

**YEDITEPE UNIVERSITY  
GRADUATE SCHOOL OF EDUCATIONAL SCIENCES**

**THE EFFECTS OF ONLINE GROUP MENTORING ON  
UNIVERSAL DESIGN FOR LEARNING IMPLEMENTATION**

**Reşit Yalın Güçkiran**

**Istanbul - 2024**



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FOR LEARNING IMPLEMENTATION

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## **ABSTRACT**

### **THE EFFECTS OF ONLINE GROUP MENTORING ON UNIVERSAL DESIGN FOR LEARNING IMPLEMENTATION**

Evidence from neuroscience indicates that learner variability is the norm, challenging traditional school and curriculum designs aimed at the average student. In response, the Universal Design for Learning (UDL) framework supports inclusive practices by embracing student variability within educational environments. As agents of change, it is crucial for teachers to acquire the knowledge, skills, beliefs, and attitudes necessary for inclusive pedagogies. However, sustainability in teacher professional learning presents significant challenges. Mentoring, as an ongoing professional development strategy, has shown benefits for teachers in various settings. Accordingly, this study investigated the effects of an online group mentoring program on teachers' application of UDL. A convergent parallel mixed methods design combining experimental design and qualitative analysis was used. The participants were 54 primary school and 35 secondary school Turkish teachers working in public schools in Istanbul. While all participants completed the UDL Basic Professional Development program, a group of teachers additionally completed the mentoring program. Quantitative data were collected using the Turkish Form of the UDL Implementation Fidelity Tool, which was adapted by the researcher, and the Turkish Form of the Expectancy-Value-Cost for Professional Development Scale. Qualitative data were collected from teacher interviews, and a thematic analysis was conducted. Findings showed that both groups were equally committed to using the UDL framework, valued the framework, and perceived similar challenges to implementation. Teachers in the mentoring program had significantly higher expectations of successful implementation of the UDL framework. Teacher interviews highlighted the benefits of feedback, self-assessment, realistic scenarios, and colleague interaction. These components allowed teachers to identify their areas of development, adopt a student-centered approach, acquire practical knowledge, and have a positive view of the UDL application. Teachers also reported that they had begun implementing various UDL strategies in classrooms after the mentoring program. This study suggests that mentoring programs can enhance teacher self-efficacy and support the

implementation of new pedagogical frameworks. Further research is recommended to optimize the design of mentoring programs for teachers' professional development.

*Keywords: Universal Design for Learning (UDL), Inclusive education, Teacher professional development, Online mentoring, Group mentoring, Implementation fidelity*



## ÖZET

### ÇEVİRİM İÇİ GRUP MENTORLUĞUNUN ÖĞRENMEDE EVRENSEL TASARIMIN UYGULANMASI ÜZERİNDEKİ ETKİLERİ

Sinir bilim çalışmalarından elde edilen kanıtlar öğrenen değişkenliğinin norm olduğunu göstermekte, ortalama öğrenciyi hedefleyen geleneksel okul ve program tasarımlarına meydan okumaktadır. Bu duruma yanıt olarak Öğrenmede Evrensel Tasarım (ÖET) çerçevesi, eğitim ortamlarında öğrenci değişkenliğini benimseyerek kapsayıcı uygulamaları desteklemektedir. Değişimin temsilcileri olarak öğretmenlerin kapsayıcı pedagojiler için gerekli bilgi, beceri, inanç ve tutumları edinmeleri kritik önemdedir. Bununla birlikte, öğretmenlerin sürdürülebilir mesleki öğrenimi ciddi zorluklar barındırmaktadır. Süreklilik sağlayan bir mesleki gelişim stratejisi olarak mentorluk, birçok durumda öğretmenlere katkılar sağlamıştır. Bu doğrultuda, bu çalışmada bir çevrimiçi grup mentorluk programının öğretmenlerin UDL uygulamaları üzerindeki etkisi araştırılmıştır. Yöntem olarak deneysel tasarım ve nitel analizleri bir araya getiren yakınsak paralel karma yöntem araştırma deseni kullanılmıştır. Katılımcılar, İstanbul'daki devlet okullarında görev yapan 54 sınıf ve 35 ortaokul Türkçe öğretmenidir. Tüm katılımcılar ÖET Temel Mesleki Gelişim programını tamamlarken bir grup öğretmen ek olarak mentorluk programını tamamlamıştır. Nicel veriler Öğretmenlerin Mesleki Gelişiminde Beklenti-Değer-Bedel Ölçeği ve araştırmacı tarafından Türkçeye uyarlanan ÖET Uygulama Bağlılığı Aracı kullanılarak toplanmıştır. Nitel veriler ise öğretmen görüşmelerinden derlenmiş ve tematik analiz gerçekleştirilmiştir. Bulgular, her iki grubun da ÖET çerçevesini kullanma konusunda eşit derecede bağlılık gösterdiklerini, bu çerçeveyi değerli bulduklarını ve uygulamaya ilişkin benzer zorluklar algıladıklarını göstermiştir. Bununla birlikte, mentorluk programındaki öğretmenlerin ÖET çerçevesini başarıyla uygulama beklentileri anlamlı derecede yüksektir. Öğretmen görüşmeleri geri bildirim, öz değerlendirme, gerçekçi senaryolar ve meslektaş etkileşiminin faydalarını ortaya koymuştur. Bu bileşenler öğretmenlerin gelişim alanlarını belirlemelerine, öğrenci odaklı bir yaklaşım benimsemelerine, kullanabilecekleri bilgiler edinmelerine ve ÖET uygulamasına daha olumlu bakmalarına olanak sağlamıştır. Öğretmenler ayrıca sınıflarında mentorluk programı sonrasında çeşitli ÖET stratejilerini uygulamaya başladıklarını belirtmişlerdir. Bu çalışma, mentorluk programlarının öğretmen öz yeterliğini

artırabileceğini ve yeni pedagojik çerçevelerin uygulanmasını destekleyebileceğini önermektedir. Öğretmenlerin mesleki gelişiminde mentorluk programlarının tasarımını optimize etmek amacıyla daha fazla araştırma yapılması önerilmektedir.

*Anahtar Kelimeler: Öğrenmede Evrensel Tasarım (ÖET), Kapsayıcı Eğitim, Öğretmen mesleki gelişimi, Çevrimiçi mentorluk, Grup mentorluğu, Uygulama bağlılığı*





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## LIST OF ABBREVIATIONS

UDL	Universal Design for Learning
PD	Professional Development
UDL-IFT	UDL Implementation Fidelity Tool
UDL-IFST	UDL Implementation Fidelity Scoring Tool



# 1. INTRODUCTION

## 1.1. Statement of the Problem

An experienced gardener knows that every type of flower requires specific environmental conditions. Like flowers, learners differ in their need for convenient educational environments in which they can grow. Since learning happens uniquely for every person in interconnected, complex, and peerless brain networks (Meyer et al., 2014), learners differ regarding their needs, ways of learning, and choices (Al-Azawei et al., 2016).

Contrary to popular belief, variability is the norm and not an exception to human existence. Consequently, no imaginary average learner is present in classrooms (CAST, 2018a). While one student can quickly learn a new concept, the other struggles and needs more support, or one student can climb a tree quickly while the other cannot (Heward, 2012). Existing diversity in experiences, opportunities, languages, and interests challenges educators to design learning environments that respond to students' varying needs (Tomlinson & Tighe, 2006).

According to findings from neuroscience, the idea of the average learner is a myth; however, schooling and curricula have been designed for the average learner throughout the decades (Ross, 2010). With the invention of the printing press, mass education became possible, and individuals could receive education at high rates that were not possible until then. Simultaneously, the system produced an unexpected result: students who could learn effectively with printed media could benefit from the curriculum; meanwhile, many unlucky students faced unintended barriers. Schools failed to offer alternatives (Meyer et al., 2014).

Another significant aspect of this historical progression is Taylorism's influence. Following the principles of the 20th century's most popular management philosophy, students were classified into school-age groups by mimicking the factory model. Children with no obvious common characteristics other than age were placed in the same classes because the system was economical and manageable (Rose, 2016). Although recent research findings challenge this approach (Lucariello et al., 2015), the "factory model" of education can still be seen in today's schools and most teaching and learning practices (Ross, 2010).



However, from the proliferation of personal computers for individual use to the spread of new media, technological advancements that have emerged recently show promise for transforming schools. Digital text, sound, video, and the internet can eliminate barriers in many ways and they have advantages over print-based media (Rose & Meyer, 2000). Additionally, today's learning environments can provide more flexible personalized paths. Technology foster accessibility and usability and becomes a game changer when it addresses diversity (Edyburn, 2010). Although we have not yet reached the desired level of transformation, the current situation is much more advantageous than that in history.

Having discussed the fundamental issues and rooted problems of educational systems that are challenged and forced for change, it is essential to point out the increasing connectedness and intertwinement of the world economically and culturally than ever before (Muggah & Goldin, 2019). Societies are dealing with an old but new controversial reality. Millions of people have tragically left their homes due to significant immigration and displacement events because of conflict, violence, climate change, and economic and political problems (World Migration Report, 2020). Additionally, data from the International Labour Organization (Popova et al., 2021) shows 272 million international migrants worldwide.

In addition to the problem of forced migration, 169 million people work outside their home countries (Popova et al., 2021). For these reasons, although the student population's diversity of cultures and backgrounds has increased over the years, the expectation for teachers to achieve high academic standards remains (Spratt & Florian, 2015). Likewise, countries strive to leverage their school systems to achieve high performance. Many countries have participated in international assessments to guide their educational policies, such as The Programme for International Student Assessment (PISA), since its launch in 2000 (Schleicher, 2019). PISA exams are considered predictors of countries' future economic status (Auld et al., 2019).

Since 2011, refugee numbers have increased in Türkiye, with new migrations from Syria, Iraq, Afghanistan, Somalia, and other Middle Eastern countries (Ertekin et al., 2019). According to data published in January 2022 by the Department of Migration and Education in Emergencies under the Ministry of National Education, Türkiye has 1 million 365,884 international students. While 31.5 % of these children cannot attend school, 935,731 are

studying at various levels of the education system (Ministry of National Education, 2022a). The enrollment rate of school-age Syrian children increased from 63.3 % in 2019–20 to 64.4 % in 2020-21 (Tunca et al., 2021).

Research on refugee students shows that these students are facing issues such as a lack of academic achievement, communication problems between parents and school administration, language problems, peer bullying, teacher–student communication problems, and lack of engagement (Pehlivan Yılmaz & Günel, 2022), poverty (Yavuz & Mızrak, 2016), and lack of schooling (Akpınar, 2017). Despite the allocated resources, students' needs cannot be fully met, and schools cannot provide the conditions to lead them to success.

Another issue related to education concerning migration is the damage to democratic traditions and the human rights perspective. Although nearly all nations were migrants in the past, rising ambiguity and fear in societies have awakened in favor of political positions. As a result, people are becoming increasingly polarized and intolerant of others (World Migration Report, 2020). Democracy is at risk due to neoliberal financial initiatives that encourage more authoritarian governance systems; thus, discrimination against social groups such as people of color, LGBTI, women, and people living in poverty is on the rise (Giroux, 2004).

At this juncture, equipping new generations with respect, acknowledgment of diversity, and awareness of human rights is an urgent issue. Moreover, building a shared, peaceful future requires more effort to target barriers before quality education and inclusion practices. The foundation of educational strategies should be an inclusive educational framework that considers the racial and socioeconomic diversity of all refugee and local children (Aksoy et al., 2017). Hopefully, approaches in educational theory such as social justice education (Hackman, 2005), culturally sustaining education (Paris, 2012), and inclusive education (Lindsay, 2003) stand against this complicated case from a humanist perspective.

Universal Design for Learning (UDL) is one of the frameworks under this umbrella that encompasses inclusion practices and promotes learner variability and diversity in educational environments (Meo, 2008). In light of neuroscience, the framework enables critical support and optimum challenge for learners; thus, educators can reduce

unintentional barriers. Designing a curriculum that considers UDL principles builds on tight goals, accessible materials, flexible methods, and assessments (Meyer et al., 2014). In other words, UDL is an action toward equity and inclusiveness (Pliner & Johnson, 2004).

Three main principles—Engagement, Representation, Action and Expression—reflect three brain networks responsible for learning: recognition networks retrieve sensory information, affective networks give meaning to the coming information, and strategic networks organize the information. The framework comprises three principles, nine guidelines, and 31 checkpoints that arise from the working mechanism of these three learning networks. The guidelines enable universal curriculum design by embracing the biology of human learning (CAST, 2018a; CAST, 2018b).

The uniqueness of individual learning paths and the increase in multicultural environments demonstrate the urgency of inclusion initiatives in educational systems worldwide. Türkiye has allocated a significant number of resources to ensure their accessibility to the fundamental needs of refugee students; however, problems that determine the future of individuals and macrosystems remain (Ertekin et al., 2019). Inclusive education and the need for improvement in accessibility and pedagogy are urgent issues in Türkiye's educational system and in many other countries (Aksoy et al., 2017).

Consequently, teachers reported that they require additional professional development programs on inclusive education (Ünal & Aladağ, 2020; Polat, 2020). These professional development programs can undoubtedly provide educators with the knowledge, skills, and attitudes necessary to address diversity and help inclusive systems accomplish their objectives (Engelbrecht, 2013). Likewise, according to Borko (2004), effective programs can significantly improve teacher learning and instructional strategies. However, courses and seminars that do not include feedback, monitoring, active participation, and reflection are found to be ineffective (Bümen et al., 2012). Additionally, guiding studies have shown that monitoring and mentoring practices are standard features of effective professional development (Darling-Hammond et al., 2017; Desimone, 2009). Although research on teacher professional development has yielded encouraging results, many programs struggle with sustainability (Ávalos, 2011).

These findings indicate that mentoring is a crucial part of professional development programs. Mentoring is “A relationship between a less experienced individual and a more

experienced individual known as a mentor through which the mentor facilitates and supports learning.” according to the UNESCO International Bureau of Education (2013). Mentors invite proteges to benefit from the wisdom and style that have helped them succeed as professionals (Healy & Welchert, 1990). It is a reciprocal process in which mentors and their mentees benefit from the mentoring period (Holloway, 2001; Sorcinelli & Yun, 2007).

The popularity of mentoring is still growing worldwide (Ragins & Kram, 2007) and this trend has not slowed down (Vikaraman et al., 2017). Research on a state-wide professional mentoring program showed that implementing mentoring practices in a professional development program builds teacher confidence and contributes to teachers’ professional capital for early childhood teachers (Nolan & Molla, 2017). According to a systematic review study, mentoring programs can significantly contribute to professional development initiatives for university teachers (Pleschová & McAlpine, 2015). It is generally observed that teacher coaching and mentoring strategies can help teachers learn, develop, and ultimately increase student success (Ali et al., 2018) and support their career success (Underhill, 2006).

With technological advancements, mentoring activities have also gained new facilities, such as online mentoring, which has emerged as an alternative way to bring individuals together with their mentors (Murphy, 2011). It is a valuable teaching tool that complements face-to-face mentoring for continuous professional development (Schichtel, 2010). Descriptions have been interchangeably used for e-mentoring, telementoring, virtual mentoring, distance mentoring, and online mentoring (Kahraman & Kuzu, 2016); this type of mentoring is at least partly done using e-mail, chat rooms, and other forms of electronic communication devices (Miller & Griffiths, 2005). Over the years, it has become increasingly enriched with computer-mediated synchronous and asynchronous communications such as discussion boards, chat rooms, blogs, webinars, and web-based solutions (Smith & Israel, 2010).

With the increase in online mentoring practices, mentoring applications have changed to a developmental network approach that involves different types of relationships (Murphy, 2011). The mentoring structure has long been chiefly based on dyadic relationships; however, group mentoring programs have shown advantages such as flexibility, interdependence, and fostering collaboration and collaborative skills (Mullen & Klimaitis,

2021). When group mentoring is conducted online, information sharing, peer mentoring, and group support also become available (Single & Single, 2005).

## **1.2. Significance of the Study**

Research has demonstrated that mentoring programs can significantly advance pedagogical knowledge (Hudson, 2013), facilitate the successful implementation of complex applications (Moran et al., 2014; Craven, 2021), and enhance the fidelity of curriculum implementation (Reinke et al., 2013; Malanson, 2014; Banja, 2020). Therefore, integrating mentoring into teacher professional development programs is essential. Concurrently, teachers require strategies to address the diverse needs of students within the age-based, one-size-fits-all approach of traditional schooling. Universal Design for Learning (UDL) is a promising framework for inclusive education with the potential to enhance educational experiences for all students (Copa, 2013; King-Sears et al., 2023).

Despite the established benefits of mentoring and promising developments in UDL, few studies have investigated the intersection of UDL and professional development programs, particularly mentoring. This highlights a significant gap in the literature and underscores the need for future research. Additionally, UDL studies in Türkiye are sparse. Although academic research on inclusive education has increased in recent years (Polat, 2020), experimental research is still needed to evaluate the efficacy of inclusive education methods (Sari et al., 2020; Amaç, 2021).

This study investigates the efficacy of an online group mentoring professional development program in applying UDL practices among teachers working in primary and middle schools. The combination of experimental design and qualitative analysis enabled the study to contribute to mentoring theory and practice, as well as professional development efforts in inclusive pedagogy. The findings are expected to encourage further research on inclusive education and UDL training, ultimately contributing to a more equitable and supportive educational system. In addition, this study is of significant importance to the field of education, as it has the potential to inform practitioners' mentoring practices and influence the design of in-service training policies that are responsive to the specific needs and conditions of teachers. The findings highlight the necessity for educational institutions to adopt more inclusive practices by developing effective mentoring models.

### 1.3. Purpose of the Study

The aim of this study was to investigate whether a mentoring program enhanced teachers' implementation of the Universal Design for Learning (UDL) framework.

Following the purpose of this study, current research addresses the following sub-questions:

#### A. Quantitative Research Questions

1. Is there a significant difference in UDL Fidelity scores between teachers who received both mentoring support and UDL Basic PD training compared to those who only participated in UDL Basic PD training?
2. Is there a significant difference in teachers' motivation to apply the UDL framework in terms of expectancy for success scores between those who received mentoring support in addition to UDL Basic PD training and those who only participated UDL Basic PD?
3. Is there a significant difference in teachers' motivation to apply the UDL framework in terms of task value scores between those who received mentoring support in addition to UDL Basic PD training and those who only participated UDL Basic PD?
4. Is there a significant difference in teachers' motivation to apply the UDL framework in terms of cost scores between those who received mentoring support in addition to UDL Basic PD training and those who only participated UDL Basic PD?

#### B. Qualitative Research Questions

1. What are the views of the teachers about their participation in the mentoring program?
  - a. What are teachers' views on the specific knowledge and skills they acquired through their participation in the mentoring program?
  - b. How do teachers perceive and describe the impact of the mentoring program components on their professional growth and ability to implement UDL strategies?
  - c. What specific UDL practices have teachers adopted in their classrooms as a result of the mentoring program?

#### 1.4. Definitions

The terminology that will be emphasized and frequently used in this study is presented below:

**Professional Development:** “The development of competence or expertise in one's profession; the process of acquiring the skills needed to improve performance in a job.” (Oxford University Press, n.d.). In the educational context, professional development is an ongoing learning process that adapts teaching to meet the needs of students (Darasawang, 2006).

**Mentoring:** “A relationship between a less experienced individual and a more experienced individual known as a mentor) through which the mentor facilitates and supports learning.” (UNESCO International Bureau of Education, 2013, p. 41). Mentoring is a collaborative, reciprocal learning relationship in which an expert helps another to advance his or her ideas and level of competence, both personally and professionally (Klinge, 2005).

**Mentor:** “A trusted counselor or guide.” (Merriam-Webster, n.d.). As in sports, a mentor is someone who serves as a coach, providing guidance, instruction, feedback, and practice techniques (Gehrke, 1988). They act as agents, advocates, resources/referrals, guides, coaches, and role models (Pulse, 2005).

**Mentee:** A person who benefits from the advice and support of others who have been on a similar journey (Bhatti et al., 2020). “A person who is advised and helped by a more experienced person over a period of time, especially within a formal mentoring program in a company, a university, etc.” (Oxford University Press, n.d.).

**Universal Design for Learning:** UDL is a framework that considers individual learner differences and guides the design of flexible, technology-rich curriculum to meet diverse student needs. (Rose & Strangman, 2007). The framework integrates cognitive neuroscience with architecture to create adaptive learning experiences that meet individual needs and maximize progress in special education (Bernacchio & Mullen, 2007).

**Universal Design for Learning Guidelines:** The UDL Guidelines are a tool used in implementing Universal Design for Learning, a framework based on neuroscience to

improve and optimize teaching and learning for all learners (CAST, n.d.). The main goal of UDL guidelines is to direct curriculum writers and educators to use evidence-based strategies to meet the vast range of individual characteristics commonly encountered in classrooms (Rose & Gravel, 2010).

**Neurodiversity:** The concept refers to abnormal neurological development as a typical human difference to recognize and accept this inherent variance. (Jaarsma & Welin, 2012). Neurodiversity promotes interventions that support individuals without changing them (Cascio, 2012). The term encompasses several neurodevelopmental conditions, including dyspraxia, dyslexia, autism spectrum disorder, dyscalculia, attention deficit hyperactivity disorder, and Tourette syndrome (Karakus et al., 2020).

**Learning Variability:** Learning variability results from a noisy plastic system where each subject contains a specific parameterization of the brain (Seghier & Price, 2018). It refers to the extent to which students adjust their learning strategies in response to the demands of a course (Nijhuis et al., 2008).



## 2. LITERATURE REVIEW

This study investigated the impact of mentoring practices as a professional development program on teachers' UDL implementation fidelity. Accordingly, the literature review provides an overview of research on teacher professional development, the UDL framework, and mentoring programs.

### 2.1. Teacher Professional Development

Professional development of teachers is crucial for improving teaching practice and student learning outcomes. It can provide teachers with new knowledge, skills, and strategies to effectively meet the needs of students and adapt to changes in education (Borko, 2004). It also promotes quality and excellence through improved teaching practices (Nicoll & Harrison, 2003) and positively impacts classroom practice (Kalinowski et al., 2020). Effective professional development, including coherent experiences, planning time, and technical support, significantly improves teachers' knowledge and ability to implement the curriculum (Penuel et al., 2007).

Developing professional development programs requires a focus on pedagogy, active learning, collective participation, coherence, transfer, and reflection (Gröschner et al., 2015). According to Desimone (2009), professional development can enhance teachers' knowledge and skills, change their practice, and potentially improve student achievement. The critical features of professional development include content, active learning, coherence, duration, and collective participation. Darling Hammond et al. (2017) identified content focus, active learning, collaboration, use of models and modeling, feedback and reflection, coaching and expert support, and sustained duration as design elements of effective professional development.

Guskey (2014, p.15) highlighted the importance of backward planning when designing professional development programs. He stated that decisions about the route must be made after the destination has been identified, if the goal is to reach a particular destination. Therefore, because the goal is to improve student learning, professional development planning should start with identifying the desired learning outcomes. Guskey outlined the steps that should be followed: "(1) Determine student learning outcomes, (2) Identify new practices to be implemented, (3) Establish needed organizational support, (4)

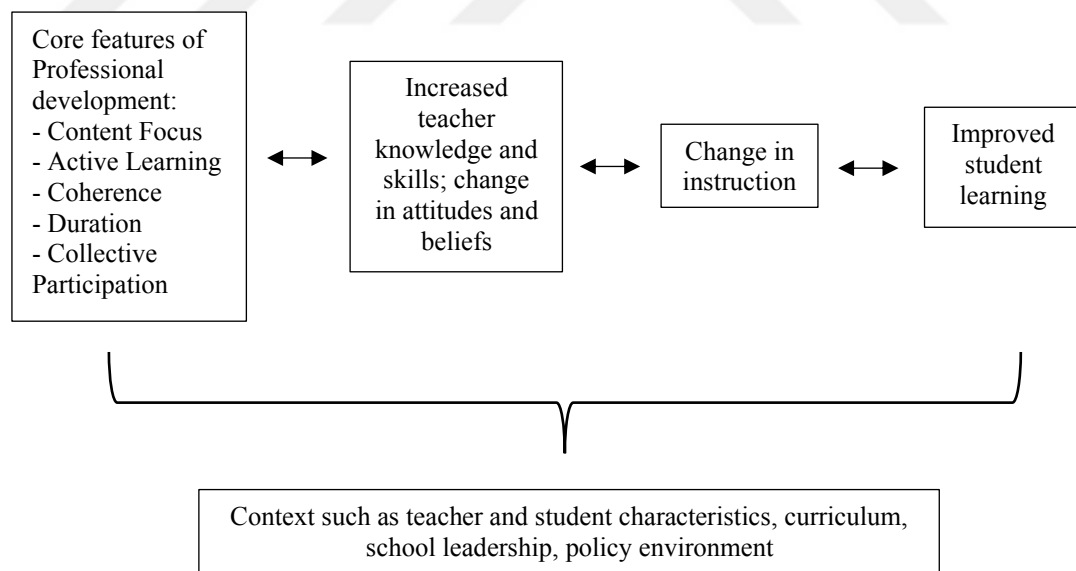
Outline desired educator knowledge and skills, and (5) Plan optimal professional learning activities.”

Desimone (2009, p. 184) proposed a basic model for teacher professional development. According to this model, the sequence and interdependence of steps for professional development would likely be as follows: “(1) Teachers experience effective professional development., (2) The professional development increases teachers’ knowledge and skills and/or changes their attitudes and beliefs., (3) Teachers use their new knowledge and skills, attitudes, and beliefs to improve the content of their instruction or their approach to pedagogy, or both. (4) The instructional changes foster increased student learning”.

These steps and their relations are shown in figure 1:

**Figure 1**

*Core conceptual framework for studying the effects of professional development on teachers and students*



*Note.* The framework illustrates the relationships among critical features of professional development, teachers' knowledge and beliefs, classroom practices, and student outcomes. From “Improving impact studies of teachers’ professional development: Toward better conceptualizations and measures” by L. M. Desimone, 2009, *Educational Researcher*, 38(3), 181-199 (<https://doi.org/10.3102/0013189X08331140>).

A synthesis of these studies indicates that professional development of teachers is vital for improving teaching skills, adapting to changes in education, fostering collaborative learning environments, supporting personal and professional growth, and reinvigorating teachers' commitment to their profession. Furthermore, effective professional development is multifaceted and requires a focus on specific teaching practices, collaborative learning, and sustained engagement. These elements can significantly enhance teacher practice and positively impact student learning outcomes.

This study investigated the change in teaching that resulted from increased knowledge and skills and desired changes in attitudes and beliefs through PD and mentoring programs in accordance with Desimone's (2009) and Darling Hammond et al.'s (2017) models. In addition, the research aims to determine whether there are any differences in teachers' motivations to apply what they have learned between mentoring and non-mentoring groups. This question of motivation was examined in the context of the expectancy-value theory, which is essential in the field of professional development of teachers. This theory can explain the results of professional development programs and the practices of teachers (Boström & Palm, 2020) in terms of changes to instruction and assessments based on teachers' intrinsic motivations and ability perceptions (Thomson & Palermo, 2018).

The expectancy for success dimension of the theory reflects the teacher's belief that they can fulfill the tasks. This belief is a source of motivation to overcome learning and application difficulties in professional development. The second dimension of the theory is the task value. It covers teachers' subjective evaluations of the tasks' importance. Task value is a concept formed by conceptualizing attainment, intrinsic, and utility values together. Third, cost describes the things invested, needed, or given up to complete a task. Whether this dimension should be evaluated under the task value or as a separate dimension remains debatable. The expectancy-value theory asserts that these three dimensions can explain teachers' motivation to apply what they have learned in professional development programs to their practice (Osman & Wagner, 2020).

## **2.2. Mentoring**

In the literature, there is more than one definition of mentoring. Murray (2001) defined mentoring as the intentional matching of a more experienced or skilled person with a less experienced or competent person, with the mutually agreed-upon purpose of helping the

less experienced person grow and develop specific abilities. With a focus on personal growth, professional achievement, and psychosocial support, it is a more comprehensive concept than coaching (Bulstrode & Hunt, 2000). It is widely recognized that mentoring plays a crucial role in lifelong learning (Gay, 1994) and is an essential component of professional development programs. Studies have shown that mentoring can significantly contribute to development initiatives (Pleschová & McAlpine, 2015). In addition, it has substantial implications for policy and practice (Nolan & Molla, 2017). As a result, mentoring has become increasingly popular since the turn of the millennium (Ragins & Kram, 2007), and teacher induction programs involving mentoring practices have been implemented in several countries, including Scotland, Denmark, and Malta (Shanks et al., 2022).

While teacher coaching and mentoring strategies support career outcomes (Underhill, 2006), they can also help teachers learn, develop, and ultimately increase learning outcomes. These practices resulted in more successful teacher learning, desired change, and student success (Ali et al., 2018). In addition, research has shown that implementing mentoring practices in a professional development program builds teacher confidence and contributes to teachers' professional capital (Nolan & Molla, 2017). Therefore, the mentoring model significantly influences the advancement of educators' pedagogical knowledge (Nopriyeni et al., 2019).

Nevertheless, essential mentoring components must be included in the programs, especially for new school teachers. For instance, mentors should allocate time and resources for lesson observation and feedback, colleague observation, and reflection. School managers should create time for mentors to handle their workload and foster a collaborative and supportive culture. In addition, the workload should be balanced so that new teachers have time for professional development and work with their mentors (Shanks et al., 2022).

While discussing the effects of mentoring practices on mentees, mentoring is a reciprocal process in which both mentors and their mentees benefit (Sorcinelli & Yun, 2007). The mentoring process involves a mentor providing guidance, support, and encouragement to a mentee while the two cultivate a mutually beneficial relationship (Lumpkin, 2011). In other words, if a mentoring program is structured and systematic, the process can improve the mentees' effectiveness while benefiting the mentors (Holloway,

2001). Thus, professional development programs promote the career development of both advanced (mentor) and beginner (mentee) individuals in work environments, and mentors invite mentees to benefit from their wisdom and professional success styles (Healy & Welchert, 1990).

However, the traditional model of mentoring needs to be updated. Despite these practices' reciprocal nature, the model's knowledge flow is conventionally considered unidirectional, from mentor to mentee. Consequently, the traditional model has been criticized for its reality regarding existing hierarchies, boundaries between positions, and diversity issues. Therefore, mentoring definitions have evolved because of the diverse mentoring relationships that people in different fields experience in non-traditional forms (Mullen & Klimaitis, 2021). The constructivist mentoring paradigm has emerged as a new conceptualization of mentoring models (Heikkinen et al., 2008).

Mullen and Klimaitis (2021) presented a classification of mentoring types, each distinguished by unique dimensions. Formal Mentoring is characterized by structured and planned interactions within a specified program, offering a clear framework for the mentor-mentee relationship. In contrast, Informal Mentoring arises spontaneously and features unplanned interactions, allowing for more flexible and personal mentoring experiences. Diverse Mentoring emphasizes the integration of individuals with varying demographics and interests, enriching the mentor-mentee relationship with different perspectives. Electronic Mentoring encompasses mentor-mentee interactions that occur at a distance and are facilitated by technology.

Co-mentoring, also known as Collaborative Mentoring, is particularly noteworthy for fostering transformative relational development through the joint efforts of the mentors. Group Mentoring involves participants with shared goals who leverage their differences. Peer Mentoring is a reciprocal relationship between peers who offer empowering assistance and support to one another. Multilevel Mentoring fosters a culture of learning and support that transcends hierarchical boundaries by extending the concept of mentoring across different organizational levels. Cultural Mentoring is a form that unites individuals from diverse cultural backgrounds under shared objectives and facilitates cross-cultural understanding and collaboration. Each type of mentoring offers varied pathways for personal and professional growth (Mullen and Klimaitis, 2021).

Solid relationships have long been recognized as essential catalysts for professional and personal growth (Sanfey et al., 2013). Mentoring practices are important because they foster individual development by promoting learning, transformation, and the ultimate achievement of career aspirations. Beyond these personal benefits, it is vital to foster a vibrant, engaged, and thriving community (Johnson, 2015). Mentoring programs offer cost-effective development initiatives for both mentors and mentees. These programs significantly contribute to the advancement of pedagogical knowledge, the cultivation of leadership roles, and the enhancement of communication skills (Hudson, 2013).

This simultaneous development of mentors and mentees cultivates a mutually beneficial relationship that enriches the entire community. According to Vikaraman et al. (2017), mentoring has become so influential that it has been implemented in job-integrated professional development programs worldwide. This trend shows no signs of slowing down, and it is only expected to persist and grow in importance and popularity. The ongoing rise of mentoring signifies the increasing recognition of its value in professional development and personal growth, further emphasizing its importance in today's professional landscape.

### **2.2.1. Online Mentoring**

The 21st century has seen the importance of online tools, such as the Internet and social media, in professional relationships. The youth increasingly use social media for personal and professional purposes and enormously benefit from online platforms. At the same time, youth professionals need support from mentors to establish their professional identity and navigate their relationships with companies. At this point, mentoring in web-based environments has emerged as an alternative way to connect mentees with mentors. These online programs can reach mentors more conveniently for a particular program and address mentees' various needs by going beyond spatial and time-bound barriers (Murphy, 2011).

Since the beginning of web-based mentoring initiatives, various studies have used different terms interchangeably to refer to the practice, including e-mentoring, telementoring, virtual mentoring, distance mentoring, and online mentoring (Kahraman & Kuzu, 2016). Single and Muller (2001) defined online/e-mentoring as follows:

A naturally occurring relationship or paired relationship within a program that is set up between a more senior/experienced individual (the mentor) and a lesser skilled individual (the mentee), primarily using electronic communications, and is intended to develop to grow the skills, knowledge and confidence of the lesser skilled individual to help him or her succeed. (p. 108)

They highlighted that online mentoring programs go beyond the limitations of face-to-face mentoring and eliminate the participation barriers of time and geography.

This mentoring practice uses email, chat rooms, and other electronic communication devices (Miller & Griffiths, 2005). It has begun to be discussed as a valuable teaching tool to complement face-to-face mentoring for ongoing professional development (Schichtel, 2010), and it is increasingly enriched by computer-mediated synchronous and asynchronous communications such as discussion boards, chat rooms, blogs, webinars, and web-based solutions (Smith & Israel, 2010).

Online mentoring makes use of information technology innovations to offer mentoring opportunities not available in in-person mentoring programs. Mentors and mentees can overcome time and location constraints by participating in online mentoring programs and connecting through electronic communications (Single & Muller, 2001). These programs offer alternative ways to connect individuals with mentors (Murphy, 2011). As a result, many companies have moved their training programs from face-to-face to offline and online forms of distance learning (Homitz & Berge, 2008).

One of the critical advantages of online mentoring is its flexibility. Mentoring relationships can be established and maintained remotely, allowing individuals to participate in mentoring programs without the need for physical proximity. This is particularly beneficial for individuals who need access to local mentors or have busy schedules that make in-person meetings challenging. In addition to its convenience, online mentoring offers a range of communication options. Mentors and mentees can communicate via email, instant messaging, video conferencing, and other web-based platforms. These options allow synchronous and asynchronous communication, accommodating different preferences and schedules (Kahraman & Kuzu, 2016). Currently, video-based platforms are widely used, enabling interaction and instant communication among participants and providing reciprocal learning, support, and development opportunities. Thus, online

mentoring can mimic face-to-face mentoring and overcome the absence of physical appearance (Mullen & Klimaitis, 2021).

Research on the effectiveness of online mentoring is growing. In light of the rise of new online induction and mentoring programs, as well as efforts to integrate online pedagogy with face-to-face mentoring best practices, it is becoming increasingly important to investigate the effectiveness of online mentoring (Smith & Israel, 2010). Studies have demonstrated increased academic performance and job opportunities for individuals through online mentoring (Murphy, 2011).

Online mentoring is a valuable practice for supporting face-to-face mentoring practices in ongoing professional development efforts. It combines the best examples of e-pedagogy and in-person experiences (Schichtel, 2010). According to Jaffe et al. (2006), online mentoring has changed how mentors and mentees interact using computer-mediated communications and Internet-based solutions. An increased frequency of interactions and blended communication methods are expected to improve the mentoring experience.

To summarize, online mentoring is currently being used and has shown benefits for mentors and mentees in various fields. Studies have highlighted valuable gains for professional development such as learner centricity, cost efficiency, long-term relationships (Walsh, 2016), classroom management and learner engagement (Shernoff et al., 2011), and increased mentors' job satisfaction, organizational commitment, and job performance (Ghosh & Reio, 2013). On the contrary, there were limitations, such as technological barriers to implementing online programs (Grant et al., 2020). Therefore, mentoring programs should be supported. Quality and rigor must be improved to increase the effectiveness of mentoring programs (Raposa et al., 2019).

### **2.2.2. Group Mentoring**

According to Kroll (2016), group mentoring is a collaborative learning model in which individuals exchange experience and knowledge to foster a supportive learning environment. According to Kuperminc (2021), purposeful mentoring can be defined as group mentoring in the presence of one or more mentors and a minimum of two mentees. It is a flexible, cost-effective learning method with best practices (Huizing, 2012). The conventional definition of mentoring is the process through which a more experienced



educator offers guidance to a less experienced one. However, compared with one-on-one conversations in traditional paired mentoring, there is a broader range of viewpoints in a group mentoring setting (Heikkinen et al., 2008).

The history of group mentoring can be traced back to Benjamin Franklin's Leather Apron Club, which he founded with Philadelphia tradesmen (Mullen & Klimaitis, 2021). These types of mentoring practices have resulted in significant positive outcomes for individuals and communities for millennia (Kroll, 2016). It can be more efficient than individual mentoring without compromising the required feedback (Meister & Willyerd, 2010). Moreover, it enables widespread access to practical knowledge, thus increasing organizational productivity (Emelo, 2011). Furthermore, Dansky (1996) emphasized the significant career benefits of group mentoring through professional associations, where inclusivity contributes to increased job attainment and role modeling positively influences salary outcomes.

In traditional mentor–mentee relationships, a more junior employee in the same organization is paired with a more senior employee who provides professional assistance. However, mentoring applications have evolved into a developmental network approach in which different relationships exist inside and outside organizations (Murphy, 2011). Although it has been a long time since mentoring practices began, the structure was mostly built on dyadic relationships. However, group mentoring has many advantages, such as flexibility, respect for diversity, interdependence, growth, and the ability to foster team culture and collaborative skills (Mullen & Klimaitis, 2021). Through activities provided in group mentoring programs, mentees develop new skills, change their attitudes, and interact with peers. Research has shown the benefits of peer interactions in group mentoring, and these activities lead participants to desired behavioral outcomes (Kuperminc, 2021).

Huizing (2012, pp. 28-34) categorized group mentoring practices under four headings: “peer group mentoring, one-to-many mentoring, many-to-one mentoring, and many-to-many mentoring.”

Busse et al. (2018) established a typology and categorized mentoring programs based on mentor type, program setting, and program aim in the United Kingdom. The study revealed that 12 mentoring models can be categorized as “personal and developmental” and “academic and employability.”

Kuperminc (2021) classified youth group mentoring programs into four categories:

- one-to-many mentoring programs, that consist of one mentor with a group of mentees
- multi-mentor mentoring programs, that consist of two or more mentors with one particular group
- team mentoring programs, that consist of multiple mentors with specific mentoring roles
- unmatched mentoring programs in which a group of mentors matched with many mentees

The group mentoring approach has variations, such as programs in which managers take responsibility, or it can also be done peer-to-peer (Meister & Willyerd, 2010). Understanding the complicated processes involved in these types of programs is essential, and analyzing mentoring relationships requires recognizing the distinctions between individual actors, roles, and overall group dynamics (Williams et al., 2019). For instance, socio-emotional skills and past relationships between mentors and mentees, the size of the group, and support from one mentor to another through practices such as co-mentoring affect program effectiveness (Kuperminc, 2021).

When implemented appropriately, group mentoring can be a significant tool for fostering confidence among individuals. It provides a broader understanding of organizational structure and dynamics, thereby leading to a strengthened sense of loyalty and integration within the organization (Carvin, 2011). The efficacy of group mentoring methods is best served when applied to individuals who share similar skill gaps. This method provides an opportunity for the collective learning and development of the group, as an individual's unique skills and competencies can be leveraged and disseminated to a larger audience relatively quickly (Murray, 2001).

Frequent starting points provide immediate support and information when analyzing different group mentoring implementations. Group mentoring practices should be seamlessly embedded in the curriculum to avoid being ignored because of the parallel vital activities. Mentoring groups should require mandatory attendance to guarantee full

engagement and emphasize the value of group mentoring as an educational component. In addition, ongoing evaluation activities help sustain high standards (Skjevik et al., 2020).

Understanding individual experiences and group processes is necessary to evaluate the effectiveness of these programs. Mentee outcomes depend heavily on the quality of one-on-one relationships. Additional help for mentors in understanding and navigating group dynamics may be beneficial. Ongoing feedback on group functioning could also benefit group facilitators (Williams et al., 2019). The outcomes of group mentoring may also be influenced by other social and relational processes, such as group cohesion, belonging, and robust group identity (Kuperminc, 2021).

Group mentoring has been widely used in educational degree programs in other contexts (Mullen & Klimaitis, 2021). These programs can help young people achieve positive outcomes (Williams et al., 2018). They are effective for various youth groups and program models and are particularly beneficial for disadvantaged and at-risk youth (Kuperminc, 2021). In addition, benefits for mentees, including higher salaries, job satisfaction, and promotions, have been demonstrated by research, and greater job satisfaction is correlated with more extensive networks. (Murphy, 2011).

In conclusion, mentoring is a crucial part of teacher professional development (PD), and one of its main goals is to enhance teaching methods. It facilitates the transfer of valuable teaching knowledge and skills while also serving as a catalyst for both mentors' and mentees' professional and personal growth. Based on the abovementioned findings, this study followed an online group mentoring approach as a professional development program. The focus of the study was primarily on two aspects: the first was to understand the influence of this approach on teachers' fidelity to the Universal Design for Learning (UDL). This examination involves understanding how effectively teachers adhere to the principles and guidelines of UDL in their teaching processes. The second aspect was to examine the motivation level of teachers in implementing the UDL framework within their instructional methods. The aim was to determine whether the approach used could motivate teachers to incorporate UDL principles into their teaching and thus enhance the overall learning experience for their students.

### **2.3. Universal Design for Learning**

The Universal Design for Learning (UDL) is based on the premise that individual differences are the norm rather than the exception. The framework draws on neuroscience studies and builds on the variability in learning activity in three essential learning networks (Mangiatordi & Serenelli, 2013). Therefore, the literature review of UDL will begin with a section on Neurodiversity and Individual Differences, wherein the framework's background will be presented. Subsequently, proceed with a detailed examination of the framework's core elements.

#### **2.3.1. Neurodiversity and Individual Differences**

Humans are neurodiverse. Despite the common acceptance of the contrary belief, atypical neurological wiring is on the typical spectrum of human differences. The brain does not work like a computer; instead, it works like (b)rain forests. Every brain creates and uses unique neurological pathways, and these ecosystems contribute in diverse ways to the community with their advantages and disadvantages (Armstrong, 2010).

Similarly, the concept of neurodiversity posits that conditions such as autism spectrum disorders and learning difficulties are inherent in human diversity (Sumner & Brown, 2015). Advances in neuroscience have revealed differences in learning among individuals as well as in other dimensions. Moreover, individuals differentiate in how they learn throughout their lives (Meyer et al., 2014). Given the variability in learners' needs, choices, and ways of learning (Al-Azawei et al., 2016), no norm can be used for disability discourse (Armstrong, 2010).

Research shows that a “typical average” learner does not exist, and the interactions between neural connections in our brains determine the variance among learners. Contrary to popular myth, “disabled” learners with print-based media are different from “disabled” learners with video- and audio-based media (Rose & Meyer, 2000). Therefore, range in neurodiversity does not cause or show disability, but context and the goal itself play a vital role in whether the situation is disabled or not. Researchers in the CAST recognized that the context and the goal depend on the curricula; therefore, they declared that the curriculum has barriers for learners. As a result, goals, methods, materials, and assessments should be carefully investigated, and unintended barriers should be eliminated to create a more

inclusive learning environment (Meyer et al., 2014). When considering education, whether the curriculum makes a learner successful or not, its limitations and absence of options are the real problems (Rose & Meyer, 2002).

Accordingly, the diversity of learners in abilities, experiences, opportunities, language, and interests leads us to an obligation to address diverse necessities in educational contexts (Tomlinson & Tighe, 2006). At this juncture, Robinson and Aronica (2015) proposed shifting the industrial approach to an agricultural one for educational institutions. They used the farmer and plant metaphor: Farmers do not make plants grow; they only adjust the environment, such as soil, water, sunlight, and time. Likewise, “people thrive in certain conditions and not others” (Robinson & Aronica, 2015, p.82).

Because the UDL framework focuses on creating inclusive learning environments, it can provide educators with practices and strategies based on neuroscience findings (Rose & Meyer, 2002). With UDL’s promising potential, many learners can reach their potential and become expert learners throughout their lives (Meyer et al., 2014).

### **2.3.2. The Concept of Universal Design**

The Center for Universal Design in Raleigh, North Carolina, is the institution where the term 'universal design' first entered our vocabulary (Gargiulo & Metcalf, 2022). Ron Mace, an architect and disability rights advocate, coined the term universal design in 1988 (Marino et al., 2024) to highlight the difference between universal and accessible design.

The Universal Design approach is inspirable and understandable in theory, although its application is complex. Hence, working under his direction at North Carolina State University, a collaboration of architects, product designers, engineers, and environmental design experts assembled the 7 principles of Universal Design. Story, Mueller, and Mace (1998) shared these principles and guidelines in their book, including examples to guide their application.

According to Story et al. (1998), The 7 Principles of Universal Design are as follows:

- Equitable Use - The design is useful and marketable to people with diverse abilities.
- Flexibility in Use: The design accommodates a wide range of individual preferences and abilities.

- Simple and Intuitive Use: Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
- Perceptible Information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
- Tolerance for Error: The design minimizes hazards and the adverse consequences of accidental or unintended actions.
- Low Physical Effort: The design can be used efficiently and comfortably and with a minimum of fatigue.
- Size and Space for Approach and Use: Appropriate size and space are provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility (Story et al. 1998, pp. 31-84).

It is important to note that the seven universal design principles are not limited to architecture alone. They are integrated into our daily lives through many products available in the market (Gargiulo & Metcalf, 2022). Similarly, King-Sears (2009) linked these commonly used principles to a curriculum focused on Universal Design for Learning (UDL) and demonstrated how instructional practices align with seven universal design principles.

The principle of flexibility in use was explained by offering learners choices based on their preferences and abilities. Equitable use as a UDL principle makes instructional materials accessible to all learners with the support of technology. Using multiple means to present content resonates with the perceptible information principle. Tolerance for error refers to approaching errors as learning opportunities. With individualized immediate feedback and scaffolding, guidance and correction provide substantial pedagogic benefits. Presenting content while clearly and explicitly considering learners' background knowledge is an example of a simple and intuitive use principle. Low physical effort can be observed in educational environments when an activity offers efficient navigation and action accommodations. Finally, regarding the size and space for the approach and use principle, customizing the information displayed in the classroom or on the materials becomes a fundamental component for teachers.

However, Edyburn (2010) challenged the link between architectural principles and UDL-oriented instructional practices. He asserted that interactions between the learner and

the learning material or learning objective are not as static as those between the individual and the buildings.

The universal design concept emerged in the 1950s; however, the terminology has changed until today. The concept is known as barrier-free design, which focuses on building obstacle-free physical environments. Over the years, it has gained awareness among designers, architects, and engineers, becoming a cornerstone in all these design-related fields (Rose & Meyer, 2002).

### **2.3.3. Overview of the UDL Framework**

Although the universal design movement began in architectural studies and focused on physical environments (Orkwis & McLane, 1998), the universal design for learning framework focuses on teaching, learning, assessment, and curriculum. Researchers at CAST have been working on guidelines and tools that create universally designed learning environments since 1984 (Gargiulo & Metcalf, 2022). In time, they used universal design to create more accessible physical spaces and curriculum materials and then considered the approach in the field of curriculum design (Orkwis & McLane, 1998).

Five clinicians founded the Center for Applied Special Technology (CAST) in 1984: Anne Meyer, David Rose, Grace Meo, Skip Stahl, and Linda Mensing. When Apple Macintosh introduced personal computers, the transformative promise of technology in education loomed on the horizon. They focused on using computers to improve learning for students with learning difficulties (CAST, n.d.).

Their initial focus was to support learning for students with learning disabilities, but researchers recognized that all learners are affected by unintended barriers in the curriculum. Because it resulted from the “one-size-fits-all” model in the educational system, they expanded their perspective on supporting all learners, whether disabled or not. The experience demonstrated that making the design more accessible contributes to students with disabilities, but every learner benefits from it (Edyburn, 2005). As a result, they shifted their perspective to making the curriculum more inclusive and addressing the needs of all diverse learners (Kumar & Wideman, 2014).

Clearly, the design is universal when accessibility is ensured for everyone, not only for individuals with disabilities. Inclusiveness means that materials or methods should not

exclude a particular learner group, such as the disabled, diverse, or non-disabled. Materials and methods should be accessible to all students and meet each student's needs (Orkwis & McLane, 1998). Because a learner can struggle throughout different points across the curriculum, options are provided for everyone, not just for some (Edyburn, 2010). The goal is to exclude barriers from curricula to make every learner successful (Novak, 2016). Considering this perspective, the UDL framework was built upon crucial research findings in learning sciences and its evidence-based instructional design principles extracted from a comprehensive review of empirical studies in CAST (Chita-Tegmark et al., 2012).

UDL framework embodies the characteristics that enable educators to design effective learning environments where all learners thrive and succeed as expert learners. It encourages proactively removing unintended barriers in learning experiences and embraces variability among learners (Basham et al., 2020). The framework focuses on effective instruction, fostering engagement, flexible use of materials, and meaningfully accessible instruction and aims to expand meaningful access and lower learning obstacles for students with various learning requirements (Marin et al., 2014).

UDL helps educators design a learning environment and instruction with embedded, just-in-time support. When a learner needs it, options are available. Moreover, these options are also provided for everyone and not just for some. Because a learner can struggle throughout different points across the curriculum, it is not limited to students with disabilities (Edyburn, 2010). Personalized challenge and support, built-in models of performance, and immediate feedback are embedded in every aspect of the curriculum and every learning experience from the beginning (Rose & Meyer, 2000).

When designing a curriculum that embraces UDL principles, educators must establish goals, assessments, methods, and materials concerning learner variability and diversity. In contrast to traditional curriculum development approaches, UDL emphasizes the interconnectedness of these four components. Since accessibility is one of the critical terms of the UDL approach, educators encourage the use of digital learning tools in the design to make teaching more flexible and accessible. Thus, the design addresses variability and appreciates diversity (Meyer et al., 2014).

It must be emphasized that goals and standards are tightly maintained in the UDL framework. Every learner should be challenged at appropriate levels. The main point is to



provide alternatives rather than make the curriculum easier (Orkwis & McLane, 1998). Katie Novak, who has significant studies in the field of UDL, defines the framework as follows: “UDL is thoroughly knowing the concept you’re going to teach and presenting that concept in different ways while engaging the students and encouraging them to express their knowledge in different ways.” (Novak, 2016, p. 13). In other words, inclusive learning environments can be achieved by reducing barriers while maintaining tight expectations for all learners. Contrary to traditional planning approaches, multiple ways are provided to access and engage in learning, and high expectations, tight goals, flexible materials, methods, and assessments are covered (Marino et al., 2024).

In summary, UDL is both a philosophy and an intervention and intends to eliminate barriers for every student (Edyburn, 2005). The framework developed considering cognitive neuroscience research guides educators in reducing unintentional barriers in the curriculum. It promises to provide support and optimum challenge and address the different needs of all learners (CAST, 2018b). Many of the discoveries in brain-based research, including the work of cognitive-social theorists, educational psychologists, and educational researchers, are reflected in the UDL framework (Gargiulo & Metcalf, 2022). The main intention is to increase the accessibility of content and materials while facilitating the growth of expert learners (Takacs et al., 2021).

#### **2.3.4. Technology and the UDL**

Today’s learning environments are more flexible for receiving and representing information. Digital media and technologies provide more engaging options than traditional instructional materials. With a focus on research and practice, the UDL framework leverages technology to improve learning (Edyburn, 2005).

Because CAST focuses on developing assistive technologies for K-12 education in the early periods (Kumar & Wideman, 2014) and promotes the use of technology to eliminate barriers in the curriculum (Rose & Meyer, 2000), educators may think UDL is inapplicable if sufficient technology does not exist. However, implementing UDL guidelines and checkpoints can be accomplished effectively without using any specific modern technology (Rose et al., 2010).

It is crucial to state that UDL does not merely include technology in instruction but also comprises its utility. It relates to pedagogy and instructional practices for diversity (King-Sears, 2009). However, technological advancements in recent years have made flexible design possible like never before and have become a game changer when it addresses diversity by providing accessibility and usability (Edyburn, 2010).

### **2.3.5. Implementation of the UDL**

Three implementation recommendations of the UDL framework for educational institutions are described in this section.

First, in their study, Orkwis and McLane (1998) suggested the First Five Steps to Implement Universal Design for Learning in classrooms:

1. Provide all text in digital format.
2. Provide captions for all audio.
3. Provide educationally relevant descriptions for images and graphical layouts.
4. Provide captions and educationally relevant descriptions for videos.
5. Provide cognitive supports for content and activities” which includes:
  - a. Summarize big ideas
  - b. Provide scaffolding for learning and generalization
  - c. Build fluency through practice
  - d. Provide assessments for background knowledge
  - e. Include explicit strategies to make clear the goals and methods of instruction (Orkwis and McLane, 1998, pp. 15-16).

Second, Schwanke, Smith, and Edyburn proposed a model demonstrating the interactions among advocacy, accommodation, and accessibility. The three-phase developmental cycle, The A3 Model, illustrates the UDL implementation process for individuals and organizations (Schwanke et al., 2001, as cited in Edyburn, 2010). Advocacy refers to questioning the system’s inequity and insufficiency problems. Accommodation refers to modifications for individuals with disabilities. Accessibility refers to a proactive approach in which the design is accessible to everyone from the outset (Edyburn, 2010)

Third, Jennifer Katz created the Three Block Universal Design for Learning (UDL) model to help teachers implement UDL framework. The model is divided into three blocks:

“creating compassionate learning communities (SEL), inclusive instructional practices, and systems and structures” (Katz, 2015, p. 4). The first block explores social and emotional learning and includes creating a compassionate and respectful learning environment; the second block, inclusive instructional practice, outlines a step-by-step framework for planning and teaching. The final block, Systems and Structures, explores systemic variables such as service delivery models, budgeting, and resource allocation. This block emphasizes the importance of school leadership in supporting educational reform through professional development in UDL (Katz, 2013). The Three Blocks UDL model offers a comprehensive approach to promoting inclusive educational environments through community building, instructional practices, and supportive systems and structures.

Fourth, Rose, Ralabate, and Meo (2014) established five phases of the UDL implementation process.

- Explore: Investigate UDL as a framework, raise awareness, and assess interest in potential implementation.
- Prepare: Establish a culture that values variability, evaluate district policies and structures, and create a vision, measurable goals, and an action plan.
- Integrate: Offer professional development, develop resources, and establish protocols for integrating UDL with existing practices.
- Scale: Expand effective processes, extend practices system-wide, and foster a community of practice for collaborative learning.
- Optimize: Anticipate and plan for changes, encourage innovation while focusing on continuous improvement, and nurture a thriving UDL culture.

### **2.3.6. UDL Guidelines**

Learning occurs in responsible networks in the brain that function uniquely for every individual (CAST, 2018a). These networks represent three separate brain areas concerning spatiality and function; however, they are interconnected and work together while learning. Each individual has a unique way of using these systems, just as we each have a unique set of fingerprints and DNA. Three distinct yet interconnected networks—recognition, strategic, and affective—reflect three distinct brain regions, and individuals use these networks in distinct ways (Gargiulo & Metcalf, 2022).

The UDL considers the variability of these three learning networks and provides principles for educators to design their instruction inclusively for every learner. The three principles consist of guidelines that provide checkpoints to reduce barriers in the curriculum (Chita-Tegmark et al., 2012). These three main principles—Engagement, Representation, Action, and Expression—relate to the mechanisms of three learning networks: retrieving sensory information through recognition networks, giving meaning to the coming information through affective networks, and organizing the information through strategic networks (CAST, 2018a). These networks have been the subject of years of research in the learning sciences, including neuroscience, which helped inform UDL (Novak, 2016).

The focus is to provide multiple ways to engage, present content, and demonstrate understanding. Three principles, nine guidelines, and thirty-one checkpoints guide educators for universal learning design that addresses variability by its research-based background (Basham et al., 2020). Thus, the UDL framework provides support and challenge in three areas of instruction: multiple means of representation, multiple means of action and expression, and multiple means of engagement (Rose & Meyer, 2000).

#### **2.3.6.1. Multiple Means of Engagement**

Without dispute, teaching and learning are only as effective as the student finds them relevant and valuable, and engagement is required for learning to be meaningful and internalized (Gargiulo & Metcalf, 2022). Therefore, curricula should offer ways of coherence with students' identity and semantic world and establish a positive attitude toward content (Chita-Tegmark et al., 2012). Moreover, the critical aspects of curriculum development should be establishing relevance, recruiting interest, and maintaining motivation. At this point, engagement guidelines provide strategies to activate affective networks and connect the curriculum with learners (Novak, 2016).

According to the UDL approach, engagement represents the "Why of Learning" and reflects the Affective Network. In other words, the goal is to make content meaningful to all learners (Takacs et al., 2021). This network is the system that monitors our internal and external world, determines our priorities and what is to be valued, motivates us, and guides our actions. At the same time, learners vary considerably in their affective network because of their neurological, cultural, personal interests, and prior knowledge. Reactions vary from person to person, within a person over time, and in different contexts. These differences

have potent effects on learners' ability to learn. For instance, emotions can affect a learner both positively and negatively (Meyer et al., 2014).

Because of the diversity in these networks in terms of motivation, providing options for engagement is one of the fundamental principles of UDL (Takacs et al., 2021). The principle is to engage students in the learning process through activities that promote affective learning in various ways (Marino et al., 2024). It explores several methods for motivation, challenge, and interest in learning (Gargiulo & Metcalf, 2022), and instruction incorporates different strategies to appeal to all students' motivations and interests (Basham et al., 2020; Orkwis & McLane, 1998). In this principle of UDL, three guidelines arise from the manifestation of affective networks in the educational environment: "providing options to recruit interest, providing options to sustain effort and persistence, and providing options to self-regulate" (CAST, 2018b).

The first guideline of this principle, providing options to recruit interest, emphasizes the need to include alternative ways of attracting interest due to the considerable variation in learners' interests. This guideline consists of three checkpoints: "Optimize individual choice and autonomy (7.1), Optimize relevance, value, and authenticity (7.2), and Minimize threats and distractions (7.3)". The second guideline of the principle, providing options to sustain effort and persistence, states that learners should be provided with choices that support their ability to self-regulate and self-determine, thereby equalizing learning opportunities. This guideline includes the checkpoints "Heighten salience of goals and objectives (8.1), Vary demands and resources to optimize challenge (8.2), Foster collaboration and community (8.3), and "Increase mastery-oriented feedback (8.4)." The third guideline of this principle, providing options to self-regulate, emphasizes that strategically adjusting one's emotional reactions or mood when interacting with the environment is an essential aspect. This guideline has three checkpoints for developing self-regulation skills: "Promote expectations and beliefs that optimize motivation (9.1), "Facilitate personal coping skills and strategies (9.2), and Develop self-assessment and reflection (9.3)" (CAST, 2018b).

#### **2.3.6.2. Multiple Means of Representation**

Accessing and making meaning of the content is the basis of teaching (Chita-Tegmark et al., 2012), and learning is only possible if the information is perceived and sensed by

learners. Therefore, it is necessary to ensure that all learners perceive important information equally (CAST, 2018b). However, although our brains share the same structure, the anatomy, size, connectivity, physiology, and chemistry of recognition networks—the system responsible for sensing information and transforming it into usable knowledge—are highly diverse (Meyer et al., 2014).

In brief, learners approach what they see, hear, and read differently; therefore, content should be presented in different ways (Al-Azawei et al., 2016). The practice of teaching without options and presenting content in a single way is ineffective. Students whose best learning method is different will be unsuccessful (Novak, 2016). At this point, The Multiple Means of Representation principle supports making sense of what we see and recognize with content delivery across multiple options (Marino et al., 2024). Information is presented and represented in a way that addresses the sensory variability of learners (Basham et al., 2020).

The representation principle is related to the WHAT of learning. The concept concerns how individuals view and interpret information. Because learners vary in how they understand and process information, options for representation are essential for addressing diversity (Takacs et al., 2021). Thus, perceptual barriers can be reduced by providing different methods for recognition. Representing content in various formats makes information accessible to more learners. (Orkwis & McLane, 1998).

Guidelines for multiple means of representation emphasize the need to provide different forms of representation to activate recognition networks (Novak, 2016). The guidelines provide students with various means of receiving and interpreting information. By offering different ways of presenting information, physical barriers can be reduced to learning and sensory, perceptual, and other learning roadblocks that students may encounter. Activating background knowledge, highlighting patterns and relationships, and guiding visualizations and information processing are all part of providing options for comprehension (Gargiulo & Metcalf, 2022).

The main idea behind this principle is that there is no ideal way of conveying information to all learners; it is essential to offer choices. There are three guidelines and 12 checkpoints in the first principle of UDL (CAST, 2018b): “provide options for perception, provide options for language and symbols, and provide options for comprehension.”

The first guideline of this principle, provide options for perception, underlines the importance of ensuring that information that is important for reducing barriers to learning is equally perceivable by all students. “Offer ways of customizing the display of information (1.1), Offer alternatives for auditory information (1.2) and Offer alternatives for visual information (1.3)” are the three checkpoints of this guide that support access to information (CAST, 2018b).

The second guideline is to provide options for language and symbols. This guideline focuses on students' alternative representations of concepts. There are three checkpoints to ensure clarity and understandability for all learners: Clarify vocabulary and symbols (2.1), Clarify syntax and structure (2.2), Support decoding of text, mathematical notation, and symbols (2.3), Promote understanding across languages (2.4), and Illustrate through multiple media (2.5)” (CAST, 2018b).

The third guideline of this principle, "Provide options for understanding," emphasizes that instructional design should include the necessary supports and scaffolding to ensure that all students have access to information. It uses the checkpoints “Activate or provide background knowledge (3.1), Highlight patterns, critical features, big ideas, and relationships (3.2), Guide information processing and visualization (3.3), Maximize transfer and generalization (3.4)” (CAST, 2018b).

### **2.3.6.3. Multiple Means of Action and Expression**

Even the most minor actions occur through complex, layered processes in the brain. In each action, a goal is set, an appropriate plan is designed and implemented, progress is monitored, and the action is corrected or adapted. Strategic networks are therefore fundamental to teaching and learning. They enable us to take action in the world around us and initiate, organize, plan, and execute our purposeful actions, from the simplest to the most complex (Meyer et al., 2014).

The Multiple Means of Action and Expression principle accommodates the strategic and motor system by reflecting on how learners process and respond to information they have received (Gargiulo & Metcalf, 2022). In other words, this principle is concerned with the HOW of learning (Takacs et al., 2021). It is about allowing students to demonstrate their understanding in various ways (Marino et al., 2024).

Learners demonstrate, synthesize, and navigate learning environments in distinct ways. They prefer various styles of expressing information and have unique preferences for conveying their knowledge (Takacs et al., 2021). The Multiple Means of Action and Expression guidelines encourage learners to demonstrate their knowledge differently. (Novak, 2016). Hence, students can choose how and which tool to use to access content and communicate what they have learned (Basham et al., 2020), and they can act in their ways of expression and have a space for choice in their responses (Orkwis and McLane, 1998).

Equally important, providing learners with options for action and expression fosters assessment accuracy (Al-Azawei et al., 2016). When students are provided with a familiar means of expressing their knowledge using this principle (Chita-Tegmark et al., 2012), assessing their mastery of content and skills would be in the best form because the design could access student learning. In other words, eliminating unintended barriers to the expression of knowledge supports students and encourages them to demonstrate their knowledge in their own ways (Novak, 2016).

Based on the mechanism of strategic networks, learners differ in how they interact with and express their knowledge. To address these differences in the learning environment, UDL introduces its second principle. Under this principle are three guidelines (CAST, 2018b): “Providing options for physical action, providing options for expression and communication, and providing options for executive functions.”

Printed materials provide limited movement, navigation, orientation, or interaction. The first guideline, provide options for physical action, includes two checkpoints to support learners in this area: “Vary methods of response and navigation (4.1) and Optimize access to tools and assistive technologies (4.2). The second guideline, providing options for expression and communication, covers alternative ways of expression and communication to enable each learner to express information, ideas, and concepts appropriately or efficiently in the learning environment. “Use multiple media for communication (5.1), Use multiple tools for construction and composition (5.2), and Build fluency with graduated levels of support for practice and performance (5.3)” are the checkpoints of this guideline.

Executive functions, which are crucial for learning, enable individuals to set long-term goals, plan strategies to achieve those goals, monitor progress, and modify strategies when necessary. The third guideline of this principle, provide options for executive



functions, recommends that educators scaffold lower-level skills and support higher-level skills and strategies in the development of executive functioning. This guideline has four checkpoints: “Guide appropriate goal setting (6.1), Support planning and strategy development (6.2), Facilitate management of information and resources (6.3), and Enhance ability to monitor progress (6.4)” (CAST, 2018b).

### **2.3.7. Effectiveness of the UDL Framework on Student Outcomes**

This research explores the Universal Design for Learning (UDL) approach, which has a promise for inclusive education by providing practical applications that positively influence student outcomes. UDL's foundational premise is to enhance accessibility and remove barriers to learning for all students, regardless of their abilities or backgrounds.

Capp (2013) conducted a meta-analysis that revealed UDL as an effective teaching methodology that significantly improves learning across diverse student bodies. Integrating UDL principles into teaching practices fosters a more inclusive learning environment, enhancing educational experiences among all students. King-Sears et al. (2023) further substantiated these findings with another meta-analysis. They found a moderate positive combined effect ( $g = 0.43$ ) among learners who received UDL treatments. This finding suggests that UDL-based instruction consistently benefits learner outcomes, although the degree of effectiveness may vary.

The research conducted by Schreffler, Chini, and James (2019) focused on the integration of UDL within postsecondary STEM education. This literature review demonstrated how UDL could improve inclusive teaching methods and encourage self-advocacy among students with disabilities. UDL frameworks can help alleviate the challenges faced by students with disabilities in STEM fields, which are often perceived as less accessible. Katz (2013) introduced the Three-Block Model of UDL, emphasizing its significant role in increasing student engagement. The three-block model of UDL is associated with increased active engagement and social interaction among peers. It creates a learning environment that prioritizes student autonomy and inclusivity, thus fostering a community of engaged and interactive learners.

However, the effectiveness of UDL-based interventions varies considerably, as noted in several studies with effect sizes ranging from small to large. UDL principles have great

potential, but their application and outcomes may be influenced by various factors such as context, implementation fidelity, and individual student characteristics. Ok et al. (2017) provided a comprehensive overview of the application of UDL in Pre-K to Grade 12 classrooms through a systematic review of research. Their work is crucial in comprehending how UDL strategies can be effectively implemented across various educational levels to maximize inclusivity and accessibility.

In conclusion, the literature suggests a positive trend for UDL frameworks in improving student outcomes. Although effectiveness varies, the overall evidence supports the integration of UDL into educational practices. Further research is necessary to identify the factors contributing to the success of UDL-based interventions and to optimize the framework for broader and more consistent application. Therefore, this study examines the impact of mentoring practices as a professional development program in the context of UDL framework.

### 3. METHODOLOGY

This section presents the research design, participants, data collection tools, language validation, the design and application process of professional development programs, and data analysis.

#### 3.1. Research Design

This study employed a convergent parallel mixed methods design, using quantitative and qualitative data to compare and explain the results obtained and gain a complete understanding of the problem (Creswell & Clark, 2018). The research process included a quantitative phase using an experimental design and a qualitative phase involving teacher interviews.

During the quantitative phase, a post-test control group design was implemented. The mentoring group participated in UDL Basic PD program (X1) and received mentoring support (X2), while the non-mentoring group participated in only UDL Basic PD program. Post-tests (O) were conducted in both groups. Data from the Turkish Form of the UDL Implementation Fidelity Tool were collected to assess whether the mentoring program was associated with significant differences in UDL fidelity scores. Subsequently, data collected from the Turkish Form of the Expectancy-Value-Cost for Professional Development Scale were collected to assess whether the mentoring program significantly influenced motivation scores for implementing the UDL framework into classroom practice. Table 1 illustrates the post-test control group design used in the quantitative phase of the study.

**Table 1**

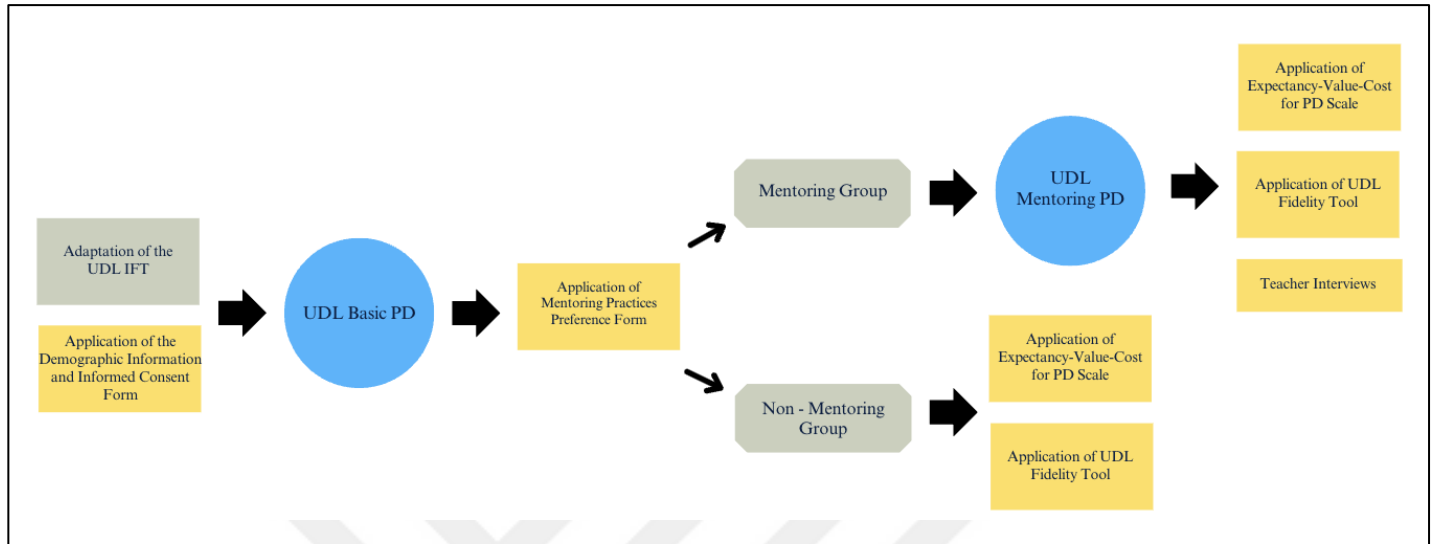
*Post-Test Control Group Design*

Groups	Treatment	Treatment	Post-tests
<i>Mentoring</i>	X <sub>1</sub>	X <sub>2</sub>	O
<i>Non-mentoring</i>	X <sub>1</sub>	-	O

In parallel, a qualitative phase was conducted to further explain and deepen the understanding of the findings. Semi-structured interviews were conducted with teachers who participated in the mentoring program. Figure 2 shows the application steps of this study:

**Figure 2**

*Application flow diagram of the research design*



### 3.2. Participants

The study participants comprised 54 primary school teachers and 35 middle school Turkish teachers from public schools across Istanbul's Asian and European sides. The selection of teachers was based on a convenience sampling method, which involves gathering samples from subjects readily available to the researcher or willing to participate (Cohen, 2000). This research was conducted as part of the "Bir Harf Bin İstanbul" project by the Istanbul Directorate of National Education. To make the UDL and mentoring programs more content-focused and effective, the project's target group was limited to primary school and Turkish teachers.

The participants in this research were selected from those who responded positively to the Istanbul Directorate of National Education's PD announcement. Participants were selected on the basis of their willingness to participate, and a sample was formed. The majority of teachers who requested to attend the PD were female and had between one and twenty years of experience. Hence, the sample was demographically formed accordingly. A total of eighty-nine participants completed the UDL Basics PD course, while 20 primary school teachers and 17 middle school Turkish teachers completed the mentoring program. The teachers in the mentoring program were treated as the experimental group, whereas the others were assigned to the control group. Table 2 presents the demographic information about the participants.

**Table 2**  
*Demographics of Study Participants*

Variables	Levels	Treatment Group		Comparison Group	
		(n)	Percentage (%)	(n)	Percentage (%)
<b>Gender</b>	Male	1	3,1	6	10,5
	Female	31	96,9	51	89,5
<b>Level of Education</b>	PhD	-	-	1	1,8
	Master	8	25	6	10,5
	Undergraduate	24	75	50	87,7
<b>Age</b>	20-30	10	31,3	32	56,1
	31-40	14	43,8	16	28,1
	41-50	8	25	8	25
	51-60	-	-	1	1,8
<b>Branch</b>	Turkish Language	13	40,6	22	38,6
	Primary School Teaching	19	59,4	35	61,4
<b>Years of Teaching Experience</b>	1-10	17	53,1	41	71,9
	11-20	13	40,6	12	21,1
	21-30	2	6,3	4	7

### 3.3. Data Collection Tools

This section presents the data collection tools used in this study, including the Demographic Information and Consent Form, the Turkish Form of the Expectancy-Value-Cost for Professional Development Scale, the Turkish Form of the UDL Fidelity Tool, and interviews.

### **3.3.1. Demographic Information and Informed Consent Form**

At the beginning of the study, participants were required to complete demographic information and an informed consent form, which requested personal and professional details. The form requested their age, education level, subject taught, district and school of employment, grade level, years of teaching experience, and the number of students in their classrooms requiring inclusive education practices. Furthermore, participants were asked to indicate whether they had participated in any professional development programs focusing on Universal Design for Learning (UDL), differentiation, or inclusive education. Finally, their informed consent was obtained via this form before the study started.

### **3.3.2. Turkish Form of Expectancy–Value–Cost for Professional Development Scale**

The scale was developed by Osman and Warner (2020) and later adapted into Turkish by Bümen and Uslu (2020). Language validity analysis was conducted using forward and back translation designs. The researchers and an English teacher translated the manuscript during the forward translation phase. The three translations were then discussed to produce a consensual text. In the back-translation stage, three English teachers who had not previously participated in the initial translation study were asked to back-translate the Turkish form into English. The researchers then compared the original and back-translated English forms and found that the two translations were consistent.

Following the completion of the language validity studies, the scale was administered to 1,192 teachers who had participated in various professional development activities. The dataset was randomly divided into two parts and subjected to exploratory and confirmatory factor analyses. The convergent and divergent validities were evaluated, as well as criterion validity, using the Individual Innovativeness Scale developed by Kılıçer and Odabaşı (2010) and the Teacher Emotion Scale developed by Göçer Şahin and colleagues (2020). The researchers found significant and positive relationships between the sub-dimensions of the scale and those of the Individual Innovativeness and Emotion Scale.

The scale was confirmed to consist of three distinct constructs and nine items through exploratory and confirmatory analyses. The internal consistency of the three subdomains

(expectancy for success, task value, and perceived cost) was high, with Cronbach's alpha values of 0.91, 0.86, and 0.80, respectively.

### **3.3.3. Turkish Form of the UDL Implementation Fidelity Tool**

The researcher adapted the UDL Implementation Fidelity Tool (UDL-IFT) to Turkish and used it to measure teachers' UDL implementation fidelity scores. The UDL-IFT Scoring Tool (UDL-IFST) was also adapted to Turkish and used in this study.

#### **3.3.3.1. Original Form of the UDL Implementation Fidelity Tool**

Kimberly Johnson created this tool in 2014 to measure teachers' implementation fidelity of UDL principles in their teaching process. The tool is based on the framework put forward by CAST and was informed by various organizations and experts working on UDL.

The UDL Implementation Fidelity Tool (UDL-IFT) is organized according to the three principles of UDL. It includes instructional techniques or indicators for the guidelines and checkpoints associated with each principle. These indicators are marked for a specific lesson that focuses on a specific goal. Regarding the study's scope, the lesson starts by introducing new content and concludes with an assessment that measures the relevant objective. According to Johnson's (2014) definition, a unit is a collection of several lessons, and a lesson is a collection of learning activities that focus on one unit component. Therefore, when evaluating a lesson using the tool, it is crucial to consider all the activities of that lesson, even if they are spread over multiple days.

The tool is available to stakeholders who want to measure their commitment to implementing UDL at the K-12 level. Teachers can use the UDL IFT to enhance and assess their UDL instructional practices. School administrators or instructional coaches can use it for evaluation and guidance, while researchers can examine the relationship or impact of UDL practices with other variables (Johnson, 2017).

The UDL Fidelity Scoring Tool scores and evaluates the UDL IFT. The tool provides instructions for scoring each element based on the indicators marked by the teacher or observer.

Indicators should be clearly addressed and made accessible to students. The scoring system involves assigning zero, one, or two points to each of the nine elements on the basis of the indicators that are marked together. For instance, if only the first indicator is checked, the second element scores zero points. If items from 2-10 are checked but not item 11, one point is scored. Two points are scored if items 2-10 are checked, and item 11 is also checked.

In 2018, the tool was sent to 41 UDL experts who were asked to provide feedback on whether each item measured its intended construct. Most of the researchers who responded confirmed that the tool measured what it intended to measure. The tool was revised on the basis of feedback, ensuring its content validity (Johnson, 2020).

### **3.3.3.2. Language Validation Process**

At the start of the process, the researcher contacted Kimberly Johnson, the tool's developer, to request permission to adapt it to Turkish with the scoring tool. After Johnson's approval, the necessary permissions were obtained from the Yeditepe University Human and Social Research Ethics Committee.

#### *Validity Analysis*

Subsequently, two faculty members from the English Language Teaching Department translated the tool into Turkish. The two translations were compared in two meetings, and any differences were discussed until a consensus was reached on all items. In the second stage, a faculty member from the Translation and Interpreting Department, who was not involved in the first translation study, back-translated the tool. The original and back-translated forms were compared, and coherence was analyzed. The two forms were compatible.

During the third stage, the translation of the instrument was reviewed by six experts in the fields of Curriculum and Instruction, English Language and Literature, and Turkish Language and Literature, who are proficient in both languages. Corrections were made on the basis of their feedback, and the tool was deemed ready for pilot applications.



In some cases, literal translation was not appropriate in terms of comprehensibility. For example, the literal translation of "Decoding support via text-to-speech software was available/accessible." is "Metinden konuşmaya yazılımı aracılığıyla kod çözme desteği mevcuttu/erişilebilirdi.". For the sake of clarity, "Öğrencinin metni okumasına/deşifre etmesine, metni sese dönüştüren bir yazılım aracılığıyla destek verildi." was preferred. Similarly, while the literal translation of "Multiple Means of Action and Expression" is "Çoklu Eylem ve İfade Araçları," "Öğrencinin Bilgiyle Etkileşimde Bulunması ve Bilgiyi İfade Etmesinde Kullanılan Çoklu Yöntemler" was preferred.

Additionally, the differences in the Turkish translations of UDL guidelines have required a more rigorous approach to certain statements. For instance, in each guideline statement, the word 'means' can be replaced with "yöntem, araç, yol." The word "araç" contains an object emphasis and is commonly used for the word 'tool', while "yol" has several of usages. Therefore, a more appropriate word was sought. The term "yöntem" was chosen because it encompasses systematic planning and is commonly used in Turkish educational literature.

### *Pilot Testing*

After completing the translation of the tool, it was subjected to a preliminary pilot study involving six teachers. Each item was discussed in depth to ensure that the teachers were able to comprehend the intended measurement. The teachers provided feedback regarding the tool's comprehensibility. Subsequently, the form was sent to 24 teachers for the pilot study and asked for feedback on the tool's comprehensibility.

For instance, the translation of the statement "Learners were left to their own devices to manage executive functions" was "Öğrenciler, yürütücü işlevlerini yönetmek için kendi hallerine bırakıldılar." Based on teacher feedback, the translation was revised to "Öğrenciler, yürütücü işlevlerini yönetmek için kendi hallerine bırakıldılar, amaçlı ve planlı olarak desteklenmediler."

### *Equivalence Testing*

Six observers, working in pairs, independently evaluated three different lessons. One observer used the original form and scoring tool, whereas the other used the translated form and scoring tool. The level of agreement between the three evaluations was calculated to be 81.5%. This high rate of concordance indicates that both forms yield closely aligned results and a high level of equivalence between the original and translated forms. Table 3 shows the percentage agreement among the observers.

**Table 3**  
*Percentage Agreement among Multiple Data Collectors*

Tool Elements	Observation 1			Observation 2			Observation 3				
	Original	Turkish	Total	Original	Turkish	Total	Original	Turkish	Total		
1	1	1	1	1	1	1	2	2	1		
2	1	2	0	2	2	1	2	2	1		
3	2	1	0	1	1	1	1	1	1		
4	1	1	1	1	2	0	2	1	0		
5	1	1	1	1	1	1	2	2	1		
6	1	1	1	1	1	1	1	1	1		
7	1	1	1	1	1	1	2	2	1		
8	1	1	1	1	1	1	1	1	1		
9	1	1	1	1	0	0	1	1	1		
Average Agreement			77.8%	Average Agreement			77.8%	Average Agreement			88.9%
									Total Agreement	81.5%	

In addition, Fleiss' Kappa was employed to assess the language equivalence between the original and translated forms. The results demonstrated a notable level of agreement, with an overall agreement percentage of 81%. The raters exhibited a high degree of consistency in their decision making. The computed Fleiss Kappa coefficient was 0.550, indicating moderate agreement beyond chance. This finding was further supported by a z-score of 3.07 and a p-

value of 0.002, which indicated that the observed agreement was unlikely to have occurred by random chance alone. These results provide strong evidence for the equivalence between the original and translated forms.

### *Inter-rater Reliability*

To assess inter-rater reliability, three independent observers evaluated the same lessons using the translated form and its scoring tool twice. The observers, who had expertise in lesson evaluation and familiarity with the UDL framework, were provided with a guideline and briefing on using the tool. Before the evaluation, a training session was conducted to familiarize the observers with the tool and address any queries regarding its application. During the evaluation process, each observer independently recorded their lesson ratings. The agreement rate among the observers was calculated upon completion of the evaluations. The resulting 81.5% agreement rate indicates a high level of assessment consistency. Table 4 shows the percentage agreement across observers.

**Table 4**

### *Percentage Agreement among Multiple Data Collectors*

Tool Elements	Observation 1				Observation 2			
	Rater 1	Rater 2	Rater 3	Total	Rater 1	Rater 2	Rater 3	Total
1	1	1	1	3	1	1	1	3
2	2	2	2	3	2	2	2	3
3	1	1	1	3	1	2	2	1
4	1	2	2	1	2	2	2	3
5	1	2	1	1	2	2	2	3
6	1	1	1	3	1	1	1	3
7	1	1	1	3	1	1	1	3
8	1	1	1	3	2	1	2	1
9	1	1	0	1	1	1	1	3
Average Agreement			77.8%	Average Agreement			85.2	
						Total Agreement		81.5

The reliability of the ratings was also evaluated using Fleiss' Kappa between two observations involving three raters. For the first observation, the agreement percentage among raters was 67% with a corresponding Kappa coefficient of 0.445, indicating moderate agreement. The associated z-score was 2.63, which, given a p-value of 0.008, suggests that the observed agreement was statistically significant.

In the second observation, a higher agreement percentage of 78% was achieved, accompanied by a substantially higher Kappa coefficient of 0.703. The z-score was 3.65 with a p-value of 0.001. These results indicated a highly significant level of agreement and exhibited a high degree of consistency in their decision-making among raters. These findings reinforce the reliability and consistency of the tool's Turkish adaptation.

#### **3.3.4. Interviews**

Qualitative data were collected through semi-structured interviews. The interview questions were developed to determine the participants' mentoring program experience and its impact on UDL practices with the aim of complementing the quantitative findings. The researcher developed the questions by reviewing the relevant literature and consulting experts. In line with the feedback received, the questions were revised and refined.

The questions addressed reflections on what was learned and resulted in professional development and growth in basic UDL and mentoring programs. They also inquired about the components of the mentoring program that provided benefits in UDL practices and the programs' effects on lesson plans and classroom practice.

Five volunteer teachers were selected for interviews, and online meetings were conducted because of the pandemic conditions. The interviews were recorded and stored in the cloud for transcription.

### **3.4. Application Process and Data Collection**

This section presents the researcher's roles as a trainer and mentor in the research and his related experiences. It also covers the development, implementation, and data collection processes of basic UDL and mentoring professional development programs.

#### **3.4.1. Researcher's Role as a Trainer and Mentor in Research and Past Experiences**

The researcher has 18 years of experience in education, having held various roles including those of classroom teacher, assessment and evaluation specialist, assistant principal, and academic assistant principal. During the research period, he served as an academic and administrative coordinator at the ALKEV Private School.

The researcher has completed the UDL101: Introduction to Universal Design for Learning course from the CAST organization and in-service UDL professional development programs. In addition, he has actively participated in many conferences and seminars on UDL. For the past five years, he has coordinated the UDL implementation process at ALKEV Private Schools, providing instructional leadership and mentoring to teachers. He has 10 years of mentoring experience as an academic assistant principal and academic coordinator.

As an academic coordinator, the researcher has designed and implemented many professional development programs. He has collaborated with academics specializing in PD design and implementation for two years as part of the UbD School initiative. He has received extensive training in instructional design, including a course he took as a special student in the Yildiz Technical University Curriculum and Instruction Master's program. In addition, he completed the Certificate of International School Leadership program organized by the Principals' Training Center (the PTC) between 2016 and 2019, which involved a seven-day Instructional Supervision and Evaluation course in London.

Based on these experiences and educational background, the researcher believes that he has the necessary competencies to develop and conduct PD programs and provide mentoring on UDL.

### **3.4.2. Design of Professional Development Programs**

Within the scope of the research, two programs were developed, one covering basic UDL knowledge and understanding and the other covering mentoring practices. The development stages and theoretical foundations of these programs are explained below.

#### **3.4.2.1. UDL Basics Professional Development Program**

The development of the UDL Basics PD program was informed by CAST's 13-week online course, UDL101: Introduction to Universal Design for Learning, and primary UDL resources. At the same time, features of Darling Hammond et al.'s (2017) Design Elements of Effective Professional Development (content focus, active learning, collaboration, use of models and modeling, feedback and reflection) and Desimone's (2009) Critical Features of Professional Development (content focus, active learning, coherence, and collective participation) were considered in the design of the program. Because the programs are delivered in an online environment, the Community of Inquiry (CoI) framework was also considered as an online learning theory (Garrison & Arbaugh, 2007).

The program lasted for five weeks. The content comprised knowledge of individual differences, the basics of the UDL framework, learning networks, guidelines, and checkpoints. In the asynchronous part of the program, that week's content was presented to teachers via videos that were shared six days before each live session. The researcher prepared the videos using the Canva platform. Teachers were then expected to complete a lesson analysis for each principle. This analysis aimed to help teachers recognize the principles in practice. Detailed feedback was provided to each teacher for each analysis.

During the program, discussion forums were created with reflection questions. In addition, four live sessions per week were organized to allow teachers to work in small groups and ask questions. In the last week of the training, examples of UDL-analyzed activities and the UDL lesson planning template were shared with the teachers.

The schedule and program design of UDL Basic PD are presented in Table 5.

**Table 5***Features of UDL Basics PD Program*

<b>Week</b>	<b>Features</b>
Week 1	Video: Individual Differences Video: Introduction to the Universal Design for Learning Visual: UDL Guidelines Task: Reflection
Week 2	Video: Recognition Networks Video: Multiple Means of Representation Document: Guidelines and Checkpoints (1st Principle) Task: Lesson Analysis (1st Principle) Live Session
Week 3	Video: Strategic Networks Video: Multiple Means of Action and Expression Document: Guidelines and Checkpoints (2nd Principle) Task: Lesson Analysis (2nd Principle) Live Session
Week 4	Video: Affective Networks Video: Multiple Means of Engagement Document: Guidelines and Checkpoints (3rd Principle) Task: Lesson Analysis (3rd Principle) Live Session
Week 5	Document: UDL Lesson Planning Template Document: Analyzed Activity Examples

The scope of this research was intentionally narrowed to enhance the effectiveness of the UDL Basics PD program and ensure that it is content-focused and study was primarily limited to primary and middle school teachers.

Table 6 presents the components of the theoretical frameworks associated with the activities and practices in the program.

**Table 6**

*Components of the UDL Basics PD Program and the Intersection Between Frameworks*

<b>Components of the UDL PD Program</b>	<b>Critical Features of Professional Development (Desimone, 2009)</b>	<b>Design Elements of Effective Professional Development (Darling Hammond et al., 2017)</b>	<b>CoI (Garrison &amp; Arbaugh, 2007)</b>
Videos lectures	-	-	Teaching presence
Lesson analyses	Active learning	Active learning Feedback and reflection	Cognitive presence
Reflection questions	Active learning	Active learning Feedback and reflection	Cognitive presence
Small group work in synchronous sessions	Collective participation	Collaboration	Social Presence
Analyzed activity examples	Content focus	Content focus Use of models and modeling	Teaching presence
UDL lesson planning template	-	Use of models and modeling	Teaching presence

#### **3.4.2.2. Treatment: Mentoring Program**

In developing the program, the literature on mentoring, online mentoring, and group mentoring was thoroughly reviewed, and critical components of previous mentoring studies were used. Smith and Israel's (2010) review of technology-mediated support in e-mentoring programs and various systematic reviews of effective mentoring programs (Hairon et al., 2020; McRae & Zimmerman, 2019; Gagliardi et al., 2019; Gagliardi et al., 2014; Bickmore & Bickmore, 2010) were examined. Accordingly, the program components were determined in a way that optimized the use of time and resources to maximize effectiveness. The program followed a one-to-many mentoring approach (Huizing, 2012; Kuperminc, 2021) and consisted of online asynchronous activities. It was structured to last four weeks, with the schedule and design presented in Table 7.



**Table 7***Features of the Mentoring Program*

Week	Features
Week 1	Self-Assessment and Goal-Setting Form Video: Tips for Multiple Means of Representation Principle Scenario: Teacher Tuğba and Her Students Discussion and Feedback Q&A via Email and Chat
Week 2	Video: Tips for Multiple Means of Action and Representation Principle Scenario: Science Lesson Discussion and Feedback Q&A via Email and Chat
Week 3	Video: Tips for Multiple Means of Engagement Principle Scenario: Teacher Ezgi and Her Students Discussion and Feedback Q&A via Email and Chat
Week 4	Ongoing Discussion and Feedback Webinar: UDL - 7 Big Ideas Behind Inclusive Teaching Reflection on Self-Assessment and Goal-Setting Form Q&A via Email and Chat

Although the objectives of the mentoring program were initially set out in the syllabus shared with the teachers, the program included a self-assessment and goal-setting exercise. Incorporating elements of adult education, such as self-directed learning and critical reflection, can significantly enhance the effectiveness of teachers' professional development (Beavers, 2009), and self-assessment significantly impacts mentoring outcomes (Kammeyer-Mueller & Judge, 2008). In addition, Shunk and Mullen's (2013) model, which combines academic mentoring research with self-regulated learning theory, includes a goal-setting exercise during the pre-mentoring phase. Murphy and Ensher (2001) suggested that self-set career goals enhance the effectiveness of mentoring practices. Therefore, the program began with a self-assessment and goal-setting phase.

Desimone et al. (2002) found that teachers are more likely to adopt particular classroom strategies when they receive professional development centered around instructional practices. In accordance with this finding, videos and presentations of instructional strategies for each UDL principle were shared with teachers throughout the program. The researcher created these

resources using the Canva platform. Following the videos, a classroom scenario with a specific problem was presented each week, and teachers were asked to devise strategies to remove barriers by implementing relevant UDL guidelines. They wrote these strategies in an online spreadsheet and linked them to the UDL guidelines. This was followed by a discussion of the strategies and suggestions made by the teachers, with the mentor providing feedback on the comments. The incorporation of scenarios into the mentoring program was due to the widespread use of narrative simulations that include such scenarios in teaching contexts (McCrary & Mazur, 2010) and scenario-based mentoring courses designed to improve the quality of mentoring (Chine et al., 2022).

A live broadcast was planned as part of the program to summarize the seven major UDL ideas. Participation in the broadcast was voluntary. An infographic summarizing the broadcast was shared with the teachers. Additionally, at the beginning of the program, it was stated that teachers could email the mentor with any questions they had about their classroom experiences during the mentoring program. In addition to email, a WhatsApp group was set up for consultation. It is well established that the accessibility of mentors is an essential factor in the effectiveness of mentoring programs (Emelo, 2017; Eller et al., 2014). The accessibility of mentors is an essential factor in the effectiveness of mentoring programs (Emelo, 2017; Eller et al., 2014).

The program used features of Darling Hammond et al.'s (2017) Design Elements of Effective Professional Development and Desimone's (2009) Critical Features of Professional Development, the Community of Inquiry (CoI) frameworks. The components of expert support and coaching, extended duration, modeling with scenarios, opportunities for reflection, and ongoing feedback were also prominent in the program.

Table 8 presents the components of the theoretical frameworks associated with the mentoring program's activities and practices.

**Table 8***Components of the Mentoring Program and Intersection Between Frameworks*

<b>Components of the Mentoring Program</b>	<b>Critical Features of Professional Development (Desimone, 2009)</b>	<b>Design Elements of Effective Professional Development (Darling Hammond et al., 2017)</b>	<b>CoI (Garrison &amp; Arbaugh, 2007)</b>
Self-assessment	Active learning	Active learning Feedback and reflection	Cognitive presence
Goal setting	Active learning	Active learning Feedback and reflection	Cognitive presence
Video lectures on classroom strategies	Content focus	Content focus Use of models and modeling	Teaching presence
Scenarios	Collective participation	Collaboration Feedback and reflection	Cognitive presence Social presence
Discussion	Active learning	Feedback and reflection	Cognitive presence Social presence
Q&A via e-mail and chat		Expert support and coaching	Teaching presence

### **3.4.3. PD Announcement and Project Information Meeting**

The study was conducted as part of the Istanbul Directorate of National Education's "Bir Harf Bin İstanbul" project. First, the necessary permissions were obtained from the Istanbul Directorate of National Education. The call for training was sent to primary and secondary schools in Istanbul. Teachers who were interested in participating in the study completed the Demographic Information and Consent Form.

Participants who completed the form were sent a syllabus by e-mail, which included the critical dates and times of the program, the content, and the tasks to be completed. They were asked to assess their suitability and return the email. Teachers who responded were sent another email informing them that the Google Classroom system would be used to share program content and announcements, and the Zoom platform would be used for live broadcasts. For teachers who still needed to gain experience with Google Classroom, content consisting of visuals and explanations was prepared and shared with all participants.

The introductory and informational meeting was held on March 16, 2022, between 8:30 and 10:30 p.m. During the meeting, detailed information was provided regarding the program's scope, how the online learning experience would be conducted, and the data collection process. The content in Google Classroom was presented, and the weekly assignment schedule was reviewed.

#### **3.4.4. Application of Professional Development Programs and Data Collection**

After the announcement emails and information were sent out, the first content was shared with participants via Google Classroom on March 17, 2022. The UDL Basics PD program began with 117 teachers and ran for five weeks with shared video content, reflection questions, lesson analysis, and live sessions. A total of 104 teachers completed the program, and certificates of participation were sent by email.

At the end of the program, teachers were asked on the Mentoring Program Preference Form if they would like to continue with the mentoring program. 36 teachers indicated that they wanted to participate. The Turkish form of the Expectancy-Value-Cost for Professional Development Scale was sent via Google Form to teachers who did not continue with the mentoring program, and 55 teachers responded to the form.

The mentoring program began on May 6, 2022, with the sharing of the syllabus, self-assessment, and goal-setting forms. Videos and scenarios of teaching strategies were shared with teachers for four weeks, and the discussion and feedback process continued throughout the week. A total of 34 teachers completed the program, and certificates of participation were emailed. The Turkish Form of the Expectancy-Value-Cost for Professional Development Scale was sent to the teachers via Google Forms, and 25 teachers responded to the survey.

The Turkish Form of the UDL Fidelity Tool, whose validity studies were conducted by the researcher in this study, was sent to the participants of the two professional development programs via Google Classroom. The teachers were asked to complete the form twice for two separate lessons; they were asked to read each question, mark the appropriate answers, and add explanations if necessary. Teachers in both groups were shown a video on how to complete the

form. 19 teachers from the UDL Basics PD Program and 21 teachers from the Mentoring Program completed two separate forms and submitted them via Google Classroom.

Finally, five participants were voluntarily selected from the teachers in the mentoring program, and they were interviewed using a semi-structured interview form on the Zoom platform. The online interviews were later transcribed.

### 3.5. Data Analysis

To ensure the appropriateness of the quantitative analyses, the distributions' normality for UDL fidelity, expectancy, value, and cost scores among participants was evaluated using the Shapiro-Wilk test. The results showed that the UDL fidelity scores did not significantly deviate from a normal distribution (Shapiro-Wilk statistic of  $W = .95$ ,  $df = 40$ ,  $p = .06$ ). This indicates that the distribution of UDL fidelity scores approximates normality. Similarly, the cost scores presented a  $W$  value of  $.97$  with  $df = 80$  and a  $p$ -value of  $.03$ . These statements suggest that the distribution of cost scores is close to normal, and these results validate the use of parametric statistical tests for further analyses. Therefore, independent sample  $t$ -tests were conducted for UDL fidelity and cost scores.

In contrast, the expectancy scores ( $W = .91$ ,  $df = 80$ ,  $p = .001$ ) and value scores ( $W = .62$ ,  $df = 80$ ,  $p = .001$ ) showed statistically significant deviations from normality, indicating non-normal distributions. Considering this finding, non-parametric statistical methods were found to be more appropriate for analyzing differences between groups and accounting for the non-normality of the data. Accordingly, the Mann–Whitney  $U$  test was conducted for expectancy and value scores. Table 9 represents the distributions as follows:

**Table 9**

*Test of Normality (Shapiro-Wilk) for UDL fidelity, expectancy, value, and cost scores*

Scores	<b>W</b>	<b>p</b>
UDL Fidelity	.95	0.63
Expectancy	.91	0.001***
Value	.62	0.001***
Cost	.97	0.03

\*\*\* $p < .001$ .

This study used a thematic analysis approach to examine responses from semi-structured interviews with teachers who participated in the mentoring program. Thematic analysis is "a method for identifying, analyzing, and reporting patterns, i.e., themes within data" (Braun & Clarke, 2006; p. 6). This method allowed for an in-depth exploration of teachers' experiences and perceptions related to their participation in the mentoring program.

The analysis process began with initial coding. Once all the data had been coded, they were grouped into categories. Within these categories, themes emerged. This process was repeated iteratively by reading and analyzing the data several times. At this point, feedback was obtained from five experts on the appropriateness of the themes that emerged as a draft. The experts consisted of a university professor and an assistant professor in curriculum and instruction programs, a doctoral and a post-doctoral researcher in the same field specializing in qualitative research, and an educational expert specializing in UDL.

The experts were asked to comment on whether the categories reflected the quotation in question, whether the categories belonged to the theme title, and whether the categories within the same theme were consistent. In the received written feedback, one suggestion was that the definition of the category "Making knowledge applicable" in the theme "Professional growth and development" was ambiguous. This category has been revised to "Acquiring practical knowledge for future use" in accordance with the feedback received. Moreover, an emphasis on preparation was noted for the category "Coping with real-life situations" in the sub-theme "Using realistic scenarios". Thus, the category was changed to "Preparing for real-life situations.". Another suggestion was that quotations related to the "Active student participation" category could be included under "Incorporating group work. Thus, the subtheme organization was changed accordingly. The category "Gamification" was removed from the sub-theme "Classroom dynamics and student engagement" by the suggestions received.

Furthermore, a five-point Likert scale related to the same questions was sent to the experts, who were asked to score each subcategory. The experts evaluated the suitability of the analysis in the relevant context. The following questions were asked: "Do the categories reflect the related content?" (Q1), "Are the categories in line with the theme title?" (Q2), and "Are the categories consistent with each other or are they overlapping?" (Q3). For these three questions,

the mean scores of each theme and subtheme were calculated separately and are presented in Table 10 as follows:

**Table 10**

*Mean Scores for Themes and Subthemes*

Theme	Mean			Subtheme	Mean		
	Q1	Q2	Q3		Q1	Q2	Q3
Building the Basis	4.87	4.93	4.60				
Mentoring Program Components	4.87	4.83	4.87				
				Feedback and Reflection	5.0	5.0	5.0
				Use of Realistic Scenarios	4.90	4.90	5.0
				Colleague Interaction and Collective Learning	4.70	4.90	4.60
Professional Development and Growth	5.0	5.0	4.80				
Change in Instruction	4.82	4.85	4.87				
				Classroom Dynamics and Student Engagement	4.76	4.76	4.80
				Focus on Student Needs and Differences	4.84	4.88	5.0
				Use of Digital Tools	4.87	4.93	4.80

Upon analysis of the results, the experts confirmed the suitability of qualitative analysis at high rates. Consequently, themes were refined to accurately reflect the participants' experiences based on quantitative and qualitative feedback. The resulting thematic framework provided valuable insights into the mentoring experiences of teachers within the UDL program, highlighting their developmental journeys and perceptions.

## 4. RESULTS

This section presents the quantitative and qualitative data analyses used to answer the study's research questions.

### 4.1. Quantitative Data Analysis

The statistical analyses that were conducted to examine the effects of the mentoring program on teachers' UDL fidelity and Expectancy-Value-Cost scores are presented below. The characteristics of the data were first explored using descriptive statistics. Then, appropriate inferential tests were employed to determine statistically significant differences between mentored and non-mentored teachers' UDL fidelity and Expectancy-Value-Cost scores.

#### 4.1.1. Descriptive Statistics

Tables 11 and 12 detail the descriptive statistics, including minimum and maximum scores, means, and standard deviations of teachers' Universal Design for Learning (UDL) Fidelity and Expectancy-Value-Cost Scores.

**Table 11**

*Minimum and Maximum Scores, Means, and Standard Deviations of Teachers' UDL Fidelity Scores*

UDL Fidelity Scores	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>SD</i>
Mentoring	21	9.5	18	13.64	2.77
Non-Mentoring	19	3	17.5	12.24	3.57
Total	40				

The table presents the descriptive statistics of UDL fidelity scores for teachers in the mentoring and non-mentoring groups. The mean score for the mentoring group teachers (N=21) was 13.64, with a standard deviation of 2.77. Their scores ranged from a minimum of 9.5 to a maximum of 18. The non-mentoring group teachers (N=19) had a mean score of 12.23 with a standard deviation of 3.57. Their scores ranged from a minimum of 3 to a maximum of 17.5.



**Table 12**

*Minimum and Maximum Scores, Means, and Standard Deviations of Teachers' Expectancy-Value-Cost Scores*

Expectancy-Value-Cost Scores		<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>SD</i>
Expectancy scores	Mentoring	25	4.7	6	5.47	0.45
	Non-mentoring	55	3.7	6	4.95	0.66
Value scores	Mentoring	25	5.7	6	5.92	0.15
	Non-mentoring	55	3.7	6	5.67	0.53
Cost scores	Mentoring	25	1.7	6	3.56	1.31
	Non-mentoring	55	1.7	6	3.90	1.13

The table presents the descriptive statistics of the expectancy, value and cost scores of 25 teachers in the mentoring group and 55 teachers in the non-mentoring group. The mean expectancy score for the mentoring group teachers (N=25) was 5.47, with a standard deviation of 0.45. Their scores ranged from a minimum of 4.7 to a maximum of 6. The non-mentoring group teachers (N=55) had a mean score of 4.95 with a standard deviation of 0.66. Their scores ranged from a minimum of 3.7 to a maximum of 6.

The mean value score for the mentoring group teachers (N=25) was 5.92 with a standard deviation of 0.15. Their scores ranged from a minimum of 5.7 to a maximum of 6. The non-mentoring group teachers (N=55) had a mean score of 5.67 with a standard deviation of 0.53. Their scores ranged from a minimum of 3.7 to a maximum of 6. The mean cost score for the mentoring group teachers (N=25) was 3.56, with a standard deviation of 1.31. Their scores ranged from a minimum of 1.7 to a maximum of 6. The non-mentoring group teachers (N=55) had a mean score of 3.90 with a standard deviation of 1.13. Their scores ranged from a minimum of 1.7 to a maximum of 6.

#### **4.1.2. Comparison of Mentoring and Non-Mentoring Groups' UDL Fidelity and Expectancy-Value-Cost Scores**

The following tables present the results of the independent samples t-test and Mann-Whitney U analyses used to determine whether there is a significant difference between the

UDL fidelity and expectancy, value and cost scores of mentored and non-mentored teachers. The assessment of the normality of the distribution determined which statistics were applied.

**Table 13**

*Comparison of UDL Fidelity Scores of Mentoring and Non-Mentoring Groups by Independent Sample t-test*

	Mentoring		Non-Mentoring		<i>t</i> (38)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
UDL Fidelity Scores	13.64	2.77	12.24	3.57	1.40	.17	1.07

An independent samples t-test was conducted to assess the impact of mentoring on teachers' UDL fidelity scores. The analysis revealed no statistically significant difference in UDL fidelity scores between the mentoring group ( $M = 13.64$ ,  $SD = 2.77$ ) and the non-mentoring group ( $M = 12.24$ ,  $SD = 3.57$ ),  $t(38) = 1.40$ ,  $p = 0.17$ . This indicates that participation in the mentoring program did not significantly influence teachers' UDL fidelity scores.

**Table 14**

*Comparison of Expectancy Scores of Mentoring and Non-Mentoring Groups by Mann-Whitney U Test*

	<i>N</i>	Mean Rank	Sum of Ranks	<i>U</i>	<i>z</i>	<i>p</i>
Mentoring	25	53.44	1336.00	364.0	-3.45	0.001***
Non-Mentoring	55	34.62	1904.00			
Total	80					

\*\*\* $p < .001$ .

A Mann–Whitney U test was conducted to examine differences in expectancy scores between teachers participating in the mentoring program and those who did not. The analysis revealed a significant difference in expectancy scores between the mentoring and non-mentoring groups ( $z = -3.45$ ,  $p = .001$ ). This significant difference suggests that individuals who receive mentoring reported higher scores, thus indicating a positive effect of the mentoring program on participants' expectancy for success.

**Table 15**

*Comparison of Task Value Scores of Mentoring and Non-Mentoring Groups by Mann Whitney U Test*

	N	Mean Rank	Sum of Ranks	U	z	p
Mentoring	25	47.08	1177.00	523.0	-1.99	.046
Non-Mentoring	55	37.51	2063.00			
Total	80					

A Mann–Whitney U test was conducted to examine differences in task value scores between teachers who participated in the mentoring program and those who did not. The analysis showed no significant difference in task value scores between the mentoring and non-mentoring groups ( $z = -1.99$ ,  $p = .046$ ). This result suggests that participation in the mentoring program did not significantly impact teachers' perceived task value.

**Table 16**

*Comparison of Cost Scores of Mentoring and Non-Mentoring Groups by Independent Sample t-test*

	Mentoring		Non-Mentoring		$t(80)$	$p$	Cohen's $d$
	$M$	$SD$	$M$	$SD$			
Cost Scores	3.56	1.31	3.90	1.13	1.18	.24	1.19

An independent samples t-test was conducted to assess the impact of mentoring on teachers' cost scores. The analysis revealed no statistically significant difference in cost scores between the mentoring group ( $M = 3.56$ ,  $SD = 1.31$ ) and non-mentoring group ( $M = 3.90$ ,  $SD = 1.13$ ),  $t(80) = 1.18$ ,  $p = 0.24$ . This indicates that participation in the mentoring program did not significantly influence the teachers' cost scores.

#### 4.2. Qualitative Data Analyses

Five teachers were interviewed to reveal their experiences in the mentoring program, and the interviews were subjected to thematic analysis. Pseudonyms were given to teachers to protect their privacy. Their background information is presented in Table 17 as follows:

**Table 17***Background Information of the Interview Participants*

<b>Pseudonymity</b>	<b>Branch</b>	<b>Teaching Experience</b>	<b>Grade Level</b>
Fatma	Primary School Teacher	14	Second grade
Ali	Primary School Teacher	1	Second grade
Elif	Turkish Language Teacher	18	Eighth grade
Burcu	Turkish Language Teacher	8	Multiple grade levels
Ezgi	Primary School Teacher	13	Fourth grade

The data from the interviews revealed four main themes and six sub-themes under the two main themes, which are presented in Table 18:

**Table 18***Themes and Subthemes*

<b>Themes</b>	<b>Subthemes</b>
Building the Basis	
Mentoring Program Components	<ul style="list-style-type: none"> <li>• Feedback and Reflection</li> <li>• Use of Realistic Scenarios</li> <li>• Colleague Interaction and Collective Learning</li> </ul>
Professional Growth and Development	
Change in Instruction	<ul style="list-style-type: none"> <li>• Classroom Dynamics and Student Engagement</li> <li>• Focus on Student Needs and Differences</li> <li>• Use of Digital Tools</li> </ul>

#### **4.2.1. Interview Findings**

Interview findings are presented in this section in thematic organization.

##### ***Theme 1: Building The Basis***

In their responses, which focused on the contributions of the UDL basic professional development program during the interview process, the teachers mentioned that this PD program provided them with knowledge of the basic ideas of the UDL framework. They increased their awareness of the importance of individual differences and began to consider

individual differences more in their lesson designs. In general terms, the program seems to have formed foundational knowledge about the framework and its implementation. The resulting categories, which fall under the theme of "Building the Basis," are presented in Table 19.

**Table 19**

*Categories under the Building the Basis Theme*

Theme	Category
Building the Basis	<ul style="list-style-type: none"> <li>• Understanding the Fundamentals of UDL</li> <li>• Significance of Learner Variability</li> <li>• Considering Individual Differences in Design</li> </ul>

Before participating in this program, the teachers stated that they had been trying to create designs for individual differences; however, they conducted these studies without being aware of a theoretical basis. Ali explained this situation: “Farkındalığıma olumlu yönde çok etkisi olduğunu ve eksikliklerimi görme noktasında bana çok katkısı olduğunu söyleyebilirim. Eksik olduğum birçok alan varmış... ben bir şeyler yapıyordum ama yaptığım şeyin ne olduğunu bilmiyordum.” [“But I can say that it positively impacted my awareness and helped me see my shortcomings. There were many areas where I was lacking... I was doing something, but I didn't know what it was.”]. Fatma mentioned the UDL principles, “Çünkü evrensel tasarımlar hakkında daha fazla bilgi sahibi oldum. Genel taslak bir bilgim vardı ama UDL sürecinde müfredat bağlamında bu farklılıkları nasıl yapabileceğim konusunda, özellikle de ilkeler doğrultusunda görmek konusunda faydası oldu.” [“Because I learned more about universal designs. I had a general outline, but during the UDL process, it was useful to see how I could make these differences in the context of the curriculum, particularly in alignment with the principles.”]. Their commonality was that they could define the approach for addressing differences in lesson designs through UDL principles.

The existence of individual differences is the most basic assumption and the starting point of UDL (Meyer et al., 2004). In the interviews, the teachers reported that their understanding of learner variability and individual differences had expanded, and they realized that the differences were systematic and predictable. Ezgi remarked, “Mesela görme engelli, işitme engelli ya da dil problemi olan yabancı dile sahip öğrenciler için aslında [...] öğrenme

tasarımını düzenlemediğimi fark ettim. Bunun için ne yapılabilir diye düşündüğümde böyle bir kısır döngüye girdiğimi hatırlıyorum.” [“For example, at work, I realized that I wasn't actually [...] organizing the design for students who are visually impaired, hearing impaired, or have language problems in a foreign language. When I thought about what could be done for this, I remember falling into such a vicious circle.”].

In the interview, the same teacher said that she addressed a particular student group that needed more learning time in her previous designs. However, after the PD program, she realized that her approach to individual differences was limited. Similarly, Burcu expressed the significance of the systematicity and predictability of learner differences. She shared: “Yani her beyin benzersiz, evet ama önemli olan işte o farklılıkları görebilmek ve oraya odaklanabilmek. Çünkü benim için aslında en önemli noktalardan biri farklılıkların sistematik ve öngörülebilir olduğu noktayıydı.” [“So every brain is unique, yes, but the important thing is to be able to see those differences and focus there. Because for me, one of the most important points was that the differences were systematic and predictable.”].

Another topic mentioned under this theme was that designs that focus on inclusion and address individual differences have begun to be used after the PD program. It was observed that they considered disadvantaged children’s needs in their lesson plans, and experiments were conducted to diversify the presentation tools. Ezgi made the following statements about his practices in the lesson:

İki tane Suriyeli öğrencim vardı sınıfımda. Mesela onların ana dilinde herhangi bir şey vermediğimi fark ettim. [...] Onlarla kendi dillerinden birkaç kelimeyi kullanarak farklı bir iletişim yakalayabileceğimi fark ettim. Gözlerinin parladığını hissettim. Bu da tabii ki ilgilerini arttırdı derse. [...] Onun dışında bir tane kaynaştırma öğrencim vardı. Hem öğrenme güçlüğü hem de görsel, işitsel sorunları olan bir öğrencimdi. Bunda da özellikle yazılı olarak destek vermenin ne kadar etkili olduğunu fark ettim. [I had two Syrian students in my class. For example, I realized that I wasn't giving anything in their native language. [...] I realized that I could communicate with them differently by using a few words from their language. I felt their eyes shining. This, of course, increased their interest. [...] Apart from that, I had one inclusive student. He was my student who had

both learning abilities and visual and auditory problems. I realized how effective it is to provide support, especially in writing.]

### ***Theme 2: Mentoring Program Components***

During the interviews, teachers were asked about the components of the mentoring program that they found beneficial and how these practices contributed to their development. The responses revealed three themes: feedback and reflection, colleague interaction and collective learning, and the use of realistic scenarios. The resulting sub-themes and categories under the Mentoring Program Components theme are listed in Table 20.

**Table 20**

*Subthemes and Categories under the Mentoring Program Components Theme*

<b>Theme</b>	<b>Subtheme</b>	<b>Category</b>
Mentoring Program Components	Feedback and Reflection	<ul style="list-style-type: none"> <li>• Receiving Feedback</li> <li>• Self-assessment</li> </ul>
	Use of Realistic Scenarios	<ul style="list-style-type: none"> <li>• Preparing for Real-life Situations</li> <li>• Effectiveness of the Scenarios</li> </ul>
	Colleague Interaction and Collective Learning	<ul style="list-style-type: none"> <li>• Seeing Different Perspectives</li> <li>• Colleague Interaction</li> </ul>

#### *Feedback and Reflection*

In sharing their experiences of the practices included in the mentoring program, the teachers stated that the feedback they received from the mentor guided them in the accuracy of their actions, provided answers to their questions, and helped them see their shortcomings. As Burcu put it:

Benim için mentörlüğün aslında en önemli noktalarından biri etkileşimli bir eğitim olmasıydı. Yani karşılıklı soru cevap, sorularımın cevabını bulabildiğim, ya da kendimdeki yanlışları, yanlışları görebildiğim [...] Bunu görebilmek benim için önemliydi. Size sorduğumuz sorular, sizin geri dönüşleriniz [...] eksikliklerimi görmeyi, kafamdaki soru işaretlerini yanıtlamamı, nasıl hareket etmem gerektiği noktasında açıkçası benim için epey faydalı olduğunu söyleyebilirim. [One of the most critical points

of mentoring for me was that it was an interactive training. In other words, mutual question and answer, where I can find the answers to my questions, or see my mistakes and errors, or [...] It was important for me to be able to see that. I can say that the questions we asked you, your feedback, [...] were quite helpful for me to see my shortcomings, to answer the question marks in my mind and how I should act.]

There is plenty of research on feedback's positive effect on learning and professional development. Correlatively, the presence and accessibility of the mentor in a PD program is also a critical part of the process (Emelo, 2017). In Ezgi's words: "Gerçekten hemen sorunun ardından verilen dönüşün ne kadar faydalı olduğunu fark ettim mentörlükte. Yani herhangi bir sorunda ya da öğrenip öğrenmediğimize emin olmadığımız bir durumda sizin verdiğiniz dönütlerin çok fazla faydasını gördüm." ["I really realized how useful the feedback given immediately after the question was in the mentoring. So, in any problem or situation where we were unsure whether we had learned, I found the feedback you gave very useful."]

At the same time, the interview data indicated that self-assessment opportunities were beneficial in identifying shortcomings and areas of growth and querying current practices. Ali emphasized the importance of self-assessment for him. He said: "Yapıyorsunuz bir şeyler ama eksik kalan kısımları da ardından görüyorsunuz. Yani öz değerlendirmenin zihinsel bağlamda daha faydalı olduğunu düşünüyorum. Çünkü dışarıdan gelen bir bilgi girdi çok fazla zihnimizi karıştırmıyor ama içerideki bir sorgulama daha fazla değerlendirme [yapmamızı] sağlıyor." "You do something, but then you see the missing parts. So, I think self-assessment is more useful in a cognitive context. Because receiving information from outside does not confuse us so much, an internal inquiry allows us to [make] more evaluation." Fatma also described that the processes that required self-assessment during the program helped her see the shortcomings.

In general, the interview data showed that teachers benefited from the feedback and self-assessment opportunities provided by the mentor to identify areas for professional development. In addition, the feedback seemed to help teachers to be informed about how accurate their interpretations and applications of the UDL framework were.



### *Use of Realistic Scenarios*

Teachers reported that they found the scenarios compelling because they reflected real-life situations and concretized how the framework could be used in the classroom. During the interviews, the participants noted that the scenarios provided them with opportunities to apply the theory and prepared teachers for real classroom situations. They also stated that the students in the scenarios were typical of schools.

Elif articulated the significance of the scenarios, stating, “Senaryolar olmasa belki biraz daha yüzeysel kalabilirdi ama senaryolar için içine girdiği zaman diyorsun ciddi böyle bir senaryoyla karşılaştığımız zaman nasıl ele almalıyım? Nasıl bir plan yapmalıyım? Ciddi anlamda bize de güzel bir kaynak oldu baktığımızda [...] Yani karşılaşılmayacak şeyler değil. Dezavantajlı çocuklar var.” [Without the scenarios, it might have remained a little more superficial, but when the scenarios come into play, you seriously ask: How should I handle such a scenario when we encounter it? What plan should I make? Seriously, it was a good resource for us when we looked at it [...] So, it is not something that can't be encountered. Disadvantaged children exist.”].

Fatma explained the representative situations in the scenarios: “İşte bir grup öğrenci vardı ki çok iyi öğreniyordu. Bir alanda çok iyiydi ama öbür alanda kendini kötü hissediyordu. Biri çok kendine güveniyordu ama farklı bir sıkıntısı vardı. Ya da dil problemi vardı ama matematiği çok iyi öğreniyordu gibi. Hepimizin sınıflarında çokça karşılaştığı öğrenci durumları vardı.” [“There was a group of students who were learning very well. They were perfect in one area but they felt bad in another. One was very self-confident, but he/she had another problem. Or maybe he/she had a language problem but was learning math very well. There were student situations that we often encountered in our classrooms.”]

At the same time, one of the points mentioned by Elif was that if there were no scenarios, i.e., authentic tasks, the program would remain theoretical and superficial. Burcu described her experience as “...şimdi birçok eğitim alıyoruz ama eğitimlerde bizim kaçma alanlarımız olabiliyor. Ama burada konuyla çok güzel yüzleştik biz.” [“...we are now getting a lot of

training, but we can have escape areas during the training. But here we have dealt with the problem very well.”].

### *Colleague Interaction and Collective Learning*

In the interviews, opinions were expressed on how valuable and essential the opportunity for interaction between colleagues was in the program in general and in the scenarios in particular. Teachers stated that this interaction allowed them to view different perspectives, improve themselves, and learn from each other.

For instance, Fatma mentioned the exchange of experiences when talking about colleague interaction: “Çünkü sadece kendi edindiğin şey değil. Bir başkasının tecrübesi de senin yol göstericin olup sana ışık tutabilir bu anlamda. Arkadaşlarımdan da çok şey öğrendim bu arada.” [“Because it is not only what you have acquired. Someone else's experience can also be your guide and in this sense can enlighten you. By the way, I have learned a lot from my friends".] Ezgi stated that she realized she would use more colleague interaction for her school work after this experience. She said: “Mentorluk sürecinde [bir çok çalışmanın] etkileşimli olması gerektiğinin farkına vardım. Yani okulumuzdaki rehber öğretmen, zümre arkadaşlarım ya da tanımadığım öğretmen arkadaşlarımla bir şekilde etkileşimde bulunarak bir şeyler tasarlayabilmişim ve onları dahil edebilmişim. Bunu fark ettim mentorluk sürecinde.” [“During the mentoring process, I realized that [much of the work] had to be interactive. In other words, I could design many things by interacting with the guidance counselor at our school, my grade friends, or teacher colleagues that I did not know, and I could involve them. I realized this during the mentoring process.].

The area where peer interaction turned into collective learning in the program was, in particular, the teachers' comment section on the scenarios. A social learning environment was created where all teachers wrote and read comments, responded to each other, and the mentor provided feedback. Burcu explained how the comments of her fellow teachers broadened her perspective: “Karşılıklı soru cevaplarla ya da diğer öğretmenlerin yazdıklarını görerek, bak ben burayı düşünmemiştim, aslında bu da varmış [...] Belki siz tek bir pencereden tek bir manzarayı izliyorsunuz. Ama odanızda beş farklı pencere olursa beş farklı manzara göreceksiniz ve bu

sizin bakış açınızı geliştirecek.” [“Through mutual questions and answers or seeing what other teachers wrote: ‘Look, I hadn't thought of this place, actually there is this one too [...] Maybe you see a single view from a single window. However, if you have five different windows in your room, you will see five different views, and this will improve your perspective’.]

Ezgi shared this process: “Öğrenme senaryolarında bu senaryolara cevap veren diğer kişilerin yorumlarını da görebilme imkanı çok hoşuma gitti. Çünkü ben onları vakit bulabildiğim kadar okudum ama daha sonra erişim imkanımız varsa okumak istiyorum. Çünkü onların yorumlarından [...] duruma bakış açılarından çok faydalandım. Kendi göremediğim ya da fark edemediğim durumların da o sayede farkına vardım.” [“I liked the opportunity to see the comments of other people who responded to these learning scenarios. Because I read them as much as I could find time, but I want to read them later if we can access them. Because I benefited a lot from their comments [...] from their perspectives on the situation. I also realized points I could not see or notice myself.”] Similarly, Ali drew attention to the benefits of other teachers’ comments during the interview. He stated: “Farklı öğretmenlerin aynı senaryo üzerinde yazdıkları değerlendirme, yöntem, teknik kısımlarını görmek benim için faydalı oldu.” [“It was useful for me to see the evaluation, method, technique parts written by different teachers on the same scenario.”]

In conclusion, teachers indicated that the components of the mentoring program that they benefited most from were feedback, self-assessment, scenarios, and colleague interaction, and that these components contributed to their professional growth and development.

### ***Theme 3: Professional Growth and Development***

This theme summarizes the outcomes regarding teachers' growth and development due to the mentoring program practices. In general, the teachers stated that the mentoring program helped them become aware of their areas of development, put the student more at the center of their lesson planning, gain practical knowledge for future application, and have a more positive view of the application of the UDL framework. The resulting categories under the Professional Growth and Development theme are listed in Table 21.

**Table 21**

*Categories under the Professional Growth and Development Theme*

Theme	Category
Professional Growth and Development	<ul style="list-style-type: none"> <li>• Considering the Learner in Design</li> <li>• Positive View on Implementing UDL</li> <li>• Acquiring Practical Knowledge for Future Applications</li> <li>• Recognition of Developmental Domains</li> </ul>

Teachers mentioned that one of the contributions of the mentoring program to their professional development was the recognition of their areas of development. For example, Elif reflected on the feedback she received as follows: “Peki teknik olarak yaptığımız ne kadar doğru? Bu yüzden geri dönüşlerinizin olması bizim teknik olarak yaptıklarımızın doğruluğu veya yönü bakımından da çok değerliydi.” [“How technically correct is what we are doing? That's why the feedback was precious in terms of the technical accuracy or the direction of what we were doing.”]. Similarly, Ezgi stated that the feedback enabled her to see her area of development. She shared: “Yani herhangi bir sorunda ya da öğrenip öğrenmediğimize emin olmadığımız bir durumda sizin verdiğiniz dönütlerin çok fazla faydasını gördüm” [“So, any problem or situation where we weren't sure if we had learned or not, I saw much benefit from the feedback you gave.”]

Burcu touched on the contribution of colleague interaction on this issue: “...senaryolar üzerinden yorumlarımız, öğretmenlerin görüşleri ve bizim oradaki farklı düşünce yapılarımız [...] eksikliklerimi görmeyi, kafamdaki soru işaretlerini yanıtlamamı, nasıl hareket etmem gerektiği noktasında benim için epey faydalı olduğunu söyleyebilirim.” [“... our comments on the scenarios, the opinions of the teachers and our different ways of thinking [...] I can say that they were very useful for me to see my shortcomings, to answer the questions in my mind and how I should act”.] Ali, on the other hand, said that self-assessments allowed him to identify areas for development: “Oradaki eksiklerinizi görüyorsunuz. Bunu bu şekilde yaptım, böyle yapabilirdim. Bu yeterince iyi değildi. [...] Çünkü gelişim alanını görüyorsunuz.” [“You see your shortcomings. I did it this way, I could do it this way. That wasn't good enough. [...] Because you see the area of development.”]

Second, teachers mentioned that the mentoring program encouraged them to be more student-centered in their lesson planning process. They were seen to be adopting the big ideas of the UDL framework, such as inclusion, attention to systematic differences, and a focus on the needs of the child. Burcu emphasized that she attempted to create student-centered designs by analyzing systematic and predictable networks. She said: “Öğrenci hangi ağda farklılaşıyor? Ben problemi bilirse buna göre hareket edebilirim [...] Bunu mentörlükte gördük. [...] Şimdi probleme baktığım zaman öğrencinin hangi ağda problem yaşadığını daha net görebilirim.” [“If I know in which network the student differs and what the problem is, I can act accordingly. [...] We saw that in mentoring. [...] When I look at the problem now, I can see more clearly in which network the student is experiencing the problem.”] On the other hand, Elif stated that during the lesson design process, she asks the following questions: “Kapsayıcılığı ne şekilde ele almalıyım? Ortaokul düzeyinde bir öğrenciyim, öğrencinin neye ihtiyacı var?” [“How should I deal with inclusivity in course design? Suppose I am a secondary school student. What does the student need?”]

Fatma expressed her belief in the value of each student and their ability to thrive with the following sentences: “Aktif katılımı destekleyen, öğrenciyi önemseyen, her öğrencinin özünde mutlaka kendini o anlamda ilerletebileceği mutlaka bir özelliği bir güzelliği olduğuna [inanmasını sağlayan, ona değerli olduğunu hissettiren [uygulamaları] özellikle karneler aşamasında çok fazla yapmaya çalıştım.” [“I tried to do a lot of [practices], especially at the report card stage, that support active participation, that care for the student, that makes every student believe that he/she has a quality and a beauty that can improve himself/herself in that sense, and make him/her feel that he/she is valuable.”] In these respects, it is understood that teachers nurtured attitudes and skills toward more inclusive and student-centered designs.

The third topic that emerged from the interviews and was evaluated within the scope of this theme is that mentoring practices provide teachers with practical knowledge about future applications of the UDL framework. In Ezgi’s words:

Birçok kuralın temelini öğrendik [...] daha öncesinde o altı haftada ama özellikle senaryolarla bunları öğrenme durumlarına nasıl uyarlayabileceğimizi gördük. Kafamızda tam oturmamış olan, şekillenmemiş olan o kurallar oturmaya başladı. Daha uygulanabilir

bir haline gelmeye başladı. Çünkü birçok eğitim bilimlerinde öğrendiğimiz kurallar teori de çok mükemmeldir ama nasıl uygulayacağını bir türlü anlayamazsın. Bunu artık pratik bir şekilde nasıl derslerimize uyarlayabiliriz onu öğrendik gerçekten. Mentörlük bence bu anlamda çok faydalı oldu. [In those six weeks, we learned the basics of many rules [...], but especially through scenarios, we saw how we could adapt them to learning situations. These rules, which were not well established and unformed, began to take root in our minds. They were starting to become more applicable. Because the rules we learn in many educational sciences are perfect in theory, but one cannot understand how to apply them. We have really learned how to adapt our teaching practically. I think mentoring has been very useful in that sense.]

Fatma shared “...sanki ilk aşama ne yapacağının farkına varma, mentorluk onu uygulama yöntemini anlama ve ona göre bir süreç işleme gibi geldi bana. Evet UDL bu işin kılavuzu, [...] ama mentörlük bunu uygulama biçimini aktardı.” [“...it seemed to me that the first stage was to realize what to do; mentoring was to understand the method of implementing it and to process it accordingly. Yes, UDL is the guideline for this work, [...] but the mentoring provided the way to implement it”]. Ali stated, “Mentörlük, doğrudan bilgi kazanmaktan ziyade sahip olduğum bilgileri nasıl kullanabileceğim konusunda [...] bilgiden ziyade sahip olduğun bilgileri uygulama, değerlendirme ve bunların arasındaki farklılıkları görme kısmında [fayda sağladı].” “Mentoring [was beneficial] in terms of how I can use the knowledge I have [...] rather than gaining knowledge directly, [...] in terms of applying and evaluating the knowledge you have and seeing the differences between them.”

Finally, the responses of the participants indicated that mentoring practices enhanced their motivation to apply the UDL framework in their lessons. Furthermore, a more positive perspective was observed in overcoming adverse conditions and existing barriers to more inclusive learning environments.

Burcu expressed her opinion on this issue: “Dolayısıyla bunlar evet birer engel. Ama şunu da fark ediyorsunuz, bir şeyler yapmak istiyorsanız bu engelleri aslında aşıyorsunuz. Yani bir yol hep var. [...] Ve bu aslında şunu da fark ettim, çok da zor değilmiş. Yani ütöpik bir şey değil. [“So yes, these are obstacles. However, you also realize that you overcome these

obstacles if you want to do something. So, there is always a way. [...] And that is what actually I noticed, it was not that difficult. So, it's not utopian.” Elif also shared: “O yüzden de bu bakış açısıyla baktığımda [...] diyoruz ya kitaplarda şu eksik, işte yıllık planda şu eksik. Esasında eksik bir şey yok. [...] orada eksikliği tamamlayacak olan biziz esasında.” [“So, when I look at it from that perspective, [...] we say this is what is missing in the books, this is what is missing in the annual plan. Basically, nothing is missing. [...] Actually, we are the ones who will fill the gap there.”]

#### ***Theme 4: Change in Instruction***

According to Desimone, when teachers experience effective professional development, their knowledge, skills, attitudes, and beliefs change first, and then then they begin to use their new competencies to improve their teaching or approach to their pedagogy (Desimone, 2009). The data collected from the interviews showed congruence with Desimone's premise. Teachers' professional growth and development led to changes in teaching. Three subthemes emerged from the participant discussions: Classroom dynamics and student engagement, focus on student needs and differences, and use of digital tools. The resulting sub-themes and categories under the Change in Instruction theme are listed in Table 22.

**Table 22**

*Subthemes and Categories under the Change in Instruction Theme*

<b>Theme</b>	<b>Subtheme</b>	<b>Category</b>
Change in Instruction	Classroom Dynamics and Student Engagement	<ul style="list-style-type: none"> <li>• Encouraging Engagement within the Lesson</li> <li>• Positive and Enjoyable Classroom Environment</li> <li>• Providing Flexibility</li> <li>• Appealing to Emotional Networks</li> </ul>
	Focus on Student Needs and Differences	<ul style="list-style-type: none"> <li>• Presenting Information through Multiple Means</li> <li>• Offering Choices to Students</li> <li>• Incorporating Group Work</li> <li>• Constructing Understanding</li> </ul>
	Use of Digital Tools	<ul style="list-style-type: none"> <li>• Use of Digital Tools</li> <li>• Use of Digital Content</li> <li>• Benefits of Technology in Learning</li> </ul>

### *Classroom Dynamics and Student Engagement*

This subtheme can be related to the third principle of the UDL framework, Multiple Means of Engagement, and thereby to affective learning networks. Affective networks form and regulate emotions and emotional responses and control how people perceive the external environment and learn. The multiple means of engagement principle provides an educational response to these variations in human cognition (Galkienė & Monkevičienė, 2021).

In their comments, the teachers said they tried different ways of gaining students' attention and helped them develop an interest in the lesson. Burcu shared the following statement about the importance students attach to the course content: “Çünkü öğrencilerin çoğunda şu var: Ben bu bilgiyi öğreneceğim ne olacak? Ne işime yarayacak? [...] Ama mentörlükle birlikte çoklu yöntemleri kullanıp öğrencinin öğrenme sürecine katılmasını yani [...] niye bunu öğreniyorum meselesini birazcık daha somutlaştırdı.” [“Because most students do: What will happen if I learn this information? What good will it do me? [...] But with mentoring, using different methods and involving the student in the learning process [...] it made the question of why I am learning this a little more concrete.”]

Another theme that emerged from the interviews was that teachers began to create a more flexible and positive classroom environment. Fatma made the following statements about making pupils feel comfortable at school: “Olabildiği kadar dersi talk show havasında işlemeye çalışıyorum. Çocuklar yaptığı işten keyif alsınlar. Oh, bugün iyi ki okuldaydım, iyi ki gitmişim diyebilirsiniz diye.” [“I try to make the lessons as much as a talk show as possible so that the children enjoy what they are doing. So that they can say: “Oh, I'm glad I was in school today, I'm glad I went.”] Similarly, Ezgi's words touched on the positive environment she tried to create in his classroom: “...pozitif bir sınıf ortamı oluşturmaya çalışıyorum her zaman için. Rekabetçi değil de öğrenmeyi destekleyen, birbirinin öğrenmesini destekleyen bir sınıf ortamı oluşturmaya çalışıyorum.” [“...I always try to create a positive classroom environment. I try to create a classroom environment that supports learning, not competitive, and that supports each other's learning.”]



Furthermore, an issue that teachers touched upon under this subtheme was supporting students emotionally. Ali said: “Öğrencilerin [olumlu] duygularını inanılmaz derecede artırdı. [...] Trafikle ilgili olan videoda da [...] çok fazla ilgisini çekti öğrencilerin. Dersin en başında bunu açtığımda o dersin aslında ders olduğunu düşünmediler. Bir eğlence gibi geldi onlara.” [“It has increased students' [positive] emotions tremendously. [...] The video about traffic [...] attracted the students' attention a lot. When I brought this up at the very beginning of the lesson, they did not think it was actually a lesson. It seemed like entertainment to them.”] Fatma also explained the work she did to improve students' sense of self-efficacy and personal coping skills with the following sentences:

Çocukların daha çok duygusal alandaki eksikliklerine ya da kişisel başa çıkma yöntemlerini göz önünde bulundurarak bir şeyler yapma çabası üzerinde daha çok durulmuştu. Çünkü öğrenmede bence duygular çok önemli. Herhangi bir konuyla ilgili ben bunu asla öğrenemem gibi bir varsayım üzerinde durursa çocuk eğer öğreneceği varsa da bazen öğrenemiyor [...] Daha fazla nasıl önemseyebilirim? Kendilerine olan benlik saygılarını, arkadaşları arasındaki tutumlarını ya da ben bunu öğrenemezsem bundan sonra bana ne derler aşamasını daha fazla önemseyip o yönlerde kendimi geliştirmek için neler yapabilirim? [The focus was more on the children's efforts to do something, considering their emotional deficits or personal coping mechanisms. Because I think emotions are essential in learning. If a child is under the assumption that he/she can never learn about a subject, even if he/she has something to learn, sometimes he/she cannot learn it [...] How can I care more? What can I do to improve myself in these aspects by paying more attention to their self-esteem, their attitude toward their friends, or their fear of what they will say to him/her from now on if I don't learn this?]

### *Focus on Student Needs and Differences*

This subtheme particularly overlaps with the first (Multiple Means of Presentation) and second (Multiple Means of Action and Expression) principles of the UDL framework. Teachers' responses in the interviews show that as a result of the program, they began to present information to students in multiple ways, offer options in tasks, include group work in lesson plans, and use UDL-focused strategies to build understanding.

For example, Burcu explained that when she discusses a topic, she explains it to the student in more than one way:

“Öncesinde olsa belki bu eğitimi almasam tahtadan anlatacağım. Evet belki çalışma kağıdı vereceğim, belki bir test yapacağım, belki evet konuşacağım, belki böyle kalacaktı. Şu an öyle kalmıyor. Konuyu farklı şekillerde sunuyorum ve sonrasında etkinlik yaparken de kendimce şöyle diyorum: Burcu, en az iki etkinlik, en az üç etkinlik yapmalısın sınıfta. Hani bir etkinlik yapıp bırakmayacaksın artık. Çünkü bu yeterli gelmeyebilir ve bunu en iyi sınıfta bile böyle yapmalısın. Belki çocukların hepsi çok iyi. Bir kere anlattın anladı. Ama olmayabilir. Çünkü orada da çok farklı öğrenciler var. Yani bireysel farklılıklar var.”  
 [“If it was before, maybe if I didn't have this training, I would explain it from the blackboard. Yes, maybe I would give a worksheet, maybe I would give a test, maybe I would talk, maybe it would stay like that. Now it doesn't. I present the topic in different ways and then when I do the activity, I say to myself: Burcu, you should do at least two activities, at least three activities in class. You know, don't do one activity and then stop. Because that might not be enough, and that's how you should do it, even in the best class. Maybe the children are all excellent. Once you explained it to them, they understood. But maybe not. Because even there are many different students. So, there are individual differences.”]

On the other hand, Ali stated that Ali indicated that he employs a combination of audio and written instructions in his lectures. Similarly, Fatma stated that she deliberately chooses materials to clarify mathematical language while presenting information in different ways. Ezgi and Elif shared their interventions to adapt the presentation of information during the interviews. Ezgi explained her intervention as follows: “Yazı tipini değiştirerek, altını çizerek, büyüterek, küçülterek dikkatin çekilmesini sağladım.” [“I drew attention to it by changing the font, underlining, enlarging, reducing.”] While Elif said: “...çok işime yaradı. Yani hızlandırma seçeneği, altyazı seçeneği, görüntüyü yavaşlatma vs. bu seçenekleri hiç kullanmamıştım.” [“...it was beneficial for me. That is, the acceleration option, the subtitle option, slowing down the image, etc. I never used these options.”]

Regarding providing options for students, Ezgi touched on how she personalized concept maps: “Kavram haritalarının [...] özelleştirilebilir bir teknik olduğunu fark ettim. Sadece bir çalışma kağıdı olarak değil de, örneğin yarı dolu bir kavram haritasına, gerçek nesnelere de kullanarak [...] farklı şekillerde çeşitlendirilebileceğini, altına kendi eklemelerini yapabilecekleri, notları alabilecekleri kısımlar koyarak kendi notlarını oluşturabileceklerini fark ettim.” [“I realized that concept maps [...] are a customizable technique. I realized that not just as a worksheet, but for example, a half-filled concept map could be diversified in different ways by using real objects [...], and students could create their notes by adding sections underneath where they could make their additions and take notes.”]

Burcu mentioned that it gives the students a chance to express themselves in more than one way with the following words: “Benim için farklılıklar var ve her öğrenci bir renk, bu renkle devam edebilir. [...] Kendi farklılığını da fark etsin. Ders bazında da işte bir yazı yazdıracaksam biliyorum ki belki yazma konusunda sıkıntı çekiyor ama resmi çok iyi. Dedim ki [...] Yunus Emre sen resim çizmeyi seviyorsun, istersen bunu resim çizerek yapabilirsin. Bir öğrencim konuşmayı çok seviyor, ifade etmeyi çok seviyor. Sen bunda bir konuşma hazırla ve sınıfta seni böyle dinleyeceğiz dedim. Yazma konusunda çok iyi olanlar zaten yazmaya başladılar.” [“For me, there are differences, and each student is a color, so that they can continue with that color. [...] He/she should also recognize their own differences. If I were to write an article for the course, I would know he might have trouble writing, but his drawing was excellent. I said [...] Yunus Emre, you like drawing, you can do this by drawing if you want. One of my students likes to talk and express himself. I said, "You prepare a speech, and we will listen to you in class like this." Those who are excellent at writing have already started writing.”]

Another strategy mentioned in the interviews was to include more group work in the lessons. UDL checkpoint 8.3 highlights the benefits of collaboration, peer support, and learning. Flexible grouping is one of the fundamental strategies for UDL implementation (CAST, 2018b). Elif said: “Grup çalışmalarının zaten çok faydalı olduğunu biliyordum. Grup çalışmalarında hem öğrencilerin aktif katılımını sağlayabilmek, hem akran öğretimini etkin hale getirebilmek için [...] öğrencileri bu anlamda organize ettim ve çok faydasını gördüm.” [“I already knew

that group work was very useful. To ensure the active participation of the students in group work and to make peer teaching effective [...] I organized the students in this sense and I found it very useful.”] Ezgi explained that students who grasp the subject quickly create peer learning opportunities for other students in group work.

Building understanding is an area of particular focus in the third UDL guideline. Reminding or teaching students about prior knowledge; emphasizing patterns, basic ideas and relationships; supporting the process of information and the transfer of learning to new contexts are related recommended strategies (Gargiulo & Metcalf, 2022).

Fatma explained that when designing a course, she first measures prior knowledge, checks readiness, and provides pre-teaching if necessary. She also said that she examines patterns and connections between concepts. Burcu stated about her assessing and activating background knowledge practice, stating: “Konuyu önce bir hazırlamak ve önce öğrenciler ne kadarını biliyor, ne kadar eksikler buna bir bakıyorum. Sonrasında da evet konu bazında işte çok eksikleri yok veya şuralarda eksikleri var veya konuyla ilgili bunu geçen yıl gördüler ama şuraları unutmuşlar diyorum.” [“I prepare the subject matter first and see how much the students know and what they lack. After that, [I say] yes, they do not have many deficiencies in the subject, or they have deficiencies in these areas, or they saw this about the subject last year, but they have forgotten these parts.”]

Ezgi stated that she uses concept maps to help students understand the relationships between concepts. She shared: “Diyelim ki kavram haritasında verdiğim önemli kavramlar var. [...] Dolayısıyla bir daha dönüp yokladığım zaman o kavramların akıllarında kaldığını fark ettim. [...] İlişkilerin kavranmasında bağlantıların çok faydalı olduğunu gördüm.” [“Let us say there are important concepts I have given in the concept map. [...] So, when I went back and looked at them again, I realized that those concepts remained in their minds. I found that connections are beneficial for understanding relationships.”]

### *Use of Digital Tools*

The third sub-theme under this theme is the use of digital tools. Teachers reported that the mentoring program encouraged them to use Web 2.0 tools. Ezgi explained this: “Bunun

dışında dediğim gibi bazı araçları, web 2.0 araçlarını özellikle kullanmaya sevk etti beni. Özellikle bazı derslerin öğretiminde videolar hazırlamayı planlıyorum YouTube'tan. [...] Ben web 2.0 araçlarını normalde kullanıyordum ama farklı kullanımlarını bilmiyormuşum diyeyim. [“Apart from that, as I said, it made me use some tools, especially Web 2.0 tools. I’m planning to prepare videos on YouTube, especially for teaching some courses. [...] I normally use Web 2.0 tools, but let me say that I did not know their different uses.”]

Elif stated that the training contributed to her approach to the development of digital content. In addition, she illustrated how she uses digital tools to address differences as follows: “...ne olursa olsun her çocuğa yönelik web 2.0 araçları var. Olmaması bizim geliştiremeyeceğimiz anlamına gelmiyor. [...] mesela çocuğa hikaye yazdırıyoruz, peki zaten hikaye yazma bilen ve yaratıcı bakımından üstün yetenekli çocuğu derse nasıl [dahil edeceğiz], bunun yanında okuma güçlüğü çeken bir çocuğu elimizdeki ders kitabıyla nasıl oyalayabileceğiz? İşte burada dijital devreye giriyor.” [“There are Web 2.0 tools for every child, no matter what. The fact that they do not exist does not mean that we cannot develop them. [...] For example, we make the child write a story, but how can we [include] a child who already knows how to write a story and is creatively gifted, and how can we keep a child with reading difficulties engaged with the textbook we have? This is where digital comes in.”]

In the findings section, the results derived from both qualitative and quantitative data are presented. Quantitative analyses were performed to examine the impact of the mentoring program on teachers’ fidelity to Universal Design for Learning (UDL) and their Expectancy-Value-Cost scores. In addition, findings from teacher interviews were provided, organized into four themes and their respective subthemes.

## 5. DISCUSSION

The aim of this study was to investigate whether a mentoring program enhanced teachers' implementation of the Universal Design for Learning (UDL) framework. This section presents a critical analysis of the study's results in line with existing research. Implications and recommendations are also provided.

### 5.1. Overview

The field of teacher professional development is complex, and its effectiveness depends on pedagogy, collaboration, facilitation, and other factors. Despite the presence of several strategies, the sustainability and application of teacher learning remains a challenge (Ávalos, 2011). Hence, ongoing professional development strategies are necessary to create lasting changes in teachers' knowledge and beliefs (Driel et al., 2001), and support practices such as mentoring are essential to professional learning (Orland-Barak, 2014).

Based on the findings in the literature, teachers' UDL Implementation Fidelity scores and expectancy, value, and cost scores were analyzed in this study. In addition, answers were sought to questions by interviews regarding the impact of the mentoring program on teachers' knowledge, skills, beliefs, and attitudes, which components of the program played a role in this change, and which UDL-based teaching strategies and principles teachers began to use in their teaching.

The results indicate that although the mentoring group's mean score is higher, there was no statistically significant difference in UDL fidelity scores between teachers who participated in the mentoring program and those who did not. Similarly, there was no significant difference in the PD and mentoring groups' task value and cost scores. The value scores were found to be high for both groups. However, the expectations for success scores of mentored teachers in implementing the UDL framework differed significantly from those of teachers who did not participate in the program.

At the same time, the teachers emphasized that the UDL basic professional development program formed the basis of their UDL perspective in the interviews. They also highlighted the

positive contributions of feedback, self-assessment opportunities, encountering realistic scenarios, and interaction with colleagues in the mentoring program. The teachers indicated that these components enabled them to identify their areas of development, adopt a more student-centered approach, obtain practical knowledge, and have a more positive perspective regarding the application of the UDL framework.

## **5.2. UDL Implementation Fidelity**

The efficacy of mentoring programs has been investigated in various settings, including education, medicine, and the corporate environment. In the educational context, mentoring is a promising strategy for teacher learning and development (Ali et al., 2018), and it can enhance the fidelity of curriculum implementation as a source of professional growth (Reinke et al., 2013; Malanson, 2014; Banja, 2020). The term "implementation fidelity" is defined as the literal application of a program by educators or other stakeholders (Bümen et al., 2014), and research indicates that higher fidelity is associated with an increase in student success (Burke, 2011; Keller-Margulis, 2012; Harn et al., 2013; Bos et al., 2022).

Comprehensive teacher training and professional development models can enhance implementation fidelity (LaChausse et al., 2014). Malanson et al. (2014) conducted a virtual mentoring study demonstrating that mentoring combined with online materials can facilitate the fidelity of novel high school curricula. However, our study contradicts the findings and claims of the aforementioned research, particularly regarding the quantitative results on UDL implementation fidelity. In terms of the qualitative aspect, it was indicated that the mentoring program resulted in a considerable number of applications in teaching practices. However, no statistically significant difference was observed between the mentored and non-mentored groups in terms of UDL fidelity scores.

A number of factors may influence the fidelity of curriculum implementation. Teachers' opinions, organizational support, clarity of guidelines for instructional practices, amount of training and professional development provided, complexity of the program, availability of resources, perceived and actual effectiveness, and structural conditions in the school environment are examples of factors that may influence teachers' ability and tendency to adhere

to the planned structure and principles of a curriculum (Roman, 2016; Du et al., 2019; Ercan & Çubukçu, 2023).

Adequate training time is crucial for maintaining high fidelity (Breitenstein et al., 2010). Given the importance of the duration, it can be argued that a four-week mentoring process was inadequate for this study. For future research, ensuring that sufficient time is allocated to mentoring may facilitate more comparable findings. Simultaneously, it may be crucial to distribute the time devoted to mentoring across the teaching period or year. Similarly, Craig (2020) found no significant difference in UDL fidelity scores in favor of the group that received instructional coaching, a practice analogous to mentoring. She identified two possible explanations for the observed lack of effect. One was the need for more time allocated to coaching.

Upon examining the average scores of the two groups, the mentoring group achieved a score of 13.64 out of 18, whereas the non-mentoring group scored 12.24 out of 18. According to the UDL Implementation Fidelity Tool, a robust/comprehensive UDL lesson is expected to score between 14 and 18 points. In this instance, both groups demonstrated a moderate degree of UDL fidelity. Considering that a significant proportion of teachers use textbooks for lesson planning and teaching (Moulton, 1997; Knight, 2015; Curdt-Christiansen, 2017; Vitta, 2023) and approach textbooks as a curriculum (Ercan & Çubukçu, 2023) while UDL aims to remove barriers in printed materials; even moderate adoption of the UDL framework can demonstrate the effectiveness of UDL Basic PD and mentoring programs.

At this point, teachers' opinions can be a valuable source for interpreting the findings, and their comments are consistent with previous research. Teachers reported that they provided students with options in several areas within the UDL guidelines during their lessons following the mentoring program. They also acknowledged that mentoring had a substantial influence on these practices. Given the results of this study and the positive correlation between practice commitment and improved student outcomes (Durlak & DuPre, 2008; Bos et al., 2022), mentoring can serve as a continuous support mechanism for the teachers' effective professional development. At this juncture, it is plausible to suggest that the support mechanisms, accessible



resources, and conditions of teachers' environments, as well as the intensity and efficiency of the mentoring model, may serve as determining factors.

### **5.3. Teacher Motivation and Perceived Expectancy for Success, Task Value and Cost**

Teacher motivation is a critical component in the success of professional development programs (McMillan et al., 2016). It is influenced by several factors at both the teacher and school levels, including prior experience, teaching experience, self-efficacy, conceptions of learning, and organizational support and leadership (Zhang et al., 2021). The subject of this study is the expectancy-value theory, which can explain changes in teacher practice following professional development programs (Boström & Palm, 2020). The expectancy for success dimension of the theory represents the instructor's confidence in completing the assignments. Task value, the second dimension, covers teachers' subjective evaluations of the significance of the tasks. Cost, the third dimension, refers to the resources used, required, or sacrificed to complete a task (Osman and Wagner, 2020).

The analysis revealed a significant difference in the expectancy for success scores of teachers who participated in the mentoring program compared with those who did not. This finding demonstrates that teachers' beliefs about their perceived ability to successfully implement the UDL framework in real settings differed from those of the non-mentored group. The qualitative data also supported this finding; therefore, when examining the reasons, it would be appropriate to refer to the teachers' explanations. Teachers' statements indicated that the mentoring program prepared them for the situations they might encounter in their classrooms and consequently gave them a positive perspective on the use of the UDL framework.

One of the most crucial elements of both short-term and long-term professional development programs that influence teacher outcomes is incorporating case studies, i.e., active learning tasks (Driel, 2001; Lauer et al., 2014). Teachers indicated that encountering realistic situations within the scenarios of the mentoring program prepared them for real-world classroom situations. It can be posited that these applications enhanced their self-efficacy and strengthened their expectations of success in practice. These results build on existing evidence

of the impact of teacher self-efficacy on teachers' motivation and ability to successfully apply their lessons in classrooms (Butts, 2016; Orakçı et al., 2023).

No significant difference was observed in the teachers' cost scores. This indicates that the practices implemented in the mentoring program do not mitigate the perception of the cost associated with UDL applications. At this juncture, the outcomes do not align with Ragins and Scandura's (1999) finding that individuals perceive higher costs and provide lower benefits in the absence of mentoring experience. However, similar to this study, Gaitas and Martins (2017) indicated that primary school teachers found differentiated teaching strategies challenging in terms of activities, materials, and evaluation areas.

In light of previous research, teachers have identified several key areas that require attention to successfully implement UDL. These include the need for collaborative planning time, differentiated resources, and professional development communities (Katz, 2015). Simultaneously, some barriers can prevent optimal learning experiences and hinder the implementation of UDL in general education settings. These barriers include the lack of teacher support, administrative support, and PD programs that increase knowledge of UDL (Scott, 2018). Although the mentoring program created a positive perspective, its inability to reduce costs may be related to the complicated processes involved in the implementation of UDL and the current conditions of teachers.

The value that teachers ascribed to UDL training did not demonstrate a statistically significant difference between teachers who participated in mentoring and those who did not. However, it is important to consider the mean scores of the groups. The average value score of the mentored group was 5.92 out of 6, whereas that of the teachers who did not participate in the program was 5.67. It can be reasonably asserted that the value of the tasks assigned to this study by both groups is high.

Given that teachers' professional development is driven by their pedagogical ideas (Vries et al., 2013) and their perceptions of professional growth are influenced by their identity (Noonan, 2018), the voluntary nature of the sample can explain these findings. Teachers who value inclusive practices may have chosen to participate in this study. Furthermore, a literature

review shows that teachers place a high value on educational programs that focus on student learning (Nir & Bogler, 2008; Avalos, 2011). Because UDL's philosophy is to provide an equitable and supportive education for all students, this philosophy may have increased the perceived importance, and accordingly, the value teachers place on the UDL Basic PD and mentoring programs.

#### **5.4. The Foundational Impact of UDL Basic PD on Teachers' Beliefs and Practices**

All of the teachers who participated in the interviews stated that the UDL Basic PD enabled them to familiarize themselves with the basic ideas of UDL. They reported that awareness of their current teaching practices increased, they learned about the source of individual differences and their systematic and predictable nature, and they developed a general understanding of inclusive and universal design. These findings are significant because the mentoring process would not be efficient without becoming aware of the principles of UDL, acquiring basic knowledge, and building understanding.

UDL emphasizes the need for teachers to become facilitators of flexible lesson design and advocates a shift away from traditional one-size-fits-all instruction toward a more inclusive, learner-centered approach (Rose & Strangman, 2007). The success of professional development initiatives has been linked to changes in teachers' beliefs (Rodgers et al., 2022), and teachers' intentions to make adjustments to their teaching practices are significantly influenced by their perceptions of what constitutes effective teaching (Maass, 2011). In line with the existing research, it can be posited that UDL Basic PD led to a change in teachers' beliefs, which in turn provided a basis for subsequent mentoring studies.

In addition, teachers' existing beliefs about teaching, students' abilities, and knowledge influence their ability to develop mastery of a method and to apply their learning in real contexts (Fives & Buehl, 2016; Gilakjani & Sabouri, 2017). Oleson and Hora's (2014) study showed that when teachers do not receive extensive training, their prior knowledge and sources of information determine their teaching practices. From another perspective, Kunter et al. (2013) found that teachers' pedagogical content knowledge - the integration of teachers' subject matter expertise and pedagogical expertise - positively impacts the quality of instruction and student

outcomes in their study of 194 secondary school mathematics classes. At the same time, the existing knowledge of individuals influences how they integrate and use new knowledge. Consequently, the components used during mentoring in this study served to reinforce an already established foundation through the UDL Basic PD program.

### **5.5. Mentoring Program Components and Structure on Professional Development and Growth**

Mentoring is a professional development practice that provides valuable opportunities for mentees to gain pedagogical knowledge and skills while influencing their attitudes and beliefs (Hudson, 2013; Nolan & Molla, 2017; Ali et al., 2018; Nopriyeni et al., 2019). A review conducted by researchers at the Harvard Graduate School of Education and Brown University found that successful professional learning opportunities, such as mentoring, can lead to changes in teachers' skills and teaching practices (Hill et al., 2022).

Nowadays, mentor-mentee relationships can be established at a distance through technological devices and the Internet, bringing participants without the opportunity to physically meet in the same environment. In this study, mentoring practices were conducted using the online group mentoring model to extend sample representation and overcome pandemic conditions. This approach allowed more teachers to participate in the study and enabled them to benefit from the flexibility and autonomy offered by the online environment. Stoeger et al. (2017) found that online group mentoring studies were more effective in communication and networking than one-to-one mentoring. This type of mentoring has advantages over other models in terms of flexibility, allowing for diversity, interdependence, growth, and the development of team culture and collaborative skills (Mullen & Klimaitis, 2021).

Although online mentoring programs present particular challenges, such as technological and communication barriers (Eby & Lockwood, 2005; Pollard & Kumar, 2021; Jan & Mahboob, 2022; Dorner et al., 2020), they can facilitate the construction of professional knowledge, support professional growth and development, and foster the development of professional bonds among participants (Mizukami et al., 2015). In line with previous research,

teachers who participated in the mentoring program indicated that the program components, such as mentor feedback, scenarios, reflective practices, and colleague interaction, helped them to become aware of their areas of development, adopt a learner-centered approach to lesson planning, gain practical knowledge for future application, and have a more positive view of the application of the UDL framework.

The first component addressed in the interviews was the feedback provided by the mentor throughout the program. As previously noted by Boe-Doe (2023), regular feedback in mentoring studies is an effective tool for identifying and developing teachers' potential, and a review of the medical professional development literature shows that effective feedback improved personal and professional development in mentoring studies between 1990 and 2017 (Sheri et al., 2018). In support of these findings, teachers indicated that feedback enabled them to gain insight into the correctness of their actions and the path they should continue to follow. It also provided answers to their questions and, in some cases, helped them identify the shortcomings in their teaching.

The second component was the self-assessment conducted at the beginning of the program. Teachers were asked to assess their perceived competence in removing barriers in an inclusive learning environment and designing lessons according to UDL principles. They then identified three professional development goals to be achieved throughout the mentoring process. As a result of this practice, the teachers' comments indicated that they became aware of their shortcomings and questioned their current practices. Shanks' (2017) study focused on mentoring relationships in different countries and showed that critical reflection on professional practice is an important way of facilitating mentees' professional development.

Looking at the benefits of mentor feedback and self-assessment more broadly, teachers became aware of their areas of development through these two components. Nilssen et al. (1998) emphasized that mentoring focusing on the "zone of proximal development" can lead to professional growth and support awareness of areas of development through reflective practice. Another mentoring study reported that these reflective studies enabled pre-service teachers to identify their areas of development by constructing teacher identity (Campbell & Brummett, 2007).

The third component of the program was the scenarios, which were designed as authentic tasks. These scenarios contributed to the professional development of teachers in two ways: first, they comprised situations akin to real classroom experiences, and second, they provided an opportunity for colleague interaction. The teachers stated that the scenarios prepared them for real-life challenges and allowed them to practice the theory. The findings of this study align with those of Dunst et al. (2015), who found that professional development programs that include active and authentic tasks are the most influential teacher in-service trainings. Furthermore, Opfer and Pedder (2011) identified that authentic tasks that consider the reciprocal effects between the three subsystems—teacher, school, and learning activity—enhance teacher professional learning. When focused on the classroom, such tasks can facilitate a professional transformational change and create a meaningful learning experience for the teacher (Slepkov, 2008; Maxwell, 2012). In this regard, as Webster-Wright (2009) postulated, professional development programs should be designed to support authentic professional learning rather than content transfer.

Teachers provided additional commentary on the scenarios, stating that a collective learning space was created in which they could provide answers and comments in the tables following the tasks. This area has enabled them to gain insight into different perspectives, increase their knowledge through the writings of other teachers, and learn from each other. The teachers' comments on the contribution of this collective field are consistent with those of previous research. For example, Ahmad Zaky El Islami et al. (2022) conducted a systematic analysis that revealed that the professional development strategies implemented between 2015 and 2019 were increasingly collaborative and collegial. A similar effect was observed in an online mentoring study conducted with mathematics teachers by McAleer and Bangert (2011). The study participants also reported that attending online discussions contributed to their professional growth. A literature review indicates that professional development activities involving colleagues positively impact teacher knowledge, skills, and student learning (Thurlings & Brok, 2017).

As a result of benefiting from all program components, teachers indicated that they became more student-oriented in their plans, understood individual differences in depth, and

turned to designs that valued the student. However, this phenomenon should not be taken as granted according to previous research. In Boer et al.'s (2011) study covering primary school teachers with students with special needs, most teachers' attitudes toward the inclusion of students were found to be neutral or negative. A study conducted by Woodcock and Hardy (2017) in Canada found that exposure to special education training negatively affected teachers' beliefs and understandings of inclusion, contrary to general belief. At this point, it is necessary to examine the PD structure to determine whether teachers encounter exclusive practices. It may also be more accurate to assume that researchers do not accept a student-centered orientation as a given and guaranteed, but at best, assume that it is neutral.

Nevertheless, teachers' attitudes toward disabled students can be shaped according to the education and experience they have earned, and this can affect the success of inclusion programs (Sze, 2009). In addition, professional development courses that place inclusion at the program's center can preserve prospective teachers' positive attitudes and beliefs toward inclusive education (Beacham & Rouse, 2012). It can be said that a UDL-based mentoring program that focused on inclusion may have contributed to teachers developing student-focused ideas.

Finally, in terms of the components of the mentoring program and their contribution to teachers holistically, it was observed that teachers developed a positive perspective on applying the UDL framework. They accepted that implementing UDL involves various difficulties, but their belief that they can overcome them is noticeable. However, when we examine the literature, it becomes evident that professional development programs based on different pedagogies do not necessarily result in positive beliefs among teachers regarding the knowledge acquired (Kennedy, 2016). One factor that may contribute to a positive perspective is teacher confidence. Mentoring programs that facilitate the acquisition of knowledge and skills, social connections, and enable teachers to make instructional decisions have been shown to build teacher confidence (Nolan & Molla, 2017).

In addition, qualified mentoring programs, particularly those aligned with constructivist principles, can facilitate the growth of teacher efficacy and enthusiasm (Richter et al., 2013). Furthermore, Gore (2017) demonstrated that a pedagogy-based and collaborative approach

significantly impacts teacher morale. This study is also supported by findings indicating that a positive attitude toward the subject emerges from collaborative professional development for inclusive education (Holmqvist & Lelinge, 2020). The discussion of teaching decisions in a collaborative learning environment, the presentation of real-life scenarios, and the provision of guidance with mentor feedback in the program may have enabled teachers to adopt a positive outlook on applying the UDL framework. These findings also align with studies showing that the presence of a mentor in collaborative learning environments enables interaction and cognitive engagement (Dorner, 2012).

### **5.6. Integrated Principles and Strategies into Classroom Instruction**

Research has demonstrated that mentoring programs can facilitate the successful implementation of complex applications by providing support, guidance, and training to individuals (Moran et al., 2014; Craven, 2021). The most effective of these programs are those that result in changes to teaching strategies and practices (Hill, 2022). Even if these programs are of limited duration, they can have an impact on teacher outcomes if there is sufficient time, if learning objectives are set, if the training meets the needs of the participants, if there are opportunities for practice, and if there are group discussions and active learning tasks (Lauer et al., 2014). Furthermore, Desimone et al. (2002) demonstrated that programs specifically focused on teaching practices result in an increase in teachers' use of these practices in their classrooms.

The study reported that teachers who participated in the mentoring program began to implement UDL-focused strategies in their classrooms. Upon analysis of the interview transcripts, the first of the subthemes that emerged was "classroom dynamics and student engagement." Titles related to engagement, positive classroom climate, flexible design, and affective networks emerged within this theme. Based on these findings, the program began to reflect the third principle of UDL—multiple means of engagement—in teachers' classroom practices. In terms of the fidelity of implementation, the issues that teachers address are aligned with the UDL guidelines under this principle.



In accordance with the "focus on student needs and differences" sub-theme, teachers have begun to present information in various ways in their lessons, provide opportunities for students to express what they know, include group work, and use cognitive strategies to construct understanding. These headings address the first principle of UDL—multiple means of representation—and the second principle—multiple means of action and expression. Lastly, the third sub-theme was the "use of digital tools". Although UDL is not a fully technology-oriented approach, it supports the use of technology to create flexible and accessible experiences for all learners (Bray et al., 2023). In parallel, the teachers stated that they had begun to benefit more from technological tools and were keen on developing digital content.

The practices mentioned under this theme appear to provide evidence that mentored teachers have begun to implement UDL framework in their classrooms. Qualitative data from teachers indicated that program components such as self-assessment, scenarios, discussion forums, and mentor feedback resulted in UDL-oriented instructional strategies in teachers' classroom practices.

### **5.7. Implications of the Study**

Inclusive education stands out as a guarantee for democracy and a peaceful future in a world where different cultures are increasingly integrated. Therefore, teachers need to internalize and reflect on the inclusive teaching approaches such as the neuroscience-based UDL framework in their practice. The results of this study will serve as a valuable resource for educators, educational leaders, policy developers, and researchers seeking to gain insight into the most effective professional development practices for supporting teachers in applying this framework in their classrooms. This study offers a novel approach to understanding the relationship between mentoring and inclusive classroom practices by combining experimental design and qualitative analysis.

Sustained duration is considered to be one of the elements of effective professional development studies (Desimone, 2009; Darling Hammond, 2017), and the follow-up of the professional development programs strongly influences teachers' knowledge and professional community (Ingvarson et al., 2005). Many studies have examined the effect of mentoring as a

follow-up strategy on teacher practices from different perspectives (Orland-Barak, 2014; Pleschová & McAlpine, 2015; Shanks, 2017; Spooner-Lane, 2017; Mok & Staub, 2021). In parallel, this study examined the impact of an online group mentoring program on teachers' commitment and motivation to implement UDL practices and explored teachers' mentoring program experiences.

Studies show that mentoring programs improve teachers' performance, behavior, and beliefs (Orland-Barak, 2014), increase their pedagogical knowledge (Nopriyeni et al., 2019), build teachers' confidence, and contribute to teachers' professional capital (Nolan & Molla, 2017). Mentoring also promotes classroom management and learner engagement (Shernoff et al., 2011) and plays a pivotal role in enhancing the fidelity of curriculum implementation (Reinke et al., 2013; Malanson, 2014; Banja, 2020).

Contrary to the hypothesized association, the mentoring program implemented in this study did not differ significantly in terms of teacher fidelity scores. In addition, the perceived cost of UDL applications did not differ between the two groups. The value scores were similar, but the means were close to the maximum in both the mentored and non-mentored groups. Simultaneously, the expectancy for success scores significantly differed in favor of mentored teachers, and interviews revealed promising results in terms of teacher outcomes.

These findings should be considered when using mentoring programs designed to foster implementation fidelity. Although the mentoring group had higher expectations of applying UDL and the qualitative data showed promising results, the lack of significant differences in fidelity scores between the groups suggests that mentoring could be integrated with more effective strategies and possibly longer-term PD efforts. Given that time does not always lead to effectiveness (Hill, 2022), a critical implication of this study is the need for further research into the structure and components of mentoring programs and the creation and testing of theoretical frameworks and models to increase effectiveness.

The significant difference in scores regarding expectancy for success between the mentored and non-mentored groups highlights the impact of mentoring on teacher motivation and confidence. Alp et al.'s (2023) study on teacher motivation in PD programs supports this

finding by showing that discontinuation of support after PD reduces teachers' success expectations. Accordingly, mentoring programs can be used to increase teacher self-efficacy in implementing new pedagogical frameworks.

At this point, teachers' experiences show that both the ongoing support and the real-life experiences in mentoring programs make them believe that they will be more successful in their classroom practice. These findings are consistent with those of Seneviratne et al.'s (2019) study, which found that authentic tasks used in professional development improved science teachers' self-efficacy for inquiry-based teaching. Given the results of previous research, significant results in expectations for success scores, and teacher interviews, practitioners can now consider including authentic tasks in mentoring programs.

Contrary to the expected positive outcomes, the indifference between groups' perceived cost levels may be related to the complicated processes of implementing UDL and teachers' current conditions. At this point, communicating goals is a factor that increases the effectiveness of a professional development program (Guskey, 1991). UDL is an efficient and teacher-friendly approach to overcoming barriers; therefore, mentoring programs should clearly and concisely outline the tangible benefits of UDL compared with other approaches to differentiation. In addition, an accurate assessment of the specific context in which the teacher operates is essential in designing a mentoring program. Policies should support the creation of mentoring programs that respond to teachers' specific needs and conditions, possibly through adaptable elements within the PD framework.

All teachers who participated in the UDL PD Basic program, regardless of whether they continued in the mentoring program, highly valued what they learned in the UDL PD programs. It has been shown that teachers place more value on PD that focuses on student learning (Nir & Bogler, 2008; Avalos, 2011), and teachers are more likely to value PD programs that are consistent with their ideas (Noonan, 2018). It is assumed that these two components affect the value attributed to the study. Therefore, policymakers and school leaders should consider the principle of voluntarism when designing professional development programs. In addition, emphasizing that teacher professional development improves student learning may benefit

teachers' perceived value. Further studies on the dynamics behind teachers' value attribution to PD programs can confirm the results of this research.

Qualitative data from the study highlighted the benefits of reflective components such as mentor feedback and self-assessment within the mentoring program. These components helped teachers identify their areas of development. Simultaneously, the collective learning environment allowed teachers to see different perspectives, improve themselves, and learn from each other. Boe-Doe (2023) addressed the benefits of feedback given to teachers in mentoring programs. Gaitas and Martins (2017) stated that teachers' analysis of their teaching practices and self-assessment encourage their participation and ownership, and collaboration opportunities in ongoing programs contribute to their professional development. These findings indicate that practices focusing on self-assessment, feedback, and colleague interaction are critical to creating programs where teachers become aware of their development areas and expand their strategy repertoire.

In this study, teachers reported that they had adopted a student-centered attitude in their lesson designs after participating in the mentoring program. This finding is consistent with Rosenfeld and Rosenfeld's (2008) study, which showed that PD focused on individual differences increased teachers' influential and interventionist beliefs about students, and Beacham and Rouse's (2012) study, which showed that PD focused on inclusion increased positive attitudes and beliefs about addressing individual differences. Furthermore, Vries et al. (2013) reported that continuous professional development activities can promote student-centered skills. Therefore, given the positive impact of student-centered approaches on students' learning (Rust, 2002) and non-academic outcomes (Li & Ding, 2023), incorporating inclusion-based approaches into teachers' professional development and supporting them with mentoring activities as a policy can have a positive impact on teachers' student-centered beliefs.

The findings of this study contribute to understanding the relationship between basic training and mentoring periods to effectively reinforce new teaching strategies. The teachers agreed that the UDL basic PD program was pivotal in equipping them with an understanding of UDL principles and the framework's essential ideas. In other words, this program has created a background for mentoring studies. Rodgers (2022) also stated that successful professional

development programs primarily require a change in teachers' ideas and beliefs. In this regard, the design of mentoring programs must first ensure that participants have acquired the necessary knowledge through a PD program and that their beliefs are aligned with the new pedagogical paradigm. Without establishing the foundations of a framework, mentoring programs may not produce desired teacher outcomes, and studies that investigate the impact of mentoring may not produce accurate results.

In this study, the UDL fidelity tool developed by Johnson (2011) was adapted into Turkish and made available to researchers and educators. Researchers can use this tool to conduct comparative analyses of UDL applications and develop interventions to improve their effectiveness. Teachers can use this tool to identify the strengths and weaknesses of their own UDL practices, ensure consistent application of UDL principles in learning environments, and set goals for improving their UDL journey.

### **5.8. Limitations**

Although this study has provided valuable insights into the effects of mentoring programs on UDL teaching practices, the findings have some limitations.

One of the primary limitations of this study is that the responses provided to the UDL Fidelity Tool reflected the subjective evaluations of the participating teachers. The rationale for employing this methodology is that it was not feasible to have all lessons evaluated by different UDL experts. An explanation was provided via text and video on completing UDL training and the process for filling out the UDL Fidelity Tool. However, self-reporting may have affected the study results.

The findings of this study are limited by the sample of Turkish and primary school teachers in Istanbul. In addition, employing the convenience sampling method may limit the generalizability of the findings. Voluntary participation in the UDL basic PD and mentoring program may also present a selection bias. These factors indicate that the results of this study may not be representative of all teachers in Türkiye. Furthermore, the sampling method did not allow for the control of teachers' background knowledge and experiences regarding inclusive education. This limitation may have influenced the outcomes of the study.

The generalizability of the results is contingent on the accurate representation of demographics, such as gender. In the 2021-2022 academic year, the proportion of female teachers was 60.1%, while that of male teachers was 39.9% (Ministry of National Education, 2022b). In our study, male teacher representation remained low in voluntary participation.

Due to the study's scope, conducting the PD and mentoring programs in person was not feasible. Given the circumstances of the ongoing pandemic and the number of participants (117 for UDL Basic PD, 36 for mentoring), online group mentoring was deemed the most appropriate format. The advantages of online programs, as outlined in the relevant literature, also informed this decision. It is essential to consider environmental factors when generalizing the results.

A potential limitation of this study is the number of interviewees and the scope of their experiences with the mentoring program. In addition, the study only included public school teachers to maintain appropriate comparability. However, it is noteworthy that during the 2021-2022 academic year, 163,975 teachers were employed in private schools in Türkiye (Ministry of National Education, 2022b). Consequently, the exclusion of private school teachers and the relatively small sample size of interviewed mentees represent a limitation in our study, as their experiences might have provided a more nuanced and comprehensive understanding of the mentoring experiences.

## **5.9. Recommendations for Future Research**

This study examined the impact of an online and group-based mentoring program on the implementation of the UDL framework in classrooms. Future research could expand on this study by including a comparative analysis between different environments, such as online and in-person, and/or between different approaches, such as group and one-to-one. These studies could identify the most effective applications within the mentoring context.

This research has shed light on the potential effects of mentoring program components on teacher practices. Further research is recommended to investigate the underlying mechanisms within the mentoring program and the relationship between the components and their effects. Researchers are encouraged to use more advanced statistical techniques to reveal

the complex interactions between components disjunctively. This will potentially contribute to theoretical advancements and more targeted and effective interventions in the field.

One possible explanation for the lack of a significant difference between the mentored and non-mentored groups in terms of UDL fidelity scores is the time devoted to mentoring. Further studies could investigate the long-term impacts and optimal duration of mentoring practices within PD programs to maximize implementation fidelity.

One limitation of this study is that the quantitative data were based on teacher self-reports. Research in which UDL experts are trained in the first phase, followed by expert observations using the UDL Fidelity Tool, may contribute to a full understanding of PD effectiveness and robust reliability.

This study is limited to examining public school teachers to control for potential confounding variables. To facilitate the broader implementation of the findings, further research should combine public and private school teachers who work under different conditions.

Many factors and conditions may play a role in teachers' motivation to participate in professional development programs and their ability to apply what they learn in these programs. For instance, for group mentoring studies to be effective, it is essential to ensure alignment with participants' priorities (Johns & McNamara, 2014). Future studies could integrate qualitative methods such as narrative inquiry and case studies to conduct in-depth analyses that reveal how teachers articulate their journeys, challenges, and successes with PD programs and how these experiences influence their professional practice.

Only Turkish and primary school teachers were included in this study to make it content-focused and more effective for a specific group of teachers. Subsequent studies may employ a larger sample size and include multiple branches of teachers to gain a more comprehensive understanding of mentoring's effectiveness on diverse participants.

The mass migration of refugees to Türkiye has created critical challenges for refugee and local students in the education system (Yavuz & Mızrak, 2016; Akpınar, 2017; Pehlivan Yılmaz & Günel, 2022). In response, teachers have identified a need for further professional

development in inclusive education (Ünal & Aladağ, 2020; Polat, 2020). Future research could examine the potential of inclusive professional development interventions, such as Universal Design for Learning (UDL), to address the critical needs of diverse learning environments.

### **5.10. Conclusion**

The professional development of teachers is a complex process influenced by various factors, and sustainability in teacher learning presents challenges. Ongoing development strategies are necessary for lasting changes in teachers' knowledge and beliefs. Support practices like mentoring are vital for enhancing teachers' long-term performance, beliefs, knowledge, confidence, and curriculum implementation. Based on previous research findings, this study examined whether the mentoring program enhanced teachers' implementation of the Universal Design for Learning (UDL) framework. The results indicated that the two groups participating in the study were similar in their commitment to applying UDL in their teaching practices. Both groups valued UDL and perceived the same difficulty in implementing it.

However, the study proposed that mentoring could foster teachers' expectations for successful implementation of new pedagogical frameworks. In addition, the teachers' responses to the interviews indicated that mentoring helped them identify their areas of development, embrace a more learner-centered pedagogical approach, obtain practical knowledge and adopt a more positive perspective regarding the application of the UDL framework. Moreover, the mentored teachers reported that they had begun to implement strategies aligned with UDL guidelines. Further research is recommended to investigate the design and elements of mentoring programs and to develop and test theoretical frameworks to enhance effectiveness.



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## APPENDICES

### APPENDIX A. PROVINCIAL DIRECTORATE OF NATIONAL EDUCATION PROFESSIONAL DEVELOPMENT PROGRAM ANNOUNCEMENT



T.C.  
İSTANBUL VALİLİĞİ  
İl Millî Eğitim Müdürlüğü

Sayı : E-59090411-604.01.01-44315753  
Konu : Bir Harf Bin İstanbul Projesi

24.02.2022

#### DAĞITIM YERLERİNE

İlgi : Valilik Makamının 14.09.2021 tarih ve 31908212 sayılı onayı.

Bir Harf Bin İstanbul Projesi kapsamında, öğretmenlere farklı öğrenci ihtiyaçlarını belirleme ve yön verme açısından farklı yöntem ve tekniklerle yol gösterecek, farklılık gösteren öğrencilerin derse aktif katılımlarını sağlama ve yüksek hedeflere ulaşmaları konusunda dersi planlama, uygulama ve değerlendirme süreçlerinde hakimiyet kazandıracak, Öğrenmede Evrensel Tasarım (ÖET) Mesleki Gelişim Programı eğitimi düzenlenmesi planlanmaktadır.

Söz konusu eğitim 16 Mart - 19 Nisan 2022 tarihleri arasında çevrim içi olacak şekilde, 5 hafta olarak düzenlenecektir. Eğitime Bakanlığımıza bağlı resmi okulların kadrolu, sözleşmeli, ücretli Sınıf Öğretmeni ve Türkçe branşında olan öğretmenler aşağıda belirtilen link üzerinden başvuru yapabilecek olup, eğitim sonunda derslere katılım sağlayan öğretmenlere katılım sertifikası verilecektir. Tüm resmi ilkokul ve ortaokullara duyuru ve bilgilendirmenin yapılmasını rica ederim.

Yıldız ÇARDAK  
İl Millî Eğitim Müdürü a.  
Şube Müdürü

#### Başvuru Linki

[https://docs.google.com/forms/d/1eN3sEl6OSN-rpMct7FqNx0yunjwmtqcyog62pU0DH0/viewform?edit\\_requested=true](https://docs.google.com/forms/d/1eN3sEl6OSN-rpMct7FqNx0yunjwmtqcyog62pU0DH0/viewform?edit_requested=true)

İletişim: birharfbinistanbul@gmail.com  
oetmeslekigelisim@gmail.com

#### Dağıtım:

39 İlçe Millî Eğitim Müdürlüklerine

**Bu belge güvenli elektronik imza ile imzalanmıştır.**

Adres : Binbirdirek Mah. İmran Öktem Cad. No: 1 Sultanahmet Fatih İstanbul Belge Doğrulama : <https://www.nankiye.gov.tr/meb-ebys>  
Telefon : 0212 384 36 30 Bilgi İçin : Ayye Eda ATAN  
E-posta : sgb34@meb.gov.tr Uzman : Şef  
Kep Adresi : mebi@sofl.kep.tr İnternet Adresi : <http://istanbul.meb.gov.tr/>

Bu evrak güvenli elektronik imza ile imzalanmıştır. <https://evraksorgu.meb.gov.tr> adresinden **7bc2-5ea8-38d3-9341-786b** kodu ile teyit edilebilir.



## APPENDIX B. PROFESSIONAL DEVELOPMENT PROGRAM ANNOUNCEMENT POSTER



The poster features a white background with decorative elements including a grid of dots and diagonal stripes. On the left, the Istanbul Ministry of National Education logo is displayed. The main title is in bold black and yellow text. Below the title, the format is specified as 'Çevrim İçi Eğitim'. The date and time are listed as '16 Mart Salı Saat: 20.30', and the platform is 'Zoom Platformu'. On the right, a circular portrait of Yalın GÜÇKIRAN is shown, with his name and title 'Eğitim Uzmanı' below it. The 'BİR HARF BİN İSTANBUL' logo is positioned above the portrait.

 İSTANBUL  
İL MİLLÎ EĞİTİM MÜDÜRLÜĞÜ

**BİR HARF  
BİN İSTANBUL**

**Bir Harf Bin İstanbul**  
**“Öğrenmede Evrensel  
Tasarım Eğitimi”**

Çevrim İçi Eğitim

16 Mart Salı | Zoom  
Saat: 20.30 | Platformu

**Yalın GÜÇKIRAN**  
Eğitim Uzmanı

**APPENDIX C. DEMOGRAPHIC INFORMATION AND CONSENT FORM**

## Öğrenmede Evrensel Tasarım Mesleki Gelişim Programı Katılım Formu

Sayın Katılımcılar,

16 Mart 2022 - 19 Nisan 2022 tarihleri arasında gerçekleşecek Öğrenmede Evrensel Tasarım Mesleki Gelişim Programı'na katılmak için aşağıdaki formu doldurunuz. Katılımcılar formu dolduran sınıf ve Türkçe öğretmenleri arasından seçilecektir.

Sorularınız için [bu e-posta adresine](#) mail atabilirsiniz.  
İlginiz için teşekkürler.

Reşit Yalın Güçkiran

[Hesap değiştir](#)



Paylaşılmıyor

\* Zorunlu soruyu belirtir

Öğrenim Durumunuz \*

- Lisans
- Yüksek Lisans
- Doktora

Yaşınız \*

Yanıtınız

**Branşınız \***

- Sınıf Öğretmeni
- Türkçe Öğretmeni

**Görev Yaptığınız İlçe \***

Yanıtınız \_\_\_\_\_

**Görev Yaptığınız Okul \***

Yanıtınız \_\_\_\_\_

**Statünüz \***

- Ücretli
- Sözleşmeli
- Kadrolu

**Derse Girdiđiniz Sınıf Düzeyi \***

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- Birden fazla düzey bir arada

**Meslekteki Kıdem Yılınız \***

Yanıtınız \_\_\_\_\_

**Derse Girdiđiniz Sınıf Düzeyi \***

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- Birden fazla düzey bir arada

**Meslekteki Kıdem Yılıınız \***

Yanıtınız \_\_\_\_\_

Sınıfınızda kapsayıcı eğitim uygulamaları gerektiren öğrenci bulunuyor mu? \*

- Özel eğitim ihtiyacı olan çocuk
- Üstün yetenekli çocuk
- Kaza sonucu fizyolojik kısıtlılık yaşayan çocuk
- Mülteci aile çocuğu
- Göçmen aile çocuğu
- Uzak yerleşim merkezinde ikamet eden çocuk
- Mevsimlik tarım işçisi ailenin çocuğu
- Anadili haricinde başka bir dilin kullanıldığı ortamda bulunan çocuk
- Hayır, kapsayıcı eğitim uygulamaları gerektiren öğrenci bulunmuyor.
- Diğer: \_\_\_\_\_

Dana önce Öğrenmede Evrensel Tasarım, farklılaştırma ve kapsayıcı eğitim ile ilgili bir mesleki gelişim programına katıldınız mı? Katıldıysanız programın adını, kapsamını, tarihini ve süresini belirtiniz. Katılmadıysanız "katılmadım" yazınız. \*

Yanıtınız \_\_\_\_\_



Öğretmenlerin, Öğrenmede Evrensel Tasarım (ÖET) planlama çerçevesi ile uygulamaya yönelik yeterliklerini geliştirmek için oluşturulan Mesleki Gelişim Programı'nın etkisini incelemek amacıyla yapılan bu çalışmada görüşme ve ölçekler yoluyla katılımcılardan veri toplanacaktır. Araştırmacı Reşit Yalın Güçkırın ve Prof. Dr. Ayşe Münire Erden dışında hiç kimseyle paylaşılmayacak ve hiçbir yerde yayınlanmayacak bu verilerin toplanmasını onaylıyor musunuz? \*

- Evet
- Hayır

Bu eğitime katılma motivasyonunuzu belirtiniz. \*

Yanıtınız

Sizinle iletişim kurabileceğimiz e-posta adresinizi yazınız. \*

Yanıtınız

Gönder

Sayfa 1 / 1

Formu temizle

## APPENDIX D. TURKISH FORM OF THE UDL IMPLEMENTATION FIDELITY TOOL

### Öğrenmede Evrensel Tasarım Uygulama Bağlılığı Aracı (ÖET-UBA)

Öğretmen:	Birlikte çalışılan kişi:	Okul:
Dersin konusu:	Dersin başladığı tarih:	Dersin işlendiği gün sayısı:

#### Yönergeler:

Soruları okuyun, uygun cevapları işaretleyin ve gerekiyorsa açıklama ekleyin. **Yalnızca bu ders sırasında bilinçli ve planlı olarak kullanılan ve öğrencilerin kullanımına sunulan göstergeleri işaretleyin.**

Not: Bir öğretim ünitesi, ünitenin yapı taşları olan birkaç dersten oluşabilir. Bir ders, çeşitli öğrenme etkinlikleri ve öğrenme deneyimleri dahil olmak üzere çeşitli bölümlere sahip olabilir. Örneğin, dil sanatlarında şiir üzerine bir ünite, birkaç güne yayılan ve birkaç farklı bileşen içeren mecazi dil üzerine bir ders içerebilir. Benzer şekilde, matematikte kesirler üzerine bir ünite, birden fazla güne yayılan ve birkaç farklı bileşeni olan kesirlerde toplama üzerine bir ders içerebilir. Her dersin bir girişi, çeşitli öğrenme etkinlikleri, öğrenme deneyimleri ve ders hedeflerinin bir değerlendirmesi (formal veya informal) olması muhtemeldir. Bu aracı kullanırken, lütfen **bütün bu dersleri** göz önünde bulundurun.

#### Ders Hakkında Genel Bilgilendirme:

\*Ders planını ekleyin.

Ölçülebilir öğrenme amacı/hedefi

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Öğrenme amacı/hedefi için planlanan değerlendirmeler

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## Bilginin Öğrencilere Aktarılmasında Kullanılan Çoklu Yöntemler

### 1. Bilginin algılanma süreci, bu ders sırasında nasıl desteklendi?

Geçerli maddeleri işaretleyin ve eğer gerekliyse açıklama yapmak için kenardaki boşlukları kullanın.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• 1. sözlü (ör. konu anlatımı/sözlü anlatım)</li> <li>• 2. basılı çıktı (ör. metin, çalışma notları)</li> <li>• 3. dijital sunu (ör. powerpoint)</li> <li>• 4. grafik görseller/animasyon</li> <li>• 5. video ya da video kesiti</li> <li>• 6. gösteri tekniği (demonstrasyon) /üç boyutlu sunum (ör. model)</li> <li>• 7. şemalar/grafikler/çizelgeler</li> <li>• 8. Metinden (yazıdan) sese ya da sestenden metne (yazyıya) dönüştürme araçları</li> </ul> | <ul style="list-style-type: none"> <li>• 9. video alt yazısı/transkripsiyon (videonun yazılı dökümü)</li> <li>• 10. dijital metin</li> <li>• 11. sesli metin</li> <li>• 12. Bilginin sunumu -bilinçli olarak- her bir öğrenci tarafından özelleştirilebilir niteliktedir.</li> <li>• Diğer (lütfen açıklayın):</li> </ul> <hr/> <hr/> |
|---|---|

### 2. Bilginin anlaşılması adına, bu ders sırasında öğrencilere nasıl bir destek sunuldu?

Geçerli maddeleri işaretleyin ve eğer gerekliyse açıklama yapmak için kenardaki boşlukları kullanın.

- 1. Öğrenciler bilgiyi sunulduğu şekliyle anlamak için kendi hâllerine bırakıldılar, amaçlı ve planlı olarak desteklenmediler.
  - 2. Bilgi, öğrencilerin ana dilinde sunuldu.
  - 3. Metnin/okuma parçasının yapısı açıklandı.
  - 4. Kullanılan kelimeler/semboller önceden öğretildi.
  - 5. Şemalar/grafikler/çizelgeler açıklandı.
  - 6. Kullanılan kelimeler/ıfadelerle ilgili gerekli açıklamalar dokümanın içinde sunulmuştur .(ör. metnin içinde sunulan kelimelere yerleştirilmiş bağlantı adresleri, açıklama, çeviri).
  - 7. Sözcük grubu/cümle yapısı ile ilgili gerekli açıklamalar dokümanın içinde sunulmuştur (ör. metnin içinde sunulan kelimelere yerleştirilmiş bağlantı adresleri, dipnotlar).
  - 8. Öğrencinin metni okumasına/deşifre etmesine, metni sese dönüştüren bir yazılım aracılığıyla destek verildi.
  - 9. Öğrencinin metni okumasına/deşifre etmesine, dijital metin kullanarak veya sesli metin aracılığıyla destek verildi.
  - 10. Öğrencilerin bilgiyi anlamasına yönelik sunulan destek, öğretmen tarafından bilinçli olarak her bir öğrenci için erişilebilir ve düzenlenebilir şekilde sunulmuştur.
  - Diğer (lütfen açıklayın):
-

### 3. Bilginin kavranması adına, bu ders sırasında öğrencilere nasıl bir destek sunuldu?

Geçerli maddeleri işaretleyin ve eğer gerekiyorsa açıklama yapmak için kenardaki boşlukları kullanın.

- 1. Öğrenciler bilgiyi sunulduğu şekliyle kavramak için kendi hallerine bırakıldılar, amaçlı ve planlı olarak desteklenmediler.
- 2. Öğrencilerde var olan ön bilgi etkinleştirildi. / Öğrenciler gerekli ön bilgi ile donatıldı.
- 3. Anahtar terim ve tanımların listesi paylaşıldı.
- 4. Ön koşul beceriler gözden geçirildi/kavramlar önceden öğretildi.
- 5. Bilgi küçük kümeler halinde gruplandı ve ilerledikçe kademeli olarak paylaşıldı.
- 6. Örüntüler/ilişkiler/bağlantılar vurgulandı.
- 7. Kritik özellikler/büyük fikirler vurgulandı.
- 8. Süreçteki basamaklar için yönergeler veya ipuçları verildi.
- 9. Öğrencilere kontrol listeleri, grafik düzenleyiciler, kavram haritaları sunuldu ve öğrenciler bu araçlarla desteklendi.
- 10. Öğrencilere, bilgiyi kavramada yardımcı olacak stratejiler öğretildi/pekiştirildi.
- 11. Öğrencilerin bilgiyi kavramasına yönelik sunulan destek, öğretmen tarafından bilinçli olarak her bir öğrenci için erişilebilir ve düzenlenebilir şekilde sunulmuştur.
- Diğer (lütfen açıklayın): \_\_\_\_\_

## Öğrencinin Bilgiyle Etkileşimde Bulunması ve Bilgiyi İfade Etmesinde Kullanılan Çoklu Yöntemler

### 4. Öğrenciler, bu ders sırasında *bilgiyle nasıl bir etkileşim* içinde bulundular?

Geçerli maddeleri işaretleyin ve eğer gerekiyorsa açıklama yapmak için kenardaki boşlukları kullanın.

- 1. Bütün öğrenciler aynı öğrenme deneyimlerini/etkinliklerini aynı yöntemle tamamladılar.
- 2. Öğrencilerin bağımsız, eşli, küçük gruplar hâlinde çalışabilme seçenekleri bulunuyordu.
- 3. Öğrenme deneyimleri/etkinlikleri için çeşitli araçlar öğretmen tarafından önceden hazırlandı. (ör. yazılım, manipülatifler, multimedya seçenekleri).
- 4. Öğrencilerin, çeşitli öğrenme deneyimi/etkinlik seçenekleri vardı.
- 5. Öğrenme deneyimi/etkinlik seçenekleri öğrencilerin güçlü yönleriyle, ilgi alanlarıyla ve tercihleriyle uyumluydu.
- 6. Öğrenme deneyimlerinde/etkinliklerinde; öğrencilerin özgün, yaratıcı ve yenilikçi bir yaklaşım sergilemeleri sağlandı ve öğrenciler bu yönde teşvik edildi.
- Diğer (lütfen açıklayın): \_\_\_\_\_

### 5. Öğrenciler, bu ders sırasında *bilgilerini/bilgiye hâkimiyetlerini nasıl ifade ettiler/gösterdiler?*

Geçerli maddeleri işaretleyin ve eğer gerekiyse açıklama yapmak için kenardaki boşlukları kullanın.

- 1. Bütün öğrenciler değerlendirmeleri aynı yolla yanıtladılar/tamamladılar.
- 2. Yanıt vermeyi gerektiren etkinlik ve değerlendirmeler için çeşitli araçlar mevcuttu. (ör. yazılım, manipülatifler, multimedya seçenekleri, modeller).
- 3. Öğrencilerin, yanıt vermeyi gerektiren etkinlik ve değerlendirmeler için birden fazla seçeneği vardı.
- 4. Öğrencilere, yanıt verme ve değerlendirme için sağlanan seçenekler öğrencilerin güçlü yönleriyle, ilgi alanlarıyla ve tercihleriyle uyumluydu.
- 5. Yanıt vermeyi gerektiren etkinlik/değerlendirmelerde; öğrencilerin özgün, yaratıcı ve yenilikçi bir yaklaşım sergilemeleri sağlandı ve öğrenciler bu yönde teşvik edildi.
- Diğer (lütfen açıklayın):

### 6. Öğrencilerin "*yürütücü işlevleri*"ni yönetmeleri adına bu ders sırasında onlara nasıl bir destek sunuldu?

Geçerli maddeleri işaretleyin ve eğer gerekiyse açıklama yapmak için kenar boşlukları kullanın.

- 1. Öğrenciler, yürütücü işlevlerini yönetmek için kendi hallerine bırakıldılar, amaçlı ve planlı olarak desteklenmediler.
- 2. Öğrenciler bu ders boyunca zaman yönetimi konusunda desteklendiler (ör. zamanlayıcı ve anımsatıcı kullanımı).
- 3. Öğrenciler bu ders boyunca çalışma alanlarını yönetme ve materyallerini kullanma konusunda desteklendiler (ör. verilen modeller).
- 4. Öğrenciler bu ders boyunca bilgiyi yönetme ve kaynaklardan yararlanma konusunda desteklendiler (ör. verilen modeller).
- 5. Öğrenciler bu ders boyunca dikkatlerini sürdürmek için stratejiler seçme, geliştirme ve kullanma konusunda desteklendiler (ör. içsel -kendinle- konuşma, kendini güçlendirme -öz pekiştirme- gibi stratejiler).
- 6. Öğrenciler bu ders için kişisel hedefler belirleme konusunda desteklendiler.
- 7. Öğrenciler bu ders için kişisel öğrenme hedeflerine nasıl ulaşacaklarını planlama konusunda desteklendiler.
- 8. Öğrenciler, kişisel öğrenme hedeflerine yönelik ilerlemelerini takip etme konusunda desteklendiler.
- 9. Yürütücü işlevlerini yönetmek için öğrencilerin kişiselleştirilmiş planlar geliştirmeleri sağlandı ve öğrenciler bu yönde teşvik edildi.
- Diğer (lütfen açıklayın):

## Öğrencinin Öğrenme Sürecine Katılımını Sağlamada Kullanılan Çoklu Yöntemler

### 7. Öğrencilerin *ilgisini çekmek ve ilgilerini canlı tutmak için bu ders sırasında onlara nasıl bir destek sunuldu?*

Geçerli maddeleri işaretleyin ve eğer gerekliyse açıklama yapmak için kenardaki boşlukları kullanın.

- 1. Öğrencilerin öğrenme etkinliklerine ve öğrenme deneyimlerine olan ilgileri planlı olmaktan çok gelişigüzel.
- 2. Öğrenme hedefinin bu ders ile olan ilişkisi, önemi ve değeri vurgulandı.
- 3. Her öğrencinin bu dersin öğrenme hedefini değerli ve alakalı bulması sağlandı.
- 4. Yeni konu ile öğrencilerin mevcut ilgi alanları arasında bağ kuruldu.
- 5. Öğrencilere, öğrenme hedeflerine hangi yöntemlerle ulaşacakları konusunda farklı seçim yolları sunuldu.
- 6. Öğrenme etkinlikleri/deneyimleri ile ilgili sunulan seçenekler, öğrencilerin güçlü yönleriyle, ilgi alanlarıyla ve tercihleriyle uyumluydu.
- Diğer (lütfen açıklayın):

### 8. Öğrencilerin *çaba göstermeleri/sebat etmeleri (kararlılıkları) bu ders sırasında nasıl desteklendi?*

Geçerli maddeleri işaretleyin ve eğer gerekliyse açıklama yapmak için kenardaki boşlukları kullanın.

- 1. Öğrencilerin çabası/sebatı (kararlılıkları) amaçlı ve planlı olarak desteklenmedi.
- 2. Öğrenme hedefinin önemi vurgulandı.
- 3. Geri bildirim sık, zamanında, detaylı ve bilgilendiriciydi.
- 4. Bu ders için verilen geri bildirimde, öğrencilerin elde ettikleri başarı ya da başarısızlıkların kendi kontrollerinde olan durumlardan kaynaklandığı vurgulandı.
- 5. Geri bildirim; öğrencilerin önceden bilmeyip yeni öğrendikleri konulara ulaşmalarında, nereden nereye geldiklerine dair bilgilendiriciydi.
- 6. Geri bildirim, öğrencilerin başarılı olduğu noktalarda bugüne kadar göstermiş oldukları çabanın/sebatın (kararlılığın) katkısına dikkat çekti.
- 7. Geri bildirim, not ve puandan ziyade çabayı/ilerlemeyi vurguladı.
- 8. Geri bildirim; öğrencinin güçlü yönlerine, ilgi alanlarına ve tercihlerine yönelikti.
- 9. Etkinliklerin zorluk seviyesi ve sunulan desteğin düzeyi, öğrencinin bireysel başarısını ve çaba gösterme isteğini artırmaya yönelikti.
- Diğer (lütfen açıklayın):

### 9. Öğrencinin öz düzenleme becerileri, bu ders sırasında nasıl desteklendi?

Geçerli maddeleri işaretleyin ve eğer gerekiyse açıklama yapmak için kenardaki boşlukları kullanın.

- 1. Öğrenciler, motivasyon kazanmaları ve/veya duygularını ve davranışlarını düzenlemeleri konusunda kendi hâllerine bırakıldılar, planlı ve amaçlı olarak desteklenmediler.
- 2. Öğrenciler içsel/dışsal motivasyon belirleme/kazanma konusunda desteklendiler.
- 3. Öğrenciler duygularını/davranışlarını düzenleme konusunda desteklendiler.
- 4. Öğrenciler farklı ortamlarda motivasyonlarını/duygularını/davranışlarını yönetme konusunda desteklendiler.
- 5. Her bir öğrenci, kişisel öz düzenleme hedeflerini belirleme konusunda desteklendiler.
- 6. Öğrenciler, öz düzenleme stratejilerini seçme ve kullanma konusunda desteklendiler.
- 7. Öğrenciler, öz düzenlemeye dair gelişimlerini kendi başlarına takip etme konusunda desteklendiler.
- 8. Öğrenciler, öz düzenlemeye dair kaydettikleri ilerleme konusunda derinlemesine düşünmeleri (yansıtma yapmaları) doğrultusunda desteklendiler.
- Diğer (lütfen açıklayın):



**APPENDIX E. TURKISH FORM OF THE UDL IMPLEMENTATION FIDELITY SCORING TOOL**

**Öğrenmede Evrensel Tasarım  
Uygulama Bağlılığı Puanlama Aracı  
(UDL-UBPA)**

	0 ÖET Değil	1 ÖET ve Yakın	2 Kapsamlı ÖET	Puan	
<b>Sunum</b>	1.	Yalnızca 1, 2 ve/veya 3 numaralı maddeler işaretlenirse 0 puan verin.	4-11 arası maddeler işaretlenir ancak 12. madde işaretlenmezse 1 puan verin.	4-11 arası maddeler işaretlenir ve 12. madde işaretlenirse, 2 puan verin.	
	2.	1. madde işaretlenirse, 0 puan verin.	2-9 arası maddeler işaretlenir ancak 10. madde işaretlenmezse 1 puan verin.	2-9 arası maddeler işaretlenir ve 10. madde işaretlenirse 2 puan verin.	
	3.	1. madde işaretlenirse, 0 puan verin.	2-10 arası maddeler işaretlenir ancak 11. madde işaretlenmezse 1 puan verin.	2-10 arası maddeler işaretlenir ve 11. madde işaretlenirse 2 puan verin.	
	<b>Çoklu Sunum Yöntemleri için Toplam Puan</b>				___ / 6
<b>Eylem ve İfade</b>	4.	1. madde işaretlenirse, 0 puan verin.	2-4 arasındaki maddeler işaretlenir, ancak 5 ve/veya 6. maddeler işaretlenmezse, 1 puan verin.	2-4 arası maddeler işaretlenir ve 5. ve/veya 6. maddeler işaretlenirse, 2 puan verin.	
	5.	1. madde işaretlenirse, 0 puan verin.	2. ve/veya 3. maddeler işaretlenir ancak 4. ve/veya 5. maddeler işaretlenmezse, 1 puan verin.	2. ve/veya 3. maddeler işaretlenir ve 4. ve/veya 5. maddeler işaretlenirse, 2 puan verin.	
	6.	1. madde işaretlenirse, 0 puan verin.	2-8 arası maddeler işaretlenir ancak 9. madde işaretlenmezse 1 puan verin.	2-8 arası maddeler işaretlenir ve 9. madde işaretlenirse 2. puan alınır.	
	<b>Çoklu Eylem ve İfade Yöntemleri için Toplam Puan</b>				___ / 6
<b>Katılım</b>	7.	1. madde işaretlenirse, 0 puan verin.	2-5 arası maddeler işaretlenir ancak 6. madde işaretlenmezse 1 puan verin.	2-5 arası maddeler işaretlenir ve 6. madde işaretlenirse, 2 puan verin.	
	8.	1. madde işaretlenirse, 0 puan verin.	2-7 arası maddeler işaretlenir ancak 8. ve/veya 9. maddeler işaretlenmezse, 1 puan verin.	2-7 arası maddeler işaretlenir ve 8. ve/veya 9. maddeler işaretlenirse 2 puan verin.	
	9.	1. madde işaretlenirse, 0 puan verin.	2-8 arasındaki maddeler işaretlenir, ancak 5-8 arasındaki TÜM maddeler işaretlenmezse, 1 puan verin.	5-8 arasındaki TÜM maddeler işaretlenirse, 2 puan verin.	
	<b>Çoklu Katılım Yöntemleri için Toplam Puan</b>				___ / 6
Bir dersin kapsamlı bir UDL dersi sayılması için en az 7 yönergenin 2 olarak puanlanmış olması gerekmektedir.				Toplam: ___/18 ___%	

Johnson, Kimberly M. (2020). Universal Design for Learning – Implementation Fidelity Tool. Copyright (2021) by Kimberly M Johnson. Used with permission.



## APPENDIX F. INTERVIEW QUESTIONS

### ÖĞRETMEN GÖRÜŞME FORMU

Bu görüşmenin amacı Öğrenmede Evrensel Tasarım (ÖET) çerçevesine yönelik mesleki gelişim eğitimi ve mentorluk deneyiminizle ilgili görüşlerinizi belirlemeye yöneliktir. Sorulara verdiğiniz cevaplar gizli tutulacak ve kişisel bilgileriniz transkripsiyon ve raporlama sürecinde anonim olarak ele alınacaktır. İçtenlikle verdiğiniz yanıtlar için şimdiden teşekkür ederim.

1. ÖET eğitiminden önce ders planlama sürecinizde bireysel farklılıklara nasıl hitap ettiğinizden bahseder misiniz?

Destekleyici Soru: Örneğin bireysel farklılıkları dikkate almak için hangi uygulamaları yaptınız? Aklınıza gelen örnekleri benimle paylaşır mısınız?

- Hazırbulunmuşluk
- İlgi
- Öğrenme stilleri

2. ÖET eğitiminin bireysel farklılıklara yönelik planlama konusunda genel farkındalığınıza yönelik nasıl bir etkisi olduğunu düşünüyorsunuz?

3. ÖET eğitiminde öğrendiklerinizi uygulamaya nasıl yansıttınız? Öğrendiklerinizi planlama yaparken kullanabildiniz mi?

Neler kullandınız örnekler verebilir misiniz?

4. Mentorluk uygulamalarında öz değerlendirme yapmanız, ipuçları içeren videolar izlemeniz, senaryoları cevaplandırmanız, geri bildirim almanız, mentorun rehberliği ÖET'yi uygulama noktasında size ne derece yarar sağladı?

Böyle bir destek olmasa uygulamalarınız nasıl olur? Nereelerde zorlanırdınız?

5. Mentorluk modelinin hangi bileşenleri sizin için öğrenme sürecinizde daha faydalı oldu?

6. Mentorluk sürecinde ÖET eğitiminde öğrenmediğiniz farklı bilgiler edindiniz mi?

7. Mentorluk uygulamalarında öğrendiklerinizden yola çıkarak ders planlarınızda hangi değişiklikler yaptınız?

## APPENDIX G. SELF-ASSESSMENT AND GOAL-SETTING FORM

### Yönerge

Değerli Öğretmenler,

Bir önceki eğitimde detaylarıyla incelediğimiz [ÖET Kılavuzlarını](#) dikkate alarak aşağıda yer alan öz değerlendirme sorularını cevaplayalım.

Verilen örnek hedeflerden yola çıkarak mentorluk programı için 3 öğretimsel hedef belirleyelim.

### Öz Değerlendirme

1) Yaptığınız ders tasarımlarını, öğrenmenin önündeki engelleri en aza indirmede veya ortadan kaldırmada ne kadar etkili görüyorsunuz?

2) Derslerinizde bilgiye erişimi ve bilginin anlaşılmasını ([1.ilke](#)) nasıl destekliyorsunuz? Geliştirmeniz gereken yönler nelerdir?

3) Derslerinizde öğrencinin bilgiyle etkileşime geçmesini ve bilgiyi ifade etmesini ([2.ilke](#)) nasıl destekliyorsunuz? Geliştirmeniz gereken yönler nelerdir?

4) Derslerinizde öğrencinin öğrenme sürecine katılımını ([3.ilke](#)) nasıl destekliyorsunuz? Geliştirmeniz gereken yönler nelerdir?

### Hedef Belirleme

4 hafta sürecek mentorluk uygulamaları için kendinize üç kısa vadeli öğretimsel hedef belirleyin. *Hedeflerinizi belirlerken şu soru sizi yönlendirebilir: [ÖET kılavuzlarını](#) dikkate alarak neyi daha farklı yapmak isterdim?*

**Aşağıdaki verilen örnek hedeflerden yararlanabilirsiniz:**

Bu 4 hafta içerisinde;

- Derslerimde en az bir teknolojik araç daha kullanmaya başlayacağım.
- Mentorluk programındaki tartışmalardan esinlenerek meslektaşlarımdan en iyi uygulamalarından örnekleri derslerime katacağım.
- ÖET üzerine çalışan başka bir meslektaşım ile ders planı geliştirmekte işbirliği yapacağım.
- Derslerimde eğitsel oyunlara/oyunlaştırmaya daha fazla yer vereceğim.
- Sınıfımda öğrenmeyi optimize edecek fiziksel düzenlemeler yapacağım.
- Öğrencilerimin işbirliği yoluyla öğrenmeleri için daha fazla fırsat sağlayacağım.
- Çabayı öven, teşvik eden öğrenciye özgü ve detaylı geri bildirimler vereceğim.
- Geri bildirim verirken değerlendirme anahtarlarından yararlanacağım.
- Kapsayıcı öğretim ile ilgili bilgi dağarcığımı genişletmek amacıyla kitap/podcast/videolardan yararlanacağım.
- Pozitif davranışları destekleyen sınıf yönetimi araçları kullanacağım.
- Derslerimde öğrencilere mümkün oldukça hareket olanağı veren etkinlikler sunacağım.
- Öğrencilere etkinliklerde ilgilerine/zorluk düzeylerine göre daha fazla seçenek sunacağım ve seçim hakkı vereceğim.
- Derslerimle ilgili düzenli günlük tutacağım/yansıtma yapacağım.
- Öğrencilerime daha fazla öz değerlendirme/yansıtma imkanı sunacağım.
- Her yeni konunun başında öncelikle ön bilgileri ölçeceğim ve hatırlatma çalışmaları yapacağım.

### Hedeflerim

1. Hedefim

.....  
 .....

2. Hedefim

.....  
 .....

3. Hedefim

.....  
 .....

## APPENDIX H. SCENARIOS

### Yönerge

Değerli Öğretmenler,

- İlk senaryomuzda Çoklu Yöntemler Kullanarak Öğrencilere Bilgiyi Sunmak ilkesi üzerine çalışacağız.
- Tartışma iki adımdan oluşuyor:
  - Aşağıdaki senaryoyu okuyalım. Birinci ilkede yer alan kılavuzları dikkate alarak tablodaki sorulara **yanıt verelim**.
  - Ardından Tuğba öğretmene meslektaşlarımız tarafından verilen önerileri okuyalım. En az bir meslektaşımıza **yorum yapalım**.
  - Yorum yaparken bu [dokümandaki](#) suflerden yararlanabilirsiniz.
- Ben de her bir öğretmene mentorluk odaklı geri bildirim veriyor olacağım.
- Soruları cevaplarken iki kaynaktan yararlanabilirsiniz:
  - Tanıma Ağları Nedenli Zorlanılan Alanlar
  - [Kılavuzlar: Çoklu Yöntemler Kullanarak Öğrencilere Bilgiyi Sunmak](#)

Kolaylıklar!

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### Senaryo 1

Beşinci sınıf öğrencisi olan Aslı, güçlü **matematik** becerilerine sahiptir ancak **okuma becerisinde zorlanmaktadır**.

Şu anda **üçüncü sınıf düzeyinde** okumakta ve hala doğru **sözdizimi<sup>1</sup>** ile **basit cümleler yazmakta gelişme** aşamasındadır.

Özellikle **kelime dağarcığı, sözdizimsel anlatım, mecazi ve soyut dil kavramlarını anlama** konusunda yaş seviyesinin önemli ölçüde altında puan almaktadır.

Aslı aynı zamanda hevesli bir **futbolcu, müziğin her türüsünü seven ve okul orkestrasında flüt çalan** bir öğrencidir.

Tuğba öğretmenin odak noktası Aslı'nın **kelime dağarcığını, dil anlama becerilerini ve yaşına uygun sözdizimini** kullanmasını geliştirmektir.



## Yönerge

Değerli Öğretmenler,

Aşağıdaki senaryoyu okuyalım. ÖET birinci ve ikinci ilke kılavuzlarını dikkate alarak aşağıdaki sorulara yanıt verelim.

### Kaynak Doküman

[Tanıma Ağları Nedenli Zorlanılan Alanlar](#)

[Stratejik Ağlar Nedenli Zorlanılan Alanlar](#)

1. İlke Kılavuzlar: [Çoklu Yöntemler Kullanarak Öğrencilere Bilgiyi Sunmak](#)

2. İlke Kılavuzlar: [Çoklu Yöntemler Kullanarak Öğrencilere Eylem ve İfade Olanakları Vermek](#)

## Senaryo 2

Bir ortaokul fen bilimleri öğretmeni, ekosistemler ünitesinde bir ders gerçekleştiriyor. Ünitenin hedefi öğrencilerin ekosistemler konusunda bildiklerini yazılı olarak açıklayabilmeleri.

Öğrencilerden ders kitabından bir bölümü okumaları ve bölümün sonundaki soruların cevaplarını yazmalarını istiyor.

Öğrencilerinden Ali'nin ciddi motor/hareket engelleri bulunuyor (serebral palsi), Nevin ve Kübra üstün zekalı ve yetenekli programında yer alıyor, Lina'nın ana dili İngilizce, Neslihan'ın ise okuma güçlüğü bulunuyor.



## Yönerge

Değerli Öğretmenler,

Videoyu izledikten sonra aşağıdaki senaryoyu okuyalım. ÖET üçüncü ilke kılavuzlarını dikkate alarak sorulara yanıt verelim.

### Kaynak Doküman

[Duyuşsal Ağlar Nedenli Zorlanılan Alanlar](#)

[3. İlke Kılavuzlar: Çoklu Yöntemler Kullanarak Öğrencinin Öğrenme Sürecine Katılımını Sağlamak](#)

### Senaryo 3

Ezgi öğretmen yeni atandığı sınıfta öğrencilerini duyuşsal açıdan desteklemek ve bu sayede öğrenme başarılarını artırmak.

Bunun için bir ay boyunca dikkatli bir şekilde gözlem yapıyor. Gözlemleri sonucunda sınıfta:

- hem kendine fazla güvenen hem başarılı olamayacağını düşünen,
- hem tek başına çalışmakta zorlanan hem grup çalışmalarına uyum sağlayamayan,
- hem kaygılı, içe kapanık hem de yaramazlığa meyilli,
- hem düzenli ve dikkatini ders boyunca sürdürebilen hem de ilgilerini sürdürmekte
- zorlanan ve çalışmalara ilgisiz öğrencileri bulunduğunu görüyor.

Bu kadar çeşitlilikle karşılaşınca ise kendini çaresiz hissediyor.

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