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Examining the Mentoring Process in Collaborative Project-based Learning of Preservice Instructional Technology Teachers

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Abstract

The main purpose of this study was to investigate how special education knowledge and practice can be expanded through mentoring activities. In this respect, an interdisciplinary one-to-many mentorship study with Collaborative Project-based Learning (CPBL) was conducted. The mentors were Special Education faculty members who guided preservice teachers from the Instructional Technology department. During this guiding process, the preservice teachers developed animations for teaching daily life skills to students with intellectual disability (ID). The study followed a mixed-methods design. This current study showed that mentoring with CPBL can be effective in equipping both mentors and mentees with a variety of skills. Specifically, mentoring can be an effective process for preservice teachers to construct context-specific knowledge in educating students with special needs. The study's quantitative findings showed that the mentors were successful during the mentoring process.
Keywords: special education; mentoring; inclusion; collaborative project based learning; preservice teachers

Introduction

Recently there has been a focus on educating individuals with disabilities along with their typical peers within the general education classroom. This is termed as "inclusion," and has become accepted both nationally (Turkey) and internationally (Civitillo et al., 2016). Turkey has demonstrated a significant difference in supporting the inclusion of students with disabilities (SWDs) due to quick and major changes in state-level policy, legislation, and philosophy. According to the latest Turkish Ministry of National Education (MoNE) statistics for the 2018-2019 academic year, the total number of students in Turkey with special needs is 398,815, and that 295,697 are educated within inclusive classrooms, representing an inclusion rate of 74%. While there are 115,556 SWDs at the elementary school level who receive their education in an inclusive setting, there are 130,624 at the secondary school level and 49,877 at the preschool level (Ministry of National Education, 2018). There is a positive increasing trend in the percentage of individuals diagnosed with special needs being educated within general education classes.

Despite the number of inclusion students having increased rapidly over the past 20 years, researchers have argued that the inclusion approach is still not being applied in practice as it ought to be (Melekoglu et al., 2009; Moberg et al., 2020; Rakap & Kaczmarek, 2010; Zagona et al., 2017), since teachers from different disciplines do not generally possess the specific teaching skills required for the inclusive educational setting. A growing number of studies have highlighted the need for both preservice

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and inservice teachers to develop the necessary teaching skills for the inclusive educational setting (Andrews, 2002; Florian, 2014; Laarhoven et al., 2006; Metsala & Harkins, 2019; Moberg et al., 2020; Sharma et al., 2008). In order to provide meaningful inclusion practices, teacher effect and high quality differentiated instruction for individuals with disabilities is considered as being amongst the factors most significant for student learning (Rockoff, 2004; Sanders et al., 1997). However, many general education teachers struggle to provide meaningful inclusive practices in the general education classroom (De Boer et al., 2011; Metsala & Harkins, 2019; Moberg et al., 2020). Researchers have underlined that preservice teacher programs need to consider alternative approaches in order for preservice teachers to receive the correct support, guidance, and encouragement during their teacher education programs and into their early careers (Ambrosetti & Dekkers, 2010; Hall et al, 2008; Hudson, 2013; Korhonen et al., 2017). In particular, taking a very limited number of courses at the undergraduate level that promote inclusive practices for general education teachers appears insufficient compared to the extensive needs of SWDs (Metsala & Harkins, 2019). One rationale discussed is that most teacher education program courses are designed on a theoretical rather than practical basis (Allen, 2011). On this point, mentoring can be considered as a form of professional development aimed at developing and enhancing preservice teachers' pedagogical and instructional skills in order to meet the needs of SWDs in the general education classroom (Angelides & Mylordou, 2011; Moon et al., 1999).

Aiming to address these gaps and to support governmental studies and initiatives, the current study attempts to overcome problems related to inclusive education in Turkey by conducting an interdisciplinary mentoring study with collaborative project-based learning. This study, therefore, aims to positively impact the practices being conducted so as to improve on the quality of inclusive education being offered.

Mentoring

Internationally, one of the most common concepts of mentoring is where the mentor has sufficient knowledge and expertise to provide the correct level of information, advice and emotional support to their mentee (Ambrosetti & Dekkers, 2010). However, depending on the context of the mentoring process, both the mentor and the mentee can benefit from the sharing of knowledge, expertise and support (Hudson, 2013). Such a view has been affected by the constructivist theoretical approach, in that mentoring can be reciprocal for both mentor and mentee. Whilst the definition of mentoring can differ significantly according to the specific context or goal, Ambrosetti and Dekkers (2010) defined the mentoring of preservice teachers as a "non-hierarchical, reciprocal relationship between mentors and mentees who work towards specific professional and personal outcomes for the mentee" (p. 52).

The contribution of mentoring for both mentor and mentee significantly relates to the context and relationship between the parties (Ambrosetti et al., 2014). A variety of benefits of mentoring have been noted by researchers (Cawyer et al., 2002; DuBois et al., 2011; Lumpkin, 2011) based on personal growth (Huizing, 2012; Hunter et al., 2006; Ragins et al., 2000), professional development (Goodnough et al., 2009; Hudson, 2004, 2013; Lumpkin, 2011), and pedagogical growth (Hudson, 2004; Pamuk & Thompson, 2009). The common implication is that mentoring has the potential to support increasing positive outcomes in line with the intended purpose. Mentoring programs have therefore received considerable attention from academic scholars based on the professional development of preservice teachers' content-specific knowledge construction (Hudson, 2004; Mena et al. 2017) and their learning how to teach (Ambrosetti & Dekkers, 2010). Whilst the benefits in the literature of mentoring programs are outlined in a number of studies, only a few have targeted preservice teachers and have described how mentees perceived their role in the mentoring program within their specific context (Ambrosetti & Dekkers, 2010).

In order to ensure adequate benefit is realized from mentoring programs, studies have suggested several conditions (Baran, 2016; Giblin & Lakey, 2010; Hudson & Skamp, 2002; Izadinia, 2016) which may vary based on the context. According to the literature, some of the critical success factors are the nature of the mentoring relationship (Ambrosetti et al., 2014; Baran, 2016; Hudson & Skamp, 2002), the

social support afforded by mentors (Giblin & Lakey, 2010; Izadinia, 2016), and their personal attributes (Hudson & Skamp, 2002).

In order to address the needs of students with disabilities in the general education classroom, preservice teachers' knowledge and skills on instructional design needs to be specified within the preservice teacher preparation program. Preservice teachers could be assigned to a special education department as part of an interdisciplinary mentoring program in order to raise their awareness of the needs of students with disabilities and thereby to improve their teaching skills so as to meet those needs. Although mentoring programs are becoming a popular means to enhancing the professional development of preservice teachers, research on the roles of mentor and mentee from different disciplines has been limited.

The Study

The mentoring program designed in the current study applied the principles of collaborative project-based learning. Collaborative Project-based Learning (CPBL) is an educational approach that influences constructivism to help students to build knowledge and skills using a more experimental-based method. CPBL consists of multiple individuals working on common goals, and with shared responsibilities and collective effort as part of a project-based process (Kapp, 2009). Working collaboratively in making decisions and creating a production process can lead to students becoming more engaged and motivated (Jones, 2019). As opposed to more traditional methods, students learning according to CPBL can become more active in a progressive way.

The current study is grounded on a mutual relationship, whereby the process is aimed to contribute to both mentors and mentees. However, the mentors naturally have a greater level of responsibility than their mentees in this process. First, the mentors in the current study provided guidance to preservice teachers from the field of Instructional Technology (IT) as their mentees. The purpose of the mentor in this relationship was twofold; they aimed to guide the preservice teachers in developing instructional materials specifically for students with intellectual disability (ID), and also to guide their mentees to construct knowledge in educating students with special needs. During this guidance process, groups of preservice teachers developed 2D animations for the teaching of daily life skills to students with ID. The mentors aimed to improve their mentees' know-how in special education (SE), whilst they learned about available assistive technologies.

A one-to-many mentorship structure was investigated in the period from September 2018 to September 2019 through a mentoring project implemented for two courses; Project Management I and Project Management II, at a university in Turkey. Before the study, the researchers applied to the Institutional Review Board (IRB) to obtain the necessary permissions to conduct such a study. The course instructor aimed to address five primary issues in the mentoring program:

- Development of mentees' academic skills and knowledge in contemporary SE technology by ensuring students search for the latest current information;
- Development of mentees' academic skills and knowledge in how to teach students with special needs;
- Mentees practiced their knowledge by improving instructional material aimed at a specific group of learners; adding to their theoretical knowledge development in SE;
- Improvement of mentors' knowledge in assistive technologies;
- Creation of opportunities for mentors and mentees to conduct an interdisciplinary project;
- Development of mentors' and mentees' knowledge of effective project management, with weekly meetings held to address theoretical aspects of project management.

In order to achieve the goals of the current study, the researchers conducted a meeting at the outset of the study in which the preservice teachers were grouped and a mentor assigned to each group. Mentees were tasked with searching for the appropriate assistive technologies available for their target diverse-needs student group, and they then shared this information with their mentors. Each group held meetings based

on their schedules. Parallel to these meetings, the course instructor conducted weekly lectures. After several meetings and discussions had been conducted, the groups agreed on designing a 2D animation-based instructional material set for teaching daily life activities specifically to students with ID under the guidance and assistance of their mentors. According to the literature, animation-based instructional material was found to be the appropriate form, based on a needs analysis performed with teachers and families of SE students. Based on this research, groups were assigned responsibility for two different daily life skills. The roles of the mentors and mentees is presented in Table 1.

Table 1

Roles of mentors and mentees

Mentors	Mentees
1. Arrange weekly meetings with mentees	1. Join in weekly meetings
2. Share knowledge and experience in teaching students with special needs	2. Guide mentors on available assistive technologies in preparation for future academic studies
3. Guide the development process of an animation program	3. Develop 2D animations
4. Provide constant feedback about critical elements when designing for ID	

Research Method

Design

This study followed a mixed-methods triangulation design, featuring which includes equal integration of both qualitative data and quantitative data within during the same timeframe (Creswell, 2008). The purpose of triangulation design is "to obtain different but complementary data on the same topic" (Morse, 1991, p. 122). Qualitative data were collected from both mentors and their mentees in order to conduct in-depth research so as to understand the process of the study. Quantitative data were collected from the mentees on the effectiveness of their mentors in order to provide more generalizable results. According to the purpose and nature of the current study, the following research questions were derived;

1. What are the benefits and challenges of the mentoring program based on the mentors' and mentees' experiences?
2. How successful were the mentors in guiding their mentees during mentorship?

Participants

The first group of participants of the study were from the Instructional Technology (IT) department at a university in Turkey, and included 42 preservice teachers (24 female, 18 male) enrolled in two courses, Project Management I and Project Management II. The participant students were all preservice computer teachers who, once qualified, will teach primary and middle school students. Since schools in Turkey aim to make education more inclusive, preservice teachers should be able to meet the educational needs of students with diverse needs, and as such, preservice teachers should be able to

integrate technology knowledge into SE. The participant preservice teachers were organized into groups, with eight groups of five or six individuals assigned to mentee roles.

The second group of participants were eight faculty members (three female, five male) from the Special Education (SE) department of the same university. Two of the faculty members were Assistant Professors who graduated in the field of SE in the United States of America or the United Kingdom. One faculty member was an Assistant Professor who graduated in the field of Instructional Technology (IT) in Turkey, and conducted studies on integrating assistive technology into SE, and was also the main facilitator of the study. The other five faculty members were Teaching Assistants working with the participant students at the same university.

Instruments

Semi-structured Interviews. In order to answer the first research question, two different interview schedules were prepared by the researchers. One interview protocol was developed for the mentee focus group interviews, which consisted of five questions about the experiences and opinions of the preservice teachers in terms of their mentoring. A second interview protocol was developed for the mentors, which consisted of 10 questions about their experiences and opinions regarding the mentoring process. The first version of both protocols were piloted with one individual and followed-up with any necessary editing. Final versions of both protocols were then checked by two experts from the Educational Sciences department.

Mentorship Effectiveness Scale. In order to answer the second research question mentorship effectiveness scale was performed. The scale was originally developed by Berk et al. (2005), and consisted of 1 factor and 12 questions. The scale was adapted to the Turkish context by Yirci et al. (2016). As a result of Confirmatory Factor Analysis (CFA), the values determined that the obtained goodness of fit indices demonstrated compliance to a sufficient level (GFI = .87, AGFI = .86, CFI = .96, NFI = .96, TLI = .93).

Data analysis procedures

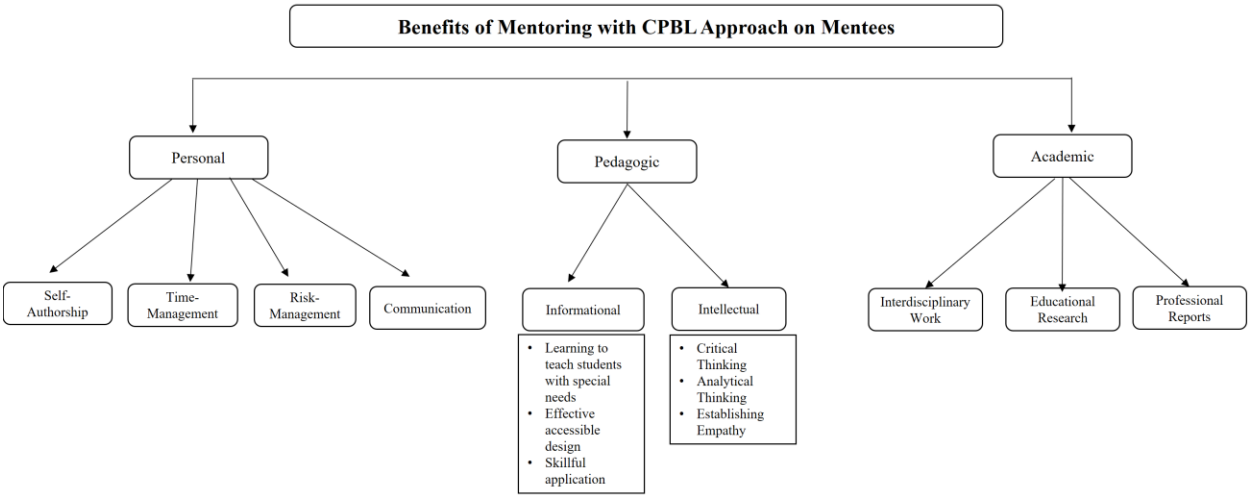
The collected data was analyzed using both qualitative and quantitative data analysis techniques. Content analysis was conducted for the qualitative data. First, the researchers transcribed audio data verbatim and then read through the textual data several times in order to become familiarized with the data. The researchers then analyzed the data independently and met regularly in order to agree on the most plausible codes. After reaching agreement on the codes, themes were determined that explained the data at a general level. During the whole process, the data were analyzed according to the study's interview questions concerning any consistencies and differences. The coding process was maintained until a consensus was reached between the researchers. By doing so, investigator triangulation was assured so as to minimize potential researcher bias. Scale results are presented descriptively.

Findings

Benefits for Mentees

Mentees and mentors described their experiences during the current study as a tremendous learning opportunity that both presented challenges and contributed to their experiences of real-world activities. Analysis of the interview question responses revealed three main benefits as "pedagogic growth," "personal growth," and "academic growth." For the categorization of the benefits, three categories developed by Pamuk and Thompson (2009) were used. The mentees believed that they would reflect those positive outcomes from the current study during their subsequent professional careers. An illustration of the study's coding hierarchy is presented in Figure 1.

Figure 1
Benefits of Mentoring with CPBL Approach on Mentees



Pedagogic Growth

The mentees mainly discussed that despite having received SE courses prior to joining the current study; they had not been able to conduct any actual teaching practices that targeted learners with special needs. Through the current study, the mentees received the opportunity to move beyond their theoretical knowledge, and to become more aware of context-specific issues. These experiences are discussed within two subcategories, as "Informational" and "Intellectual."

Informational. The participant groups strongly emphasized that during the mentoring process of designing educational materials for students with ID, negotiating with their mentor, and searching for information about the education of students with special needs, they found out more about context-specific informational growth and thus how to "teach students with special needs." Moreover, they indicated that despite having previously designed many technological educational materials before, they had not focused on issues related to accessibility. By actively engaging in the current study related to SE, they were able to receive the chance to learn "effective accessible design." The third issue discussed under this subcategory was "skillful application." This indicated the mentees' perceptions about meeting the requirements of the study. In line with this, all groups reported being satisfied with both the mentoring process and CPBL, since they succeeded in the skillful application of technological knowledge transfer in teaching students with ID. The mentors also reported on similar issues, with one mentor having stated that;

> "Mentees in this study will make a difference when they become teachers compared to others. They gained the skills to prepare adaptive materials and to employ an adaptive approach".

Intellectual. The current study's results clearly revealed that mentees believed they grew intellectually during the study, which was also something reportedly observed by the mentors. It was noted that the quality of the regular meetings held with mentors and mentees resulted in certain

intellectual outcomes. First, both the mentors and mentees strongly stated that the most crucial benefit for mentees was their growth in domain-specific "critical thinking" as related to the education of a diverse student population. They perceived having made good progress throughout the study in critically evaluating their ideas due to the effective discussions held with their mentors in figuring out solutions for the educational needs of those with diverse needs. Especially, all of the focus groups reported that they realized that they need to think in more detail, even about the most simple of daily issues, which are considered very easy or straightforward for those with normal development. Second, as a natural consequence of their critical thinking, the mentees were able to "think analytically," and six of the groups stressed that towards the end of the study, they were able to reach well-reasoned conclusions. In line with this, as stated by both mentors and mentees, the mentees were able to significantly concentrate on the SE issues whilst developing their technological solutions, and that they started to "think with more empathy." One of the groups pointed out that they realized even adding an extra window to their design in the animations could have negatively affected the target group. In addition, the mentors indicated that their mentees understood that every student could learn when the right techniques and methods were applied.

Personal Growth

As the findings supported, the mentees achieved notable personal growth due to the benefits they gained in terms of developing self-authorship, risk-management skills, time-management skills, and a more democratic working attitude.

Self-Authorship. The mentees believed that developing a collaborative project within a mentoring process guided through project management steps contributed to them developing their internal voice in order to meet the challenges of their future careers in many aspects. Especially, they believed that they would be able to meet the expectations they would face if presented with students with special needs in future inclusive settings.

Risk-management Skills. The mentees developed risk-management skills since they experienced and overcame numerous challenges. They indicated that since they believed the project they developed would contribute to real people, they were better motivated to complete the required tasks.

Time-management Skills. The mentees indicated that they had undertaken many projects throughout their university education; however, they had only ever completed them at the last minute. Through having real-world experience in the current study based on specific project management steps, they were able to complete the assigned tasks according to the given schedule.

Democratic Attitude. The mentees believed that working within a collaborative group project and working with mentors they had not known prior to the project helped to improve their democratic attitude. The mentees indicated that they were better able to take value from each other's opinion, and became more aware as a result of each other's contribution.

Academic Growth

In line with the purpose of the current study, the mentees were also able to develop certain academic skills that would contribute later to their professional teaching careers.

Interdisciplinary Work. As all the groups and mentors pointed out, the most significant contributing factor to the mentees' academic growth was conducting interdisciplinary work. Combining IT with SE was seen as critical for the mentees since they started to think beyond their normal boundaries.

Educational Research. As a part of their interdisciplinary work, the mentees were responsible for conducting educational research related to the SE field. Six of the groups indicated that they improved through experiencing educational research within a different discipline. Especially, conducting educational research related to two different disciplines and trying to associate information from the two areas enhanced their research capabilities. Similarly, the mentors also supported this, having observed that their mentees improved in their educational research capability.

Writing Professional Reports. The mentees were also satisfied with their progress in learning to write professional reports, which also added value to their prospective academic careers. As strongly

emphasized by six of the eight groups, writing reports based on predetermined criteria as part of a current project was considered a significant gain. One of the focus groups stated that:

> "Learning to write a report is very helpful preparation for the business world. We learned specific clues that will be very useful to us, especially if we later work in the private sector."

Benefits for Mentors

The mentors also highlighted having specifically benefitted in terms of their academic, personal, and pedagogic growth. All of the mentors especially emphasized that this was the first time they had been part of an interdisciplinary work, and had, over time, improved their professional skills. Similarly, all of the mentors believed that the mentoring study contributed to their personal growth, especially in terms of improving their effective communication skills. As they believed that effective communication played a central role in successful mentoring, they paid particular attention to this issue. The other contribution of the current study to the mentors was their pedagogic growth. They believed that whilst the mentees were improving their SE knowledge, it also helped to improve their own knowledge in terms of available assistive technologies. In providing feedback to their students they had to consider the technical aspects and their suitability for the target group.

Challenges for Mentors and Mentees

All of the mentor/mentee groups reflected their perspectives, and that the mentoring process in the current study was deemed to have been both successful and effective. However, there were certain challenges that had been experienced during this process. First, a challenge reported by both mentors and mentees was time management. Since the mentors had numerous responsibilities at the university due to their field, all of the groups reported problems in arranging mutually acceptable meeting times.

The other challenge mentioned related to the high expectations of the mentors. Two of the groups mentioned that at the beginning of the study, their mentors expressed very high expectations from them, which were not seen as realistic by the mentees. However, in time this issue was overcome.

The Mentors' Success

In order to support the interview results in terms of mentorship success, a Mentorship Effectiveness Scale was implemented at the end of the study. Analysis of the 42 participant preservice teachers is presented descriptively in Table 2. Based on the values reported, the mentoring process executed in the current study may be evaluated as having been successful, since the participant mentees considered the mentoring program to be effective, with all of the items having mean values exceeding 4.00. The highest values belonged to Item 3, which indicates that the mentors in the current study effectively guided their mentees in SE. Similarly, the values show that all of the mentors were seen as effective in this process, which supports the interview findings of the applied success criteria.

Table 2

Mean Scores of Mentorship Effectiveness Scale

Item	$\bar{x}$	*SD*	*n*
1. My mentor was accessible to me.	4.57	0.86	42
2. My mentor demonstrated professional integrity.	4.50	0.80	42
3. My mentor demonstrated content expertise in my area of need.	4.64	0.88	42
4. My mentor was approachable.	4.50	0.96	42

Item	$\bar{x}$	*SD*	*n*
5. My mentor was supportive and encouraging.	4.61	0.76	42
6. My mentor provided constructive and useful critique of my work.	4.35	1.03	42
7. My mentor motivated me to improve my work product.	4.24	1.12	42
8. My mentor was helpful in providing direction and guidance on professional issues (e.g., networking).	4.57	0.85	42
9. My mentor answered my questions satisfactorily (e.g., timely response, clear, comprehensive).	4.21	1.33	42
10. My mentor acknowledged my contributions appropriately (e.g., committee contributions, awards).	4.38	1.01	42
11. My mentor suggested appropriate resources (e.g., experts, electronic contacts, source materials).	4.00	1.34	42

Discussion

The study's findings suggest that mentoring can be an effective process for preservice teachers to construct context-specific knowledge in educating students with special needs. After developing 2D animations for learners with ID via an established formal mentoring process using CPBL, the mentees reported that their mentoring was perceived as beneficial. The benefits of mentoring are also supported in the literature, with university students shown to develop pedagogically (Healy et al., 2001; Hudson, 2004; Pamuk & Thompson, 2009; Volkwein et al., 1986), personally (Hunter et al., 2006; Ishiyama, 2007), and academically (Baran, 2016; Ishiyama, 2007; Lopatto, 2003) through faculty contact maintained outside of the classroom environment (Volkwein et al., 1986). As mentees highlighted the academic and social connections with their mentors throughout the current study, they were reportedly able to improve their practical knowledge in the field of SE.

The benefit most emphasized by the mentees was pedagogical growth in terms of informational and intellectual factors. The current study, therefore, contributes to the small existing body of literature on specific mentoring practices for preservice teachers' professional development (i.e., Feiman-Nemser & Parker, 1993; Hudson, 2004). As Feiman-Nemser and Parker (1993) stated, mentoring should focus on content-related issues. As strongly argued by the mentees in the current study, they improved in terms of content-specific informational growth related to SE, which was a critical output of the study since developing teaching skills in an inclusive classroom requires the acquisition of particular knowledge. This issue was also discussed by Hudson (2004), who indicated that specific mentoring practices could foster improvements in preservice teachers' subject-specific knowledge rather than generic mentoring. In the current study, the participants highlighted learning to teach students with ID, effective accessible design, and skillful application aspects under the "informational" factor. Extensive literature exists on the role of mentoring in teacher education and for learning to teach (e.g., Ambrosetti et al., 2013; Campbell & Brummett, 2007; Feiman-Nemser, 2001; Hairon et al., 2019; Wang & Odell, 2002). However, learning effective accessible design and skillful application were seen as specific to the current study due to the requirement of developing a project within a mentoring process. The participant preservice teachers cultivated specific design skills related to the teaching of students with ID.

Another factor significantly discussed by the mentees as a benefit relates to the "intellectual" factor. As highlighted in the literature, both formal and informal contact of undergraduate students with faculty outside of the classroom environment can influence their intellectual growth and subsequent career-based decisions (Blackwell, 1989; Lentz & Allen, 2007). The mentees believed that they grew

intellectually in their critical thinking, analytical thinking, and their ability to establish empathy with regards to students in the field of SE. The mentors stated that the mentoring process helped their mentees to consider the needs of students with ID and to empathize with them, saying; "they did their best to make sure that the developed tool was appropriate for people with ID." Since teacher education programs have little time dedicated to the field of SE, the current mentoring study ensured that it helped mentees to integrate their learning from different modules and enabled them to practice their knowledge from different disciplines, whilst also becoming aware of those with different abilities. This experience led them to consider real-life problems, and then to plan and modify their instructions based on the needs of individuals with ID.

There is an ongoing area of research in the literature concerning the personal growth of those receiving mentorship, which suggests that mentoring could posit effective practices within almost any context (Baran, 2016; Barrett, 2002; Hunter et al., 2006), and was also the second most emphasized benefit in the current study. In the faculty-mentored study of Hunter et al. (2006), students noted their personal growth in terms of understanding how science works in hands-on practice. Similarly, mentees in the current study better understood SE issues through actual material development practice. Additionally, the personal benefits of the current study were categorized as "self-authorship," "risk-management skills," "time-management skills," and "democratic attitude," which are all critical skill areas for preservice teachers, and especially once they begin their professional careers in teaching (Witney & Smallbone, 2011). These outputs of the current study may relate to the instructional approach used which corroborates existing studies in the literature that reported on the effectiveness of CPBL in terms of improving the democratic attitude (Jacobowitz & Sudol, 2010) and time-management skills (Donnelly & Fitzmaurice, 2005) of mentees.

As expected, the current study's mentees explained their academic growth as being due to the mentoring they had received, which is also in line with the published literature (e.g., Baran, 2016; DuBois & Karcher, 2005; Pamuk & Thompson, 2009). Factors related to the academic growth of those receiving mentoring may change according to different application types. In the current study, the relevant factors were related to interdisciplinary work, conducting educational research, and the writing of professional reports. As argued by the mentees, thanks to the interdisciplinary nature of their assigned work tasks, they were able to think across boundaries, which is critical for all preservice teachers as part of their professional development.

As the findings revealed, not only the mentees but also their mentors benefitted from this mentorship process in terms of their professional development. As opposed to the traditional studies, partnership models focus on reciprocal relationships (Boyer et al., 2004; Hudson, 2004, 2016; Thompson, 2007). Therefore, similar to mentees, mentors in the current study also highlighted certain benefits related to their own academic, personal, and pedagogic professional development. During the process, the mentors were focused more on assistive technology issues. Since SE is positively affected from most of today's technological developments (Ertmer & Ottenbreit-Leftwich, 2013), the current study seemed to meet requirements related to the professional development of the SE faculty members.

Both mentees and their mentors mentioned the issue of time management as a challenge that they faced throughout the study, whilst mentees especially mentioned the high expectations of their mentors as a challenge they had to face at the outset of the study. However, as the study progressed, these challenges seem to have minimized, or at least been better handled.

Implications and Conclusion

The findings of the current study support the previously published research in terms of the benefits and challenges, and further contributes to the field especially in highlighting the positive outcomes related to preservice teachers' gains in terms of SE specifically related to learners with ID. Especially, it can be concluded that mentoring studies with the CPBL approach should be implemented within higher education contexts aiming to increase awareness and knowledge within a certain context. This current study showed that mentoring with CPBL can be effective in equipping both mentors and

mentees with a variety of skills, which also supports those studies that have called for partnership mentoring. Mentoring with CPBL offers certain affordances for the learning of new subjects, and also for improving a variety of skills. Teacher training programs should therefore include mentoring studies for preservice teachers in order to help improve their skills in teaching students with diverse needs during their subsequent professional careers as teachers.

Due to the significant importance of gaining interdisciplinary skills, and especially related to SE for preservice teachers from any discipline, integrating mentoring studies with the CPBL approach into teacher training programs may lead to more effective pedagogical, personal and academic gains. For this reason, further studies should be conducted in order to provide additional evidence of the impact of mentoring with CPBL on preservice teachers' context-specific skills.

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Conflict of Interest

Author has no conflict of interest to report.

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