlanmaktadır. Görüşmede genel olarak katılımcıların uygulama ile ilgili değerlendirmeleri alınacaktır.

Araştırma bilimsel amaçla yapılmaktadır. Katılımcıların kişisel bilgileri gizli tutulacaktır. Toplanan veriler araştırma ekibi hariç hiç kimseyle paylaşılmayacaktır. Kayıtlar araştırma süresince araştırmacının şifreli bulut hesabında ve kişisel bilgisayarında tutulacak ve araştırma tamamlandığında tümüyle silinecektir. Katılımcı herhangi bir sebeple araştırmadan çekilmeyi seçerse toplanmış verileri imha edilecektir.

Öğretmenlerin paylaştıkları ürünler kişisel bilgiler gizli tutularak bilimsel çalışma metninde paylaşılabilir.

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1. Adınız Soyadınız
2. Görev yaptığınız okul
3. Branşınız
4. Görev yaptığınız kademe
5. Cinsiyet
    - □ Erkek
    - □ Kadın

6. Mezuniyet durumu

□ Lisans

□ Yüksek lisans

□ Doktora

7. Öğretmenlik tecrübesi

□ 0-2

□ 2-5

□ 5-10

□ 10-15

□ 15-20

□ 20 yıl üzeri

8. Yaş aralığı

□ 20-30

□ 30-40

□ 40-50

□ 50-60

□ 60-70

9. Çevrimiçi dijital yeterlilik modülü uygulamasına katılmayı kabul ediyorum.

□ Evet

□ Hayır

Bölüm 1: Mesleğinde Dijital Becerilerin Kullanımı Öğretmenlerin dijital yeterlikleri, dijital teknolojilerin sadece okul ve sınıf ortamında eğitim-öğretim amaçlı kullanılmasıyla sınırlı değildir. Bunun yanında, diğer öğretmenler, öğrenciler, veliler ve eğitimle ilgili tüm paydaşlarla mesleki etkileşim kurmayı, kişisel mesleki gelişim sağlamayı, eğitim-öğretim için en iyi olanı bulmayı ve kullanmayı da kapsamaktadır. Bölüm 1 bu alandaki durumunuzu ele almaktadır.

1-) Öğrenciler, veliler ve meslektaşlarımla iletişimi geliştirmek için farklı dijital posta, blog, okulun web sitesi, olarak kullanabilirim (e iletişim kanallarını sistematik uygulamalar vb).

□ Dijital iletişim kanallarını nadiren kullanırım.

□ Temel dijital iletişim kanallarını kullanırım.

□posta, bloglar (e .. kullanırım Farklı dijital iletişim kanallarını birleştirerek veya okul web sitesi)

□ Etkili iletişim kurmak için farklı dijital iletişim kanallarını sistematik olarak seçer, uyarlar ve birleştiririm.

□ Kullanacağım iletişim stratejileri üzerine düşünürüm, tartışırım ve etkin bir şekilde geliştiririm.

2-) Okul içindeki ve dışındaki meslektaşlarımla birlikte çalışmak için dijital teknolojileri kullanırım.

□ Meslektaşlarımla dijital ortamda işbirliği yapmak için nadiren fırsat bulurum.

□ Meslektaşlarımla bazen e-posta yoluyla materyal alışverişi yaparım.

□ Meslektaşlarımla çevrimiçi işbirlikçi ortamlarında birlikte çalışırız veya ortak depolama alanlarını (googledrive, dropbox, icloud...vb.)birlikte kullanırız.

□ Çevrimiçi öğretmen ağlarında (EBA vb.) okulum dışındaki öğretmenlerle de fikir ve materyal alışverişinde bulunurum.

□ Çevrimiçi öğretmen ağlarındaki (EBA vb.) diğer öğretmenlerle ortaklaşa materyaller oluştururum.

3-) Dijital öğretim becerilerimi aktif olarak geliştirmeye çalışırım.
□ Dijital öğretim becerilerimi geliştirmek için nadiren vaktim oluyor.
□ Dijital öğretim becerilerimi deneyimlerle geliştiririm.
□ Meslektaşlarımla yenilikçi yöntemlerin geliştirilmesinde ve eğitim uygulamalarının iyileştirilmesinde dijital teknolojinin nasıl kullanılacağını tartışırım.
□ Meslektaşlarımın dijital öğretim stratejilerini geliştirmelerine yardımcı olurum.

4-) Çevrimiçi eğitimlere katılırım. (online kurslar, webinarlar, MOOC tabanlı eğitimler vb.)
□ Bu, üzerinde henüz dikkate almadığım yeni bir alan.
□ İlgimi çekiyor ancak henüz katılmadım.
□ Bu tür bir çevrimiçi eğitime bir veya iki defa katıldım.
□ Farklı farklı çevrimiçi eğitimlere katıldım.
□ Her türlü Çevrimiçi eğitimlere sık sık katılırım.

Bölüm 2: Dijital Kaynaklar Eğitimciler günümüzde oldukça fazla ve çeşitli eğitsel dijital kaynakla karşılaşabilmektedir. Herhangi bir eğitimcinin geliştirmek için ihtiyaç duyduğu temel yeterliklerden bazıları; bu çeşitlilik ile başa çıkmak, öğrenme hedeflerine en uygun kaynakları etkili bir şekilde tanımlamak, materyal zenginliğini yapılandırmak, bağlantılar kurmak ve değiştirmek, öğretimi desteklemek için kendi dijital kaynaklarını geliştirebilmektir. Aynı zamanda, eğitimcilerin dijital içerikleri bilinçli bir şekilde nasıl kullanacaklarının ve yöneteceklerinin farkında olmaları gerekir. Kaynakları kullanırken, değiştirirken ve paylaşırken telif hakkı kurallarına saygı duymalı ve dijital sınavlar veya öğrencilerin notları gibi kişisel verileri korumalıdır. Bölüm 2 bu alandaki durumunuzu ele almaktadır.

1-) Farklı dijital kaynaklar bulmak ve seçmek için farklı internet siteleri ve arama stratejileri kullanırım.
□ Dijital kaynak bulmak için İnterneti nadiren kullanırım.
□ Kendi derslerimle ilgili dijital kaynakları bulmak için arama motorlarını ve eğitim platformlarını kullanırım.

□ Dijital kaynakları öğrencilerimin seviyelerine göre değerlendirip seçerim. Dijital kaynakları çeşitli kriterler kullanarak karşılaştırırım. (Örneğin güvenilirlik, kalite, uygunluk, tasarım, etkileşim, çekicilik.)
□ Meslektaşlarıma uygun dijital kaynaklar ve arama stratejileri hakkında önerilerde bulunurum.

2-) Kendi dijital kaynaklarımı oluşturur ve var olan kaynakları ihtiyaçlarıma göre değiştiririm.
□ Kendi dijital kaynaklarımı oluşturmam.
□ Bilgisayarla çalışma sayfaları oluştururum ama kullanacağım zaman yazdırıyorum.
□ Bazen dijital sunumlar oluştururum.
□ Farklı türden dijital kaynaklar oluşturur ve mevcut kaynakları uyarlarım.
□ Karmaşık ve etkileşimli dijital kaynakları geliştiririm ve uyarlarım.

3-) Sınav, öğrenci notları, kişisel veriler vb. hassas içeriği etkin bir şekilde korurum.
□ Bunu yapmama gerek yok çünkü bu bilgilerin korunmasından okul sorumludur.
□ Kişisel verileri elektronik olarak saklamaktan kaçınırım.
□ Bazı kişisel verileri korurum.
□ Kişisel verilerin olduğu dosyalara şifre koyarak koruma sağlarım.
□ Kişisel verileri kapsamlı bir şekilde korurum. (Örneğin tahmin edilmesi zor parolaları şifreleme ve yazılım güncellemeleriyle birleştirme.)

Bölüm 3: Öğretme ve Öğrenme Bilgi ve iletişim teknolojilerini eğitimde kullanmanın en temel yetkinliği, dijital teknolojilerin kullanımını öğretme ve öğrenme sürecinin farklı aşamalarında tasarlamak, planlamak ve uygulamaktır. Ancak, bunu yaparken amaç, dersin odağını öğretmen liderliğinden öğrenci merkezli süreçlere kaydırmak olmalıdır. Bölüm 3 bu alandaki durumunuzu ele almaktadır.

1-) Dijital teknolojilerin sınıfta etkili bir şekilde kullanılmasını sağlamak için nasıl, ne zaman ve neden kullanılacağını özellikle düşünürüm.
□ Sınıfta teknolojiyi kullanmam ya da nadiren kullanırım.
□ Mevcut ekipmanı temel olarak kullanırım. (örneğin; etkileşimli tahta veya projeksiyon.)
□ Derslerimde çeşitli dijital kaynaklar ve araçlar kullanırım.

□ Dijital araçları öğretimi sürecini sistematik olarak geliştirmek için kullanırım.
□ Yenilikçi pedagojik stratejileri uygulamak için dijital araçlar kullanırım.

2-) Öğrencilerimin işbirlikçi çevrimiçi ortamlardaki etkinliklerini ve etkileşimlerini izlerim.
□ Dijital ortamları öğrencilerimle birlikte kullanmam.
□ Kullandığımız çevrimiçi ortamlarda öğrencilerimin etkinliğini takip etmem.
□ Öğrencilerimi ve onların tartışmalarını bazen kontrol ederim.
□ Öğrencilerimin çevrimiçi etkinliklerini düzenli olarak takip ve analiz ederim.
□ Öğrencilerimin etkinliklerine motive edici veya düzeltici yorumlarla düzenli olarak dâhil olurum.

3-) Öğrencilerim gruplar halinde çalışırken öğrenme çıktısı elde etmek ve belgelemek için dijital teknolojileri kullanırlar
□ Öğrencilerim gruplar halinde çalışmaz.
□ Öğrencilerimin grup çalışmalarında dijital teknolojileri bütünleştirmem mümkün değil.
□ Öğrencilerimi grup çalışmalarında internet üzerinden bilgi aramaya ve çalışmalarının sonuçlarını dijital formatta sunmaya teşvik ederim.
□ Öğrencilerimden grup çalışmalarında araştırma yapmak ve sonuçlarını dijital formatta sunmak için interneti kullanmalarını isterim.
□ Öğrencilerim gruplar halinde çalışmak için ortak bir çevirim içi öğrenme ortamı kullanır ve birlikte projeler oluştururlar.

4-) Öğrencilerin, kendi öğrenme süreçlerini planlamalarını, belgelemelerini ve izlemelerini sağlamak için dijital teknolojileri kullanıyorum. (Örneğin öz değerlendirme için sınavlar, dokümantasyon ve sergileme için e-portfolyolar vb.)
□ Çalışma ortamımda bunu yapmam mümkün değil.
□ Öğrencilerim öğrenme süreçleri üzerinde düşünür ancak bunu dijital teknolojilerle yapmazlar.
□ Bazen öz değerlendirme sınavlarını dijital teknolojiler kullanarak yaparım.
□ Öğrencilerimin öğrenmelerini planlamalarını, belgelemelerini veya ortaya koymalarını sağlamak için çeşitli dijital araçlar kullanırım.

□ Öğrencilerin ilerlemelerini, planlamalarını, izlemelerini ve ortaya koymalarını sağlamak için farklı dijital araçları sistematik olarak bir arada kullanırım.

Bölüm 4: Değerlendirme Dijital teknolojiler mevcut değerlendirme stratejilerini geliştirmekte ve yeni ve daha iyi değerlendirme yöntemlerini mümkün kılabilmektedir. Ayrıca, öğrencinin kişisel eylemlerinde mevcut olan (dijital) veri zenginliğini analiz ederek, öğretmenler daha iyi geribildirim ve destek sunabilme imkânına erişmektedir. Bölüm 4 bu alandaki durumunuzu ele almaktadır.

1-) Öğrencinin gelişimin izlemek için dijital değerlendirme araçlarını kullanırım.
□ Öğrencilerin gelişimini izlemem.
□ Öğrencilerin gelişimini düzenli olarak izlerim, ancak dijital yöntemler kullanmam.
□ Öğrencilerin gelişimini izlemek için bazen dijital bir araç kullanırım. (Örneğin öğrencilerin ilerlemelerini kontrol etmek için dijital bir sınav.)
□ Öğrencinin gelişimini izlemek için çeşitli dijital araçlar kullanırım.
□ Öğrenci gelişimini izlemek için çeşitli dijital araçları sistematik olarak kullanırım.

2-) Ek desteğe ihtiyacı olan öğrencileri zamanında belirlemek için elimdeki tüm verileri analiz ederim. Veri"; öğrencilerin katılımı, performansı, notları, devam durumları; (çevrimiçi) ortamlardaki etkinlikler ve sosyal etkileşimleri içermektedir. "Ek desteğe ihtiyaç duyan öğrenciler"; ,okulu bırakma düşük performans riski taşıyan öğrenciler; öğrenme bozukluğu olan veya özel eğitime ihtiyacı olan öğrencilerdir.
□ Bu veriler elimde mevcut değil ve / veya bunları analiz etmek benim sorumluluğumda değildir.
□ Sadece akademik verileri analiz ederim. (Örneğin performans ve notlar.)
□ Ek desteğe ihtiyacı olan öğrencileri belirlemek için öğrencilerin etkinlikleri ve davranışları hakkındaki verileri de dikkate alırım.
□ Ek desteğe ihtiyacı olan öğrencileri belirlemek için mevcut tüm verileri düzenli olarak izlerim.
□ Verileri sistematik olarak analiz eder ve zamanında müdahale ederim.

3-) Etkili geri bildirim sağlamak için dijital teknolojileri kullanırım.
□ Çalışma ortamımda geri bildirim gerekli değil.

□ Öğrencilere geri bildirim veriyorum ancak dijital format kullanmam.
□ Geri bildirim sağlamak için bazen dijital yollar kullanırım. (Örneğin çevrimiçi sınavlarda otomatik puan verme, çevrimiçi ortamda yorum veya "beğenme".)
□ Geri bildirim sağlamak için çeşitli dijital yöntemler kullanırım.
□ Geri bildirim sağlamak için dijital yaklaşımları sistematik olarak kullanırım.

Bölüm 5: Öğrencilerin Güçlendirilmesi Dijital teknolojilerin eğitimdeki en güçlü yönlerinden bazıları öğrencilerin öğrenme sürecine aktif katılımını sağlamak ve öğrencileri aktif hale getirmektir. Dijital teknolojiler ayrıca her öğrencinin yeterlik seviyesine, ilgi alanlarına ve öğrenme gereksinimlerine uyarlanmış öğrenme etkinlikleri sunmak için de kullanılabilir. Bununla birlikte mevcut eşitsizlikleri (örneğin dijital teknolojilere erişimde) azaltmaya ve özel eğitim ihtiyacı olanlar da dâhil tüm öğrenciler için erişilebilirliği sağlamaya özen gösterilmelidir. Bölüm 5 bu alandaki durumunuzu ele almaktadır.

1-) Öğrenciler için dijital ödevler oluştururken karşılaşabilecekleri potansiyel dijital güçlükleri göz önünde bulundururum. (Örneğin dijital cihazlara ve kaynaklara eşit erişim; birlikte çalışma sorunları; dijital becerilerin eksikliği)
□ Dijital ödevler oluşturmam.
□ Öğrencilerim dijital teknolojiyi kullanırken sorun yaşamaz.
□ Dijital ödevleri, öğrencilerimin karşılaşabilecekleri sorunları en aza indirecek şekilde uyarlıyorum.
□ Öğrencilerimle olası sorunlar ve bu sorunların çözümleri hakkında tartışırım.
□ Dijital kaynakların erişimindeki ve kullanımındaki farklılıkları hesaba katarak çeşitliliğe izin veriyorum. (Örneğin ödevi uyarlarım, çözümleri tartışırım ve ödevi tamamlamak için alternatif yollar sunarım.)

2-) Öğrencilere bireyselleştirilmiş öğrenme ortamları sunmak için dijital teknolojileri kullanırım. (Örneğin farklı öğrencilere bireysel öğrenme ihtiyaçlarını, tercihlerini ve ilgi alanlarını ele almak için farklı dijital görevler veririm.)
□ Sınıfta, tüm öğrencilerin, seviyelerine bakılmaksızın aynı etkinlikleri yapmaları gerekmektedir.
□ Öğrencilere ek kaynaklar için önerilerde bulunurum.

□ İleri seviyedeki veya geride kalmış öğrencilerim için isteğe bağlı dijital etkinlikler yaparım.
□ Dijital teknolojileri, mümkün olduğunca farklı öğrenme seçenekleri sunmak için kullanırım.
□ Derslerimi öğrencilerin bireysel öğrenme ihtiyaçlarına, tercihlerine ve ilgi alanlarına göre sistematik olarak dijital teknolojiler yardımıyla uyarlarım.

3-) Öğrencilerin derse aktif olarak katılması için dijital teknolojileri kullanırım. Derslerimde öğrencilerin derse aktif bir şekilde katılmalarını sağlamak mümkün değil.
□ Öğrencileri derse aktif olarak dâhil ediyorum ama bunu yaparken dijital teknolojileri kullanmam.
□ Derslerimde motive edici materyalleri kullanırım. (Örneğin videolar, animasyonlar, çizgi filmler.)
□ Derslerimde kullandığım dijital araçlar öğrencilerimin ilgisini çeker. (Örneğin elektronik çalışma sayfaları, oyunlar, kısa sınavlar.)
□ Öğrencilerim düzenli olarak araştırma, tartışma ve bilgi oluşturmak için dijital teknolojileri kullanır.

Bölüm 6: Öğrencilerin Dijital Yetkinliklerinin Kolaylaştırılması Öğrencilerinin dijital okuryazarlığını geliştirebilmesi, bir öğretmenin dijital yeterliliğinin ayrılmaz bir parçasıdır. Bölüm 6 bu alandaki durumunuzu ele almaktadır.

1-) Öğrencilere bilgilerin güvenilirliğini nasıl değerlendireceklerini, yanlış bilgilendirme ve önyargıları nasıl tespit edebileceklerini öğretirim.
□ Bunu yapmak derslerimde/sınıfımda mümkün değil.
□ Onlara zaman zaman tüm çevrimiçi bilgilerin güvenilir olmadığını hatırlatırım.
□ Onlara internetteki güvenilir ve güvenilmez kaynakları ayırt etmeyi öğretirim.
□ Öğrencilerimle bilgiyi nasıl doğrulayacağımızı tartışırım.
□ Öğrencilerimle bilginin nasıl üretildiği ve nasıl çarpıtılabileceği hakkında kapsamlı bir şekilde tartışırız.

2-) Öğrencilerimin birbirleriyle veya çevreleriyle iletişim kurmak ve işbirliği yapmak için dijital araçları kullanmalarını gerektiren ödevler veririm.

□ Bunu yapmak derslerimde/sınıfımda mümkün değil.
□ Sadece nadir durumlarda öğrencilerimin çevrimiçi iletişim kurmaları veya işbirliği yapmaları gerekir.
□ Öğrencilerim, aralarında dijital yollarla iletişim kurar ve işbirliği yaparlar.
□ Öğrencilerim birbirleriyle ve okul dışındaki çevreyle iletişim kurmak ve işbirliği yapmak için dijital araçlar kullanırlar.
□ Düzenli olarak öğrencilerin dijital becerilerini geliştirmelerini sağlayan ödevler hazırlarım.

3-) Öğrencilerin dijital içerik oluşturmalarını gerektiren ödevler veririm. (Örneğin videolar, müzikler, fotoğraflar, dijital sunumlar, bloglar, wiki'ler ...vb.)
□ Bunu yapmak derslerimde/sınıfımda mümkün değil.
□ Bunu öğrencilerimle uygulamak zordur.
□ Bazen eğlenceli bir aktivite olarak uygularım.
□ Öğrencilerim çalışmalarının ayrılmaz bir parçası olarak dijital içerik oluşturur.
□ Öğrenmelerinin ayrılmaz bir parçası olduğu için ve öğrencilerimin becerilerini daha da geliştirmek için sistematik olarak zorluk seviyesini yükseltirim.

4-) Öğrencilere güvenli ve sorumlu bir şekilde çevrimiçi platformlarda nasıl davranacaklarını öğretiyorum.
□ Bunu yapmak derslerimde/sınıfımda mümkün değil.
□ Kişisel bilgileri çevrimiçi olarak aktarırken dikkatli olmaları gerektiğini onlara bildiririm.
□ Çevrimiçi ortamlarda güvenli ve sorumlu davranmak için temel kuralları açıklarım.
□ Çevrimiçi ortamlarda sorumlu davranış kurallarını tartışır ve bunlara uymayı kabul ederiz.
□ Öğrencilerimin, dijital ortamlarda genel olarak kabul görmüş kurallara uymalarını sistematik olarak geliştiririm

5-) Öğrencilerimi somut problemleri çözmek için dijital teknolojileri yaratıcı bir şekilde kullanmaya teşvik ederim. (Örneğin öğrenme sürecinde ortaya çıkan engellerin veya zorlukların üstesinden gelmek için)
□ Bunu yapmak derslerimde/sınıfımda mümkün değil.
□ Nadiren öğrencilerin dijital problem çözme becerisini geliştirme fırsatım oluyor.

□ Arada bir, bir fırsat ortaya çıktığında öğrencilerimi teşvik ederim.

□ Sorunları çözmek için sık sık teknolojik yöntemler kullanırız.

□ Dijital problem çözme fırsatlarını sistematik olarak bir arada kullanırım.

APPENDIX I

ETHICS COMMITTEE APPROVAL

T.C.
BOĞAZİÇİ ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sosyal ve Beşeri Bilimler İnsan Araştırmaları Etik Kurulu (Sbinarek)

Sayı : E-84391427-050.01.04-176131 18.04.2024
Konu : 2024-30T Kayıt Numaralı Başvurunuz Hakkında

Sayın Dr. Öğr. Üyesi Mutlu ŞEN AKBULUT

Tez danışmanlığını yürüttüğünüz öğrenciniz Nur Banu Çetinkaya'nın "Exploring Teachers' Digital Competencies by the DigCompEdu Framework: A Mixed-Method Study" başlıklı projesi ile Boğaziçi Üniversitesi Sosyal ve Beşeri Bilimler İnsan Araştırmaları Etik Kurulu (SBİNAREK)'e yaptığınız 2024-30T kayıt numaralı başvuru 18.04.2024 tarih ve 2024/03 sayılı kurul toplantısında incelenmiş ve projeye etik onay verilmesi uygun bulunmuştur.

Bu karar tüm üyelerin toplantıya on-line olarak katılımıyla ve oybirliği ile alınmıştır. Onay mektubu tüm üyeler adına Komisyon Başkanı tarafından e-imzalanmıştır. Bilgilerinizi rica ederiz.

Saygılarımızla,

Dr. Öğr. Üyesi Işıl ERDUYAN
Kurul Başkanı

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Belge Doğrulama Kodu : 0E09-6LBE-0LB1 Belge Doğrulama Adresi : https://www.turkiye.gov.tr/bogazici-universitesi-ebys

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