Öğretmen Adaylarının Kapsayıcı Uygulamalarını Artırmak için Konuya Özel Mentörlük: Olanaklar Açısından Bakış

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Öz

Bu araştırma, öğretmen adayları tarafından konuya özel mentörlük yaklaşımıyla geliştirilen bir dizi gözlem, görüşme, mentör günlükleri ve materyal analizine dayanan bir vaka çalışmasıdır. Bu kapsamda, özel eğitim öğretim üyeleri ile bilişim teknolojileri öğretmen adaylarını bir araya getirerek konuya özgü mentörlük incelenmiştir. Bilişim teknolojileri öğretmen adaylarının teknolojiyi kapsayıcı eğitimle ilgili pedagojik uygulamalara entegre etmelerine rehberlik etmek amacıyla, 8 özel eğitim öğretim üyesine (üç kadın, beş erkek) mentörlük rolü verilmiştir. Toplamda 42 bilişim teknolojileri öğretmen adayına (24 kadın, 18 erkek) menti rolü verilmiş; ayrıca öğretim tasarımcısı olma işlevini de üstlenmişlerdir. Çalışma, özellikle katılımcıların bu özel mentörlük çalışmasının olanaklarına ilişkin anlayışlarını keşfetmeyi amaçlamıştır. Mentörlük programının olanakları açısından çalışmanın bulguları; "aracı unsurlar", "sosyal destek", "yapılandırılmış süreç" ve "konuya özel odaklanma" olmak üzere ortaya çıkan dört tema etrafında kümelenmiştir. Bu çalışma, konuya özel mentörlüğün, öğretmen adaylarının kapsayıcı eğitim uygulamalarıyla ilgili becerilerini yapılandırma ve nihayetinde özel eğitimde öğretimsel karar vermeyi uygulama konusunda mesleki gelişimlerini artırmanın bir yolu olduğunu göstermektedir.

Anahtar Kelimeler

Kapsayıcı Eğitim, Öğretmen Adayları, Konuya Özel Mentörlük, Öğrenmede Evrensel Tasarım

Atıf Bilgisi

Subject-Specific Mentoring for Increasing Preservice Teachers' Inclusive Practices: A Lens of Affordances

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Abstract

This research focuses on a case study based on a series of observations, interviews, diaries of mentors and material analysis that were developed by preservice teachers guided by a subject-specific mentoring approach. In this study, subject-specific mentoring brought together special education (SE) faculty members and preservice Instructional Technology (IT) teachers. To guide the preservice IT teachers' integration of technology into pedagogical practices related to inclusive education, eight Special Education faculty members (three female, five male) were assigned mentor roles. In total, 42 preservice IT teachers (24 female, 18 male) were assigned mentee roles; additionally, they undertook the function of being instructional designers. The study aimed to explore how participants perceived the affordances of this specific mentoring study. Affordances of the study's mentoring program clustered around four emerging themes; namely "mediating elements," "social support," "structured process," and "subject-specific focus." The study points toward subject-specific mentoring as a way of enhancing knowledge construction of preservice teachers to conduct instructional decision-making in SE.

Keywords

Inclusive Education, Preservice Teachers, Subject-Specific Mentoring, Universal Design for Learning

Citation

Introduction

Teacher education programs have recognized the necessity of including fundamental components that foster the professional development of students, preparing them for proficiency in handling complex teaching methods (Zeichner, 2010). This approach aligns with existing literature focused on offering strategies to cater to the needs of diverse student populations. Since teacher education programs provide teacher candidates with a series of theoretical education courses related to their specific field, this can sometimes lead to a significant difference or gap between the knowledge gained through university coursework and their practical experiences in the field (Dani et al., 2019). One of the reasons put forward for this divide relates to the limited courses included in teacher training programs, which are deemed insufficient in inclusive teaching practices (Metsala & Harkins, 2019).

Inclusion is the focus of educating individuals with special needs alongside their typical peers within general education, but without overlooking their individual needs (Nilholm & Göransson, 2017). With consideration to the increased number of inclusive students in the general setting, all teacher programs should include curriculum that promotes inclusive instructional methods. Teacher candidates need to be trained in promoting their professional development to serve students equitably whilst being responsive and sensitive to diverse learners (Benton-Borghi, 2013). Moreover, the influx of improvements seen in Information and Communication Technology (ICT) has added numerous opportunities and as well as additional responsibilities for both preservice and inservice teachers according to research studies on the need for effective technology integration in learning (Bella, 2016; Bower, 2017; Conole & Dyke, 2004; Twyman & Tindal, 2006; Xiangming & Song, 2018).

Taken together, the exponential growth of ICT and the growing integration of students with special requirements into mainstream education necessitates increased focus on teacher training programs, since the effectiveness of inclusion education is dependent upon well-prepared teachers (Marino et al., 2009). Teacher education programs play a significant role in the preparation of teachers in how to teach diverse students and how to support their learning.

Universal Design for Learning (UDL) is a framework was created by The Center for Applied Special Technology (CAST, 1998) that ensures that not only individuals with special needs but also students from different backgrounds and cultures can benefit from inclusive education services in meaningful level by offering various avenues to access the curriculum, reducing possible hindrances to learning, and enhancing learning possibilities for each student (Kamalı-Arslantaş, 2021). As suggested in the literature, preparing teachers with the necessary skills to educate diverse students is achievable when trained

according to the UDL approach (Scott et al., 2019; Spooner et al., 2007; Vitelli, 2015). By implementing UDL in ICT, teachers are better equipped to support students with disabilities (Coyne et al., 2017; McMahon et al., 2016; Tornero & Kan, 2017).

Teacher education programs still do not always equip preservice teachers with the necessary skills to successfully adopt and utilize technology for inclusive education practices (Marino et al., 2009; Russell et al., 2007; Vitelli, 2015). There have been insufficient studies published that have researched technology usage for students with special needs, accentuating that digital technology usage is still inadequate in this area (Subaşıoğlu & Atayurt Fenge, 2019). Concerning the inequalities, teachers should embrace technology and possess the relevant skills to be able to provide alternative content representation forms that include technology adoption. This transition sets the stage for a comprehensive exploration of how mentoring within preservice teacher education can contribute to bridging this gap and enhancing the professional development of future educators.

Literature Review on Mentoring

The practice of mentoring has gained extensive usage in the context of educating preservice teachers, which offers crucial benefits for the professional and personal growth of preservice teachers (Ambrosetti & Dekkers, 2010; Arslan, 2013; Awaya et al., 2003; Kamalı-Arslantaş & Kocaöz, 2021; Le Cornu & Ewing, 2008; Mena et al., 2017), especially in their learning how to teach (Ambrosetti, 2014; Wang, 2002). In the context of preservice teacher education, mentors and mentees work together for specific positive outcomes of the mentees (Ambrosetti & Dekkers, 2010).

It has been previously suggested that mentoring programs should focus upon specific objectives (Dani et al., 2019; Hudson, 2004) and that mentoring programs should be implemented to instigate targeted change through collaborative processes (Hudson et al., 2005). Collaboration requires that both mentors and mentees work actively and productively. Hudson (2004) suggested focusing on a specific mentoring approach, which can differ from subject to subject, instead of a more generic (non-subject-specific) approach to mentoring.

The first factor of the Hudson's (2004) model relates to the mentors' personal attributes. As mentoring involves complex relationships, mentors should possess the attributes and skills for supportive and flexible communication (Hudson & Hudson, 2018), and be able to provide constructive advice (Baran, 2016). As the literature also suggests, the mentor-mentee relationship should foster a reciprocal connection. As highlighted by Ambrosetti

et al. (2014, p. 225), "nurture, support, mutuality, and trust" encompasses this approach.

The second factor relates to the system requirements, which is about the mentors' awareness and knowledge of school curricula and policies. As Dani et al. (2019) highlighted, there is often a divide between the courses offered in preservice teacher education by universities and the subsequent field experience of new inservice teachers. Thus, the mentors' involvement in decreasing the divide is of significant importance. In the current study, mentors followed the issues related to the UDL framework, as well as the policies related to this framework.

The third factor relates to the mentors' pedagogical knowledge and field experience that they have had in schools with students with diverse needs. In the current case study, each mentor possesses distinct pedagogical expertise that aligns with the relevant subject matter, which is knowledge of general SE issues. Ensuring the involvement of SE faculty members was aimed at helping to prepare the preservice IT teachers for their subsequent field experience.

The fourth factor was modeling, which defines the mentors as experts who model practices for their mentees. Subject-specific mentoring requires mentors to model particular aspects that are related to the subject (Hedner et al., 2011; Hudson, 2004; Nabi et al., 2019), which is seen as key for the success of the mentoring process.

The fifth and final factor of the model relates to feedback, which is vital in the formation of an effective mentoring process. Mentors should be able to offer critical and constructive feedback on all aspects related to their pedagogical expertise (Baran, 2016; Hairon et al., 2019).

Mentoring was implemented as an intervention strategy in the current study, which brought together Special Education (SE) faculty members and preservice IT teachers. The idea behind the current study emerged during a university-level course in which preservice instructional technology (IT) teachers were required to develop technological products for teaching purposes. The researchers were in charge of conducting the course for two semesters. Since the preservice IT teachers were explicitly engaged in the role of technology in the classroom and were responsible for minimizing the risks associated with digital inequity, the current study aimed to contribute to their inclusive teaching practices by tasking in product development for students with special needs. The preservice IT teachers researched, analyzed, and held discussions with their mentors through an inquiry-based and active learning process. The mentors were each assigned responsibilities to guide preservice teachers to understand the UDL and SE issues in the product development process. The current study was inspired by Hudson's (2004) work, with subject-

specific mentoring implemented for the purpose of increasing the inclusive education practices of preservice IT teachers through application of the UDL framework.

Methodology

Research Design

This research focuses on a case study based on a series of observations, interviews and material analysis developed by preservice teachers guided by a subject-specific mentoring approach. Through a case study of a university in Turkey, the researchers explore how participants perceive affordances of this particular mentoring study. Subject-specific mentoring studies may provide promising improvements in preservice teacher education, and by identifying the affordances of this specific mentoring, the researchers aimed at contributing to sustainable preservice teacher development in specific areas.

This study followed a mixed qualitative and quantitative approach, with a majority focus on the qualitative element of the research, which included an interpretivist element. As the study aimed to focus on understanding the preservice teachers' affordances of the mentoring approach, the interpretive elements were given significance in the study to reflect their position as the primary data source (Mason, 2002). In order to assess the preservice teachers' products, a rubric was used.

The study was guided by the following research questions:

(1) What affordances do subject-specific mentoring provide for preservice teachers' professional development for inclusive education?

(2) How successful were the preservice teachers in developing the products specific to target group?

Sample

To guide the preservice IT teachers' integration of technology into pedagogical practices related to inclusive education, eight Special Education faculty members (three female, five male) were assigned mentor roles. Notably, two of the faculty members held the rank of Assistant Professors and had received their degrees in Special Education from institutions in the United States of America or the United Kingdom. One faculty member, also an Assistant Professor, specialized in Instructional Technology (IT) and completed their studies in Turkey. This individual conducted research on the integration of assistive technology into Special Education and served as the primary facilitator of the study. The remaining five faculty members were Teaching Assistants who worked closely with the participating students at the same university.

In total, 42 preservice IT teachers (24 female, 18 male) were assigned mentee roles; additionally, they undertook the function of being instructional designers. This multifaceted approach allowed for a comprehensive exploration of their engagement with technology and inclusive education within the mentorship framework. Notably, the participant students were all preservice computer teachers, who, upon qualification, would be responsible for teaching primary and middle school students.

Implementation of Mentoring

Mentoring was implemented throughout the end-to-end process of two semester university-level courses. Mentoring activities directed both the researchers' weekly face-to-face lectures as well as the group meetings held with their mentors. Prior to commencing the current study, the researchers applied to the Institutional Review Board (IRB) in order to obtain the necessary permissions to conduct the research. The current study was progressed in three phases:

Preparation phase (first 10 weeks). During this phase, the student teachers were assigned mentors on the basis of one mentor to five or six students (mentees). The researchers informed the participants about the process, with weekly instructor-based lectures conducted and each mentor-mentee group held three group meetings. During this phase, the following issues were addressed:

- Basic instruction provided by mentors and guided practice regarding the characteristics of students with special needs;

- Instructor-based training on project management and project management steps;

- Discussion about UDL (first group meeting);

- Instructor-based training on UDL and technology integration;

Conducting needs analysis and literature review (second and third group meeting) in which the mentees visited special education schools, and talked with SE teachers. The purpose was to help them understand the needs of actual practitioners. During these visits, the mentees were informed about the difficulties faced by students with intellectual disabilities (ID), especially concerning daily life skills acquisition;

Discussion and deciding upon instructional material to be developed (instructor-based lecture with all participants): After the needs analysis, all participant groups discussed and decided upon the specific product (educational materials using animation to teach everyday activities, designed specifically for students with intellectual disabilities (ID).

- Each group was assigned responsibility for two different daily life skills; with all groups working to form one overall comprehensive materials set for teaching daily life skills;

- Discussion about daily life skills;

- Presentation (by mentors) about daily life skills, role modeling, and how to teach them to students with ID.

Intervention Phase (15 weeks). This phase included the students' product development process and weekly instructor-based lectures. Each group held at least five meetings with their mentors according to their own progress. During this phase the following issues were addressed:

Mentees developed animation-based instructional material under guidance of their mentors. Each animation included two cartoon characters. Mentors directed the student mentees based upon their level and provided continuous feedback at every step. The animations interface included four sections, namely modeling, guided practice, independent practice, and assessment;

- Instructor-based lectures conducted to follow the groups' project development and to guide the technical development of the animations (developed with Adobe Animate CC);

- Mentors provided concentrated feedback to mentees;

- Observation forms completed by the researcher and the mentors.

- Assessment phase (2 weeks).

- During the following class session, the participants each wrote reflections about the process.

- Experts assessed the created animations based on a rubric.

- Interviews were conducted with the mentees.

Data Collection

Interviews. Semi-structured focus group interviews were conducted with the mentees at the end of the study to explore their practices throughout the mentoring activities and aimed to address the critical moments and key points related to the preservice teachers' professional development. Sample questions were "Can you describe a specific critical moment or key point during your mentoring experience that significantly impacted your professional development as a preservice teacher?" and "In your opinion, what were the most valuable aspects of the mentoring activities that contributed to your growth as a preservice teacher, and can you share an example that illustrates their impact?" Each interview lasted between 45 and 60 minutes.

Diaries of mentors. At the end of each meeting with their mentees, the mentors maintained a diary about the mentoring process; noting especially their comments about the procedures applied by their mentees (preservice teachers).

Observations. A series of observation forms were completed by the researcher to follow the progress of the preservice teachers in the project development process. This was also applied to understand the individual workload of the mentees, and how they progressed with each step of the product development.

Rubric form. Developed by the researchers, a rubric form was employed in the evaluation of the animations developed by the participant preservice teachers. After an extensive literature review, the developed rubric included a total of 25 items related to typography (*e.g. The contrast of the color provides legibility*), product suitability to the target group (*e.g. Free from undesirable elements (race, religion, language, violence, aggression, fear, gender discrimination, etc.)*, as well as the content of the animations (*e.g. Content is presented with an understandable language).* The initial rubric was reviewed by three experts from the faculty's IT department who work in the SE field and was then finalized according to their suggestions. The rubrics were completed by the mentors following completion of the animations' development. Each group was evaluated by three experts to assure validity of the scores between the groups.

Analyzing of Data

Thematic analysis (Hayes, 2000) was applied to the qualitative data by the researcher, which is a versatile qualitative data analysis method employed to offer a comprehensive and intricate representation of the data (Braun & Clarke, 2006). It is also considered a way of summarizing the key points related to a large dataset, based on a structured approach to create clear organized reporting (King, 2004).

First, the interview recordings were transcribed into written form. Then, as an initial coding stage (Saldaña, 2013), the authors worked with another researcher; sharing the data between them and processing it separately in their independent identification of the data's themes. The qualitative data were repeatedly read by the two researchers in order to search for meanings and patterns, and accordingly initial codes were assigned to the data.

The next step was axial coding, whereby the two researchers met and reviewed the initial codes and tried to reach a consensus. These codes were then categorized under broader potential relevant themes, developed through

the inductive approach, these were closely connected to the actual data (Patton, 2002).

Finally, as a theoretical coding, the researcher reviewed the literature again, and searched the published studies for assigned codes that matched the findings from the current study's data. At the end of the process, the researcher was able to draw together the overall story of the data based on the identified themes (Braun & Clarke, 2006).

Findings

Affordances

Both the mentors and their mentees found the subject-specific mentoring to be a successful process. Ultimately, mentoring within the current study's implementation ensured that the preservice IT teachers were better prepared to conduct instructional decision-making in SE. The success of the process related to the affordances of the current study's mentoring. From analysis of the data, the affordances of the current study's mentoring program were found to be clustered around four emerging themes, namely "mediating elements," "social support," "structured process," and "subject-specific focus."

Mediating Elements. Mediating elements in the current mentoring study refer to the "discussion with peers and mentors," "hands-on practice," "in class lectures," "modeling activities," and "intense feedback." The mentees indicated that the current study's mentoring was the first time they had had the opportunity to practice their knowledge for students with special needs. On this issue, focus group 3 stated that:

> "The features offered to us during the process enabled us to have an efficient process. Thanks to this and our mentor, we learned the intricacies of the field of special education, so frankly, I think it contributed more to us because it was in a different discipline."

Discussion was part of the mentor-mentee meetings and also of their in-class lectures. The discussions held were mainly about the UDL framework, the special needs of students with disabilities, and how to effectively teach daily life skills to students with ID. It was the mentors who led the discussions, and the mentees reportedly found the methods discussed helpful in terms of their learning about how to teach students with special needs and the UDL framework. As highlighted by the study's mentees, the discussions were conducted through effective communication, which was both flexible and open, and based upon mutual respect that was seen as continuous throughout the mentoring process. Focus group 4 especially emphasized that:

> "The communication style of the mentors was very motivating
> and reflective and was perceived as being considerably helpful in
> conducting such an interdisciplinary study."

Another issue mentioned by the mentees was their hands-on practice of the technical knowledge needed to solve the needs of a specific student group. By adapting the developed product for a specific group, the process was seen as helping to increase their confidence in working with students with disabilities. The in-class lectures were another area favored by both the mentors and their mentees, with it said that it provided the means to control the product development process. This ensured a shared feeling of success amongst the preservice IT teachers and motivated them to move forwards to the next step of the process.

The other aspect discussed was the modeling activities conducted by the mentors. As for the teaching of daily life skills to a specific group, it was the first experience for the student teachers, and they noted appreciation for their mentors having role-modeled the steps, as well as highlighting some of the potential challenges they may face in the future as teachers. This step helped the mentees to understand the way in which students with special needs often figure out how to learn daily life skills and how they can accomplish them. The mentors mainly highlighted this issue, believing that their acting as role models was considered an integral part of the mentoring process. They believed that if they effectively role-modeled how to deal with certain challenges, the mentoring process would prove more effective overall.

The analysis also revealed that intense feedback given to the mentees by their mentors helped to elaborate adaptions to the animations based on the characteristics and specific needs of the target group.

Social Support. Excerpts were coded as social support when the mentees or mentors mentioned about information exchange sessions, receiving help from each other, or in providing comments about the procedure. Social support was attributed as being one of the most critical affordances of the mentoring process. Regarding this focus group 1 stated that:

> "The meetings we had with our mentor were very informative
> and contributed a lot. In this process, the mentor helped us a lot
> by showing prerequisite skills and their steps for individuals with
> ID, made everything more concrete, in other words, the process
> progressed very well for us."

In coding the social support factor, the categorization of Deng and Yuen (2011), who adapted the work of House (1981), was employed as a guide in the current study. In this respect, three sub-categories according to the most

emphasized social support types were utilized, which were, "Informational," "Appraisal," and "Emotional."

One common factor derived from the analysis was the importance of ongoing informational support during the mentoring process. The mentees noted that the meetings were conducted as information exchange sessions, which was seen as critical during times when they experienced difficulties related to implementing UDL and the project development process. The informative suggestions of the mentors related to key factors in designing materials for students with ID was especially considered as being crucial in achieving a sustainable process.

During the interviews, the mentees repeatedly mentioned that the performance appraisals provided by their mentors positively affected their motivation and self-efficacy. The mentors affirmed having provided true responses to the mentees' actions in their critique of the developed products. The mentees were aware that the criticism they received from their mentors opened their eyes to new perspectives in terms of viewing the products that they had developed.

The affordances of mentoring were also seen to lie in the emotional support provided by the mentors to their mentees. Overall, the mentees indicated that their mentors helped to make it easier for them to continue with the study by supporting them on an emotional level, which was perceived by them to be critical to the success of the mentorship.

Structured Process. The structured process of the mentoring, from the planning stage through to completion of the product, and based on the project management steps, ensured that effective progress was made in terms of collaborative working, establishing a clear understanding of the process, and in successfully accomplishing the required tasks according to the given schedule. Regarding this issue, one of the mentors noted that:

> "The whole project was based on a planned and structured process. I observed that regular meetings and constant feedback, were very helpful both for mentees and mentors in having a productive process."

The affordance of the structured process was related to the "regulations" and to the "distribution of roles."

Regulations are the criteria that direct people's behaviors. In terms of the current study, the regulations consisted of the mentor-mentee group meetings, in-class lectures, and compulsory project management steps that the mentees were required to follow during the development of their products. The regulation considered of most importance related to the success criteria

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applied to the assessment of the developed products. The mentees were collectively required to prepare the product according to the needs of a specific group of students. As the mentees indicated, the regulations helped to create a cooperative learning environment.

The second issue favored by the participants was the distribution of roles. In the current study, both the mentees and mentors held several roles and responsibilities during the process. Defining and assigning important roles and responsibilities to each of the participant preservice teachers significantly motivated them to complete their tasks to the expected quality. They reportedly had a sense of preparing a useful and relevant product according to the roles they were assigned.

Subject-Specific Focus. Both the mentors and mentees in the current study reportedly valued the subject-specific focus of the mentoring, which provided a strong focus to help improve the preservice IT teachers' skills in a subject-specific area. Focus group 1 indicated that:

> "Both the subject-specific information and the feedback we received from mentors ensured successful construction of skills related to inclusive education practices. Specifically, we were able to improve our ability to adapt instruction for the specific needs of students with disabilities; and that without receiving such subject-specific mentoring, we would likely only be able to develop standard products."

Additionally, both the mentors and mentees valued the relevance of the current study's subject. Considering the professional development of preservice teachers, mentoring related to SE issues and UDL in particularly was found to be of significant relevance, which was perceived to be helpful to their future teaching experience working in schools. As both the mentees and mentors held belief in the necessity and validity of exercises such as the current study, they reportedly felt better able to internalize what they had learned. Also, the mentees conferred that the principle of relevance could be achieved through mentoring-based studies, since preservice teachers learned strategies well from working alongside experienced mentors.

Evaluation of Mentee Products

The assessment of the developed products yielded a significant range in mean scores, with an approximate difference of 23 points observed between the highest and lowest-scoring groups ($\underline{x}2 - \underline{x}1 = 91 - 68 = 23$). This variation underscores the diversity in the quality and effectiveness of the materials created by different groups. It is noteworthy that despite this disparity, all groups managed to meet or surpass the predefined standards outlined in the

rubric assessment. The criteria set in the rubric necessitated a minimum score of 50 points to consider the materials successful. Remarkably, every group's products achieved this benchmark, affirming their proficiency in crafting materials that align with or exceed the stipulated standards. To gain a more detailed insight into the mean scores achieved by each group and their respective products, please refer to Table 1 below.

Table 1.

Mean Scores for Group Products

	Daily Life Skills	$\bar{x}$	Total
Group 1	Using a washing machine	85	87
Group 1	Wearing shoes	88	
Group 2	Wearing a sweater	77	76
Group 2	Pulling up a zip	74	
Group 3	Wearing a coat	83	79
Group 3	Doing up a button	75	
Group 4	Preparing a sandwich	84	87
Group 4	Ironing	89	
Group 5	Washing hands and face	87	87
Group 5	Pulling trousers up or down	86	
Group 6	Brushing teeth	91	91
Group 6	Combing hair	90	
Group 7	Dusting	88	87
Group 7	Making a bed	86	
Group 8	Making tea	68	68
Group 8	Setting the dinner table	68	

Discussion

Many studies in the literature have shown that university courses are not necessarily designed to teach the application of UDL principles, specifically in terms of teaching students with disabilities (Israel et al., 2014; Pearson, 2015; Scott et al., 2017), despite the importance of the UDL framework for both teacher candidates and faculty members (Moore et al., 2018; Scott et al., 2017; Thoma et al., 2009). Therefore, the research suggests that preservice teachers need to be guided so as to improve their competencies in addressing the

requirements to students with diverse needs. Faculty members should be encouraged to collaborate with other parties on campus in promoting UDL (Moore et al., 2018), and in developing and applying specific mentoring practices in order to enhance the subsequent professional teaching experiences of preservice teachers (Hudson et al., 2005).

The findings of the current study revealed four main affordances. The first was related to the mediating elements, namely discussion, hands-on practice, in-class lectures, modeling, and also feedback. The subject-specific expertise of the faculty members ensured high quality discussions were held based upon effective communication, which was valued considerably by the study's mentees. Through those discussions, the mentees improved their pedagogical knowledge related to UDL principles and learning for all. As the study's findings revealed, communication should be both flexible and open, and based on mutual respect as a continuing factor throughout the entire mentoring process; which also corroborated the findings in the published literature (Alemdag & Ozdemir Simsek, 2017; Ambrosetti et al., 2014; Hudson & Hudson, 2018; Kennedy & Dorman, 2002).

The mentors also guided their mentees in developing animations for a specific target group, which helped to increase their confidence in working with students with disabilities. Pianta et al. (2012) documented that mentoring can be an effective method to include students within the active learning process, and also as a means to enhancing their learning experience. During the process applied in the current study, in-class lectures were conducted in order to follow the process and required product development steps. Both the mentors and mentees valued this approach, stating that moving step-by-step in such kinds of product development ensured the success of the developmental process. As supported by the literature, following sequential procedures can lead to increased levels of knowledge building (Kanuka et al., 2007; Murphy, 2004).

The mentors also conducted role modeling activities which were favored by the mentees, which is also highlighted in the literature as part of the nature of any mentoring-based study. Crisp and Cruz (2009) discussed role modeling as one of the main functions of mentoring in the undergraduate context, and which manifests as learning in emulating and learning how to deal with challenges and issues. Also, studies have shown that the existence of an effective role model ensures that mentees become more resilient in their dealing with the challenges they may face in the future (Hedner et al., 2011; Nabi et al., 2019), and in comprehension of fundamental teaching techniques in particular academic disciplines among those being mentored (Hudson, 2004).

Intense feedback was also highly valued by the participants as an affordance of the mentoring process. Providing constant and intense feedback can help mentees to improve within a subject-specific environment. Subject-specific

mentoring reduces variability in mentor feedback and provides a more effective in-depth form of analytical feedback (Hudson, 2016).

Social support was the second most discussed affordance of subject-specific mentoring, which concerns both interpersonal relationships as well as counselling. This corroborates the findings of several other studies (Alemdag & Ozdemir Simsek, 2017; Giblin & Lakey, 2010; Izadinia, 2016; Torrez & Krebs, 2012), which emphasizes the critical role of social support in the mentoring relationship. As pointed out by Giblin and Lakey (2010), "social support" is of significant relevance to the mentoring process, and even well-established findings within social support research can be generalized to mentoring research. In line with this finding, the match in the current study between student mentees from the IT department and subject-specific faculty member mentors from the SE department helped to foster the natural emergence of successful mentoring partnerships. With respect to social support functions, the mentees emphasized "informational," "appraisal," and "emotional" factors the most. During the discussion and in-class lecture sessions, mentees were reportedly satisfied with the suggestions given to them in relation to design issues for learners with ID, and with the advice given regarding their future careers in teaching, the performance appraisals provided by their mentors, as well as the empathy, care and trust demonstrated by the mentors throughout the mentoring process. These various social support functions helped to increase the mentees' motivation so that they successfully completed their assigned tasks according to the given schedule, and thereby achieved a level of self-efficacy, which also supports previous research in this area (Giblin & Lakey, 2010; Moulding et al., 2014).

Structured process was found to be the third affordance. In the current study, the researcher structured the mentoring process from the beginning right through to the end through several regulations and the distribution of roles. This finding contributes to the small body of literature that has investigated the impact of structured mentoring, with structured planning helping to ensure a successful mentoring process (Arslan et al., 2021; Baran, 2016; Hairon et al., 2019; Hudson, 2004). As Baran (2016) highlighted, structured mentoring activities can ensure continuous communication between mentors and their mentees. Also in the literature, structured activities have been found to be related to higher levels of knowledge construction (Hairon et al., 2019; Kanuka et al., 2007; Murphy, 2004), which can also be related to the pedagogical growth of mentees seen in the current study.

The other affordance was "subject-specific focus," as both the mentees and their mentors considered the focus of mentoring to be highly significant. As highlighted by Hudson (2004), specific mentoring practices provide a stronger focus for the development of mentees in subject-specific areas. Similarly, Dani

et al. (2019) emphasized that the involvement of content-specific faculty in mentoring can empower the alignment between courses and subsequent field experience. Relevance was also valued by the participants, and which was also notably supported by Hairon et al. (2019). Since the mentees in the current study were aware that the instructional tool they were tasked to develop was considered to be of significant importance to learners with ID and could significantly change their life, they were highly motivated to successfully complete the task (Hobson et al., 2009).

Conclusion

The current study indicates that subject-specific mentoring is a way of enhancing the professional development of preservice teachers' construction of skills related to inclusive education practices, and ultimately to apply instructional decision-making in SE. As the findings support, subject-specific mentoring has certain affordances for increasing the professional skills of preservice teachers. Thus, the subject-specific five-factor mentoring model developed by Hudson (2004) for developing primary science teaching practices can be adapted to other contexts, as it promotes promising findings.

Concerning the gap in the literature and the need for further studies that incorporate UDL into teaching programs, subject-specific mentoring may provide unique solutions to improve content-specific pedagogical practices that better account for the diverse needs of today's students. Especially, it can be concluded that subject-specific mentoring is an appropriate means of promoting the skills of preservice teachers from any discipline in order to transfer their knowledge and to provide support to a broader range of students with diverse abilities.

Recommendations

Since the focus of the current study was to improve the inclusive education skills of preservice IT teachers as mentees, the subject-specific mentoring model can also be applied as a form of professional development for mentors. Further studies could therefore be conducted in order to explore the affordances of the subject-specific mentoring model through this perspective. Also, further research could explore the ways in which such a model can promote the professional development of mentors.

The affordances of the current study may help practitioners in order to improve their inclusive instructional practices for being responsive and sensitive to diverse learners. Based on the affordances of the current study, practitioners may seek ways for interdisciplinary collaborations, which potentially contribute to deal with complex teaching practices. Professionals in

SE play an essential role in helping teachers successfully navigate the challenges related to the education of students with ID.

The current study has aimed to contribute to the line of inquiry on preservice IT teachers' technology adoption according to the UDL framework, and the conclusions are seen as leading the way for future research in this area of study. Future mentoring programs could be extended beyond the university course of the current study and beyond the IT department. Other disciplines from within education faculties could also incorporate the UDL framework through subject-specific mentoring. Moreover, mentoring in terms of field-based experience could be conducted in order to better support the inclusive education practices in the classroom.

Limitations

The mentoring program applied in the current study was limited to the Project Management I and II courses, and the students were not required to actually implement the IT products they developed in a live school environment with the intended target group. Thus, follow-up studies are needed in order to test the effectiveness of the developed products, and then to assess the learning outcomes of the students as the end receivers.

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