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REVERSE MENTORING: FACULTY MEMBERS' TECHNOLOGY INTEGRATION GOALS AND THE FACTORS THAT DRIVE THE MENTORING PROCESS

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Abstract. This quantitative case study examined the goals of faculty members in a faculty technology mentoring (FTM) program to integrate technology into their teaching process and the factors that influence the mentoring process. Data sources of the study: (a) weekly meeting diaries, (b) end-of-program evaluation interviews, and (c) case reports. According to the results of this study, four goals were effective in the participation of 10 faculty members in this program. These are the delivery of skilled and interactive instruction, the development of prospective teachers' digital literacy, the publication of scholarly work on emerging instructional technologies, and the fulfillment of expectations for the use of technology in higher education. With these goals in mind, the faculty members who participated in the FTM process rated the contribution of the process to their teaching studies as supportive. Another important finding is the factors driving the mentoring process. These six categories are the expansion of mentees' technology integration opportunities, barriers arising from technological tools, the impact of the pandemic COVID -19, Mentors' successes from the mentoring experience, factors that develop during the program process, and finally the relationship between mentee and mentor.

Keywords: Faculty technology mentoring, reverse mentoring, technology integration, professional development, higher education.

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1 Introduction

The spread of open educational resources and the diversification of information and communication technologies, as well as the fact that all systems that are digitized and automated can be used by anyone and adapted to daily life, require a digital transformation. The biggest part in the acquisition of digital skills and more is, of course, is belong to educational institutions. Due to the COVID-19 epidemic, some teaching approaches have been quickly adapted because the whole world to move to emergency remote teaching, that is, the effort to continue learning and teaching activities and support student learning outside school (Bozkurt et al., 2020). Some of them are hybrid learning (YOK, 2021), virtual classrooms, computer-assisted instruction, distance education, e-learning tools, and open educational resources (Khan Academy, 2022). Basic computer courses taken by prospective teachers are practically insufficient for the use of technology in the teaching process (Zhao & Bryant, 2006). Even educators who have received basic training in instructional technologies need more support to teach sustainably with these technologies (Daloz, 2000). Therefore, it is increasingly becoming a necessity for every educator to teach effectively with educational technologies, regardless of the subject they teach (MER,

2008).

Technology alone is not enough to enable the integration of technology-based pedagogy (Georgina & Olson, 2008). Teachers' behaviors in using technology in their classrooms are influenced by their beliefs about the effectiveness of these methods (Hew & Brush, 2007). Integrating technology into teacher education to support these beliefs with their own experiences can provide them with experience in this regard. On the other hand, many faculties are reluctant to take the necessary initiatives in this regard due to fear of failure, indifference, and resistance to change (Gunuc, 2015). Georgina (2007) identifies the following problems with technology integration: the unwillingness of many educators to learn new approaches, time, physical inadequacy of classes, unequal access to technological tools, difficulty with technology integration because they do not receive adequate support, inability to obtain personal support, and lack of belief in the importance of technology integration of faculties.

To initiate or support the process of technology integration, training such as technology mentoring programs, in-service training, projects, courses, and seminars are organized (Gunuc, 2015). Participants in the FTM program expect that the lack of introduction and training in the use of the latest technologies will be eliminated (Çilsalar, 2017). One of the effective practices to meet these expectations is FTM programs that support teachers' subjective goals in technology integration individually. The purpose of this study is to determine the purpose of 10 faculty members' participation in the 14-week FTM program in a department where this program is used and to determine the factors that are effective in implementing the program.

1.1 Faculty Technology Mentoring as a Professional Development Program

Since the form of work in most professions changes rapidly throughout the working life in time, on-the-job training and in-service training are provided to adapt to these changes. These trainings are necessary processes to meet the changing and evolving needs of institutions and the professions. They are generally viewed as professional development programs. Mentoring, for example, is a dynamic and reciprocal process that can benefit both the mentee (who receives the mentoring) and the mentor (who gives the mentoring) (Burrell et al., 2001). It can contribute to the development of human life in many areas. The first mentors in human history influenced the whole life of their mentees like a mentor and accompanied them for a long time (Gehrke, 1988). Mentoring programs are carried out in different fields and for different purposes, such as improving the living standards of students and employees. Promoting academic and social development (Burrell et al., 2001) and supporting positive development are among the main goals of mentoring programs. In the literature, regardless of the subject area of mentoring (technical, experiential, life coaching), the person who has more experience or knowledge in that area is referred to as the mentor and the person who is younger or has less knowledge or experience is referred to as the mentee (mentee, protégé, etc.).

The faculty mentoring approach is a program that provides individualized professional learning opportunities to faculty members with special needs to integrate technology into their teaching (Chuang et al., 2003). This program consists of three parts: (1) initial training that prepares teachers to effectively use various educational resources, (2) provision of seminars and in-service training to develop competencies and opportunities to integrate technology into the classroom, and (3) offering continuing pedagogical and technical support to teachers (Vu & Fadde, 2014). In the process of technology integration, common professional development programs such as collective seminars, conferences, workshops, peer coaching, etc., offered to address the unique and context-specific conflicts of each faculty member (Pamuk, 2008) may have limitations (Cilsalar Sagnak & Baran, 2021; Zhao & Cziko, 2001). Faculty members participation in technology mentoring programs is recognized as a professional development program in many ways (Baran, 2015). As a unique and important opportunity, mentoring relationships are beneficial processes for personal and professional development (Burrell et al., 2001). The goal of FTM programs is to help faculty members integrate technology into their professional work and teaching in

the context of their individual needs. In FTM practice, a mentoring relationship is established between a faculty member and a doctoral student. In this relationship, the doctoral student is expected to support the faculty member with his or her technological needs at all levels and to address those needs and concerns in an appropriate manner (Gunuc, 2015; Pamuk, 2008). Another goal is to help them gain confidence in using technology.

FTM is the process by which the mentee is encouraged and supported by the mentor to direct his or her own learning, developing new knowledge, skills, and abilities and increasing motivation to continue (Klasen & Clutterbuck, 2002). Technology integration behaviors can be facilitated by available technologies and resources such as time, money, collaboration, computers, the Internet, technical and individual support, professional development opportunities, and technological skills (Çilsalar Sagnak & Baran, 2021). Çilsalar (2017), in which he studied the factors that affect FTM behavior, it is stated that department management plays an important role in overcoming the difficulties encountered. Instefjord and Munthe (2017) examined how to integrate teacher digital literacy into teacher education and concluded that there is still little evidence on how digital literacy and technology integration are addressed.

Englund et al. (2017) examined teachers' conceptions of and approaches to teaching and learning with technology in a 10-year longitudinal study. The results of the study showed a marked difference: experienced teachers tended to change their understandings little or not at all compared to inexperienced teachers. Similarly, Ertmer et al. (2012) examined the compatibility between teachers' pedagogical beliefs, recognized by their use of technology and technological practices in the classroom through a multiple case study. The authors cited internal factors (e.g., passion for technology, a problem-solving mindset) and support from others (administrators and personal learning networks) as influential factors in teachers' beliefs to incorporate technology. To ensure more effective use of technology, this component of supporting change in understanding should be the focus of professional development activities (Englund et al., 2017). Chuang et al. (2003) compiled a number of mentoring models for technology integration in K-12 schools. Although these models vary, common elements of effective programs include providing vision for technology use, individualized technology support, breaking down hierarchical structure, building learning communities, and providing mutual benefits for mentors and mentees. The Project ImPACT model used by Judge and O'Bannon (2007) included training, technical and peer support, access to resources, and incentives. The themes of perceived relevance of technology applications in the context of restructuring the faculty development model, time needed to develop and use technological skills, incentives, and access to resources were highlighted in the study, which included 42 faculty members.

In the study by Kabakçi Yurdakul et al. (2015), the goal of a faculty member who participated in the FTM program was to minimize the difference between him and his students in terms of new technologies and to set up a personal website. Baran (2015) mentions six mentoring strategies in the FTM program, which include cases of 12 different faculty members. These are determining needs; exploring the affordances and limitations of technology; scaffolding; sharing feedback; connecting technology, pedagogy, and content; and evaluating the implementation process. As can be seen, while FTM programs share some common elements, faculty members join these programs for different reasons. There are models in which mentoring programs are implemented in different combinations (Pamuk, 2008). The method of mentoring practice in which the more experienced person is the mentee and the less experienced young person is the mentor is reverse mentoring.

1.2 Reverse Mentoring

The major transformation of business units and organizations due to the evolution of technology is leading to an inverted mentoring approach in many companies, called reverse mentoring. The new generations come into the workforce with the technological skills they have acquired spontaneously in their daily lives (Jordan & Sorell, 2019). The visibility of the knowledge and

skills of valued experienced employees is now at the mercy of technological skills, while the business world is being turned upside down by rapid digitalization (Chaudhuri, 2019). Reverse mentoring was first used by Jack Welch (GE) in 1999 to teach senior executives how to use the Internet (Chaudhuri, 2019; Jordan & Sorell, 2019). Reverse mentoring is a reversal of the concept of intergenerational mentoring, in which the more experienced individual acts as the mentee and the less experienced employee as the mentor, providing the experienced adults with the necessary skills, knowledge, and support (Chaudhuri, 2019). Young mentors benefit from the social networks of their experienced mentees, their visibility increases, and their leadership skills develop (Chaudhuri, 2019). Jordan and Sorell (2019) identified four main benefits in their study in which they examined the possible benefits of this program. These reverse mentoring programs can provide millennials with the transparency and recognition of them they expect from the management; sharing digital skills and becoming more knowledgeable about social media, encouraging cultural change, and promoting diversity. Experienced employees learn new things in the fields of technology, social media, diversity in the workplace, work-life balance, and global perspective (Chaudhuri, 2019). In order to expand faculty members' opportunities to broaden their experience with tools, methods, and techniques in the context of technological developments, especially in distance education applications, reverse mentoring, in which young graduate students more familiar with the subject matter assume the role of mentor, is the most appropriate application among mentoring practices. The purpose of this study, conducted within FTM, is to examine the goals of the process of integrating technology into the teaching activities of faculty members participating in the technology mentoring program and the factors that influence the implementation process of technology integration.

2 Method

This qualitative case study was conducted by collecting extensive data from various sources over a long period of time. The method used in this study is the qualitative analysis of the technology integration behavior of faculty members participating in the FTM program applied in a graduate course on technology integration in the Faculty of Education. The data sources for these 10 different cases are diaries of weekly meetings between faculty members (mentees) and mentors (graduate students), case reports at the end of the semester, and interviews with some faculty members.

2.1 Procedure

The mentoring program was conducted as part of a one-on-one reverse mentoring program at the education department of a large university. The FTM program was conducted as part of a technology integration course taught as a doctoral course in the CEIT department. The program was carried out with a shared responsibility, with the goal of mutually benefiting from the professional experiences of the doctoral students, who were considered relatively familiar and experienced in the use of technological tools, and the faculty members, who wished to be supported in integrating new technologies into their teaching. Mentors enrolled in the Faculty Mentoring Program for the Fall 2020-2021 semester are doctoral students who have completed a master's degree with a dissertation. The goal of this process is to work on the implementation of instructional technologies in faculty members' teaching by pairing randomly matched mentor-mentee pairs on a weekly basis.

The components of the mentoring process are listed in Figure 1. As part of the faculty technology mentoring process, mentors were informed about faculty mentoring and the expectations associated with it before the program began. Mentors, who met weekly as part of the course, were able to see what other mentors were experiencing and received feedback from other mentors about their mentoring. To monitor and manage the mentoring process, the mentee's and men-

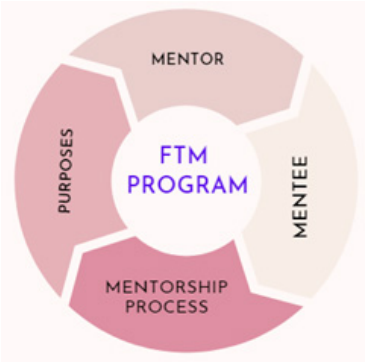

Figure 1: Components of the mentoring process

tor's weekly meeting diaries and other mentor-prepared activities were recorded in a web-based word processing environment. In addition, these meeting logs were shared with all mentors in a common cloud environment. Subsequently, the mentors and faculty members agreed by e-mail on a date for the first meeting, which, due to pandemic measures, was held by teleconference rather than in the faculty building. In the other weeks, the meetings were conducted remotely for the same reason. At the second meeting, a work plan was created to work with the mentee to set goals for the process and then implement those goals within the program. The mentoring agreement was used to agree on mutual duties and responsibilities. Then the created work calendar was put into practice week by week. The program has set expectations from doctoral student mentors as follows:

1. Assist mentees in establishing goals that include technology integration with achievable qualifications,
2. Identifying needed solutions for them to achieve this goal,
3. Identifying possible strategies for technology integration,
4. Determining the work plan that will lead to a solution.
5. Implementing the technology integration plan with the mentee,
6. and evaluating the implementation process, writing the case report and weekly meeting diary, and sharing the results.

2.2 Data Analysis

Three sources of data were examined in this case study: (a) weekly interview diaries, (b) end-of-program evaluation interviews, and (c) case reports. All types of documents created during the mentoring process were also shared in the cloud environment for further review. End-of-process evaluation interviews were also recorded in writing. In total, approximately 350 pages of notes and case reports were collected. Descriptive analysis was used to identify determine the most emphasized concepts, structures, and words and to identify the major themes that guided the process. All salient elements were noted as codes. In the analysis of 10 cases, the codes were checked in the previous week by going back to the previous week. This spiral check was continued until all weeks were completed for each case. In the second phase, the emerged codes were compared with other cases and common goals and elements were noted. Third, the emergent codes were grouped and categorized. For example, the codes for creating online experiment applications and preparing interactive presentations were categorized as skilled and interactive teaching. The codes, categories, and sample quotes that emerged from the conceptual framework of the study are presented in Table 1.

Table 1. Emerging Categories, Codes and Example Quotes from the Study

Categories	Codes	*Example Quotes*
Technology integration goals of faculty members		
Competent and interactive teaching	Enriching the teaching process through digital teaching aids	*"I would like to enrich my course of study with various applications." - Dr. Esra*
	Creating online experiment applications	*"Can we create a gas reaction ... or an animation-style application with my students in the computer environment without ever going to the laboratory?... I have no idea how to do this or what program to use if I want to do it." - Dr. Gül*
	Preparing interactive presentations	*""I ask for help in situations like uploading a sound file, video, image, animation, etc.." - Mentor 4* *"How to create effective materials using educational technologies?" - Dr. Lale*
	Use of online assessment tools	*"The Quizlet application was mentioned and it was explained how to use it and at what stage of the course. The scope of the application made the instructor very happy and he stated that he wanted to try it out immediately." Mentor 5*
Exploring innovative tools that can facilitate the creation of scholarly publications	Develop the ability to collect and analyze data using digital tools	*"The mentee indicated that he had difficulty transcribing the audio recordings of the interviews for his qualitative studies and that he needed technical assistance in this regard." - Mentor 6*
	Writing manuscripts on educational technologies	*"How does this application (Kahoot) integrate with technology in the context of social studies and the like? How does it get adapted academically? How can I use it with my students?" - Dr. Lale* *"The goal is to provide information in academic publications about what technologies should be used and how current technologies like this can be used."- Mentor 8*
Development of pedagogical digital skills in prospective teachers	Raising prospective teachers' awareness of the benefits of using technology in the classroom	*" The more we can give them (prospective teachers) this awareness, both academically and in terms of values, the more they can raise good new generations. I look at it from that perspective as well. " - Dr. Esra*
	Setting the stage for prospective teachers' future use of technology	*"It was great to learn code org, at least they (prospective teachers) saw that now there is such a learning field where they can learn without getting bored. Thank you very much. Even though they may seem small, they are big steps..." Prof. Mahir*
	Providing information to prospective teachers about various online tools	*"There is a lot that students (prospective teachers) do not know in this regard (use of technology). I want them to see very different examples of use."-Dr. Esra*
	The need for digital content creation during the epidemic	*"There is a greater need for technology support in the distance education process. Therefore, it should be more integrated into the teaching process." - Assoc. Dr. Ayse*
Meeting expectations for technology use in higher education	Adapting the use of digital tools to different conditions for different purposes	*"I do not know what program, what technical device is used how and in what way (for teaching purposes)."-Dr. Lale*
	Accelerating digitalization	*"The use of technology is the reality of our lives. The thought that let's finish this process, that we should return to the old order, is over. Technology must enter our lives, we are obliged to accelerate this process. " - Dr. Esra*
Factors that influence the mentoring process		
expansion of technology integration opportunities for the mentee	Selection of digital tools and methods suitable for the goal	*"Work done at the beginning of the process included providing options from various applications for similar purposes and offering solutions to problems (required for technology integration) expressed by the mentee."- Mentor 4*
	Sharing learning content for pedagogical digital literacy with the mentee	*"Oh, it's great (ATAOGEM) ..., I can prepare it better from here. Something happened in my head, I swear it was very good, it was very productive." - Prof. Dr. Mahir*
barriers arising from technological tools	Usage restrictions for paid online applications	*"... Since most augmented reality applications are paid, the lack of access to appropriate tools led to a limitation of the study. This is because not all students can purchase these applications."-Mentor 9*
	Insufficient technical resources	*"...The tools that the mentee has may not be sufficient for the applications that we will be doing together." - Mentor 10*
	Concern about not being able to use technology appropriately	*"When things don't go as expected, I worry about how I'll fix it if something goes wrong." - Assoc. Dr. Ali*
COVID-19 Epidemic effect	Inadequate preparation for the digital process associated with the COVID -19 epidemic	*"Lack of experience (of the instructor) in preparing digital materials can be seen as another problem."-Dr. Lale* *I see a lack of student interaction in an environment I am not used to. I also see some issues with managing the stream in live classes. " - Assoc. Dr. Ali*
	recognition of the digital apps used mandatorily at the university as sufficient	*"It is enough to fulfill the commitment expected by university rectorate, and it is not very useful, and in fact, many of them seem to be done for the show."- Assoc. Dr. Ali*
	the opportunity to receive individual support during the mandatory remote distance learning	*"It was great to have someone who helped me immediately when I needed this information" - Prof. Dr. Mustafa*
Mentors' successes from the mentoring experience	Lessons learned from preparing the sample applications	*"Developing solutions (to technology integration problems) have also developed the mentor himself." - Mentor 4* *"It leads the mentor to improve himself/herself in the subject being mentored." - Mentor 5*
	Gained confidence in administering degree programs	*"I could easily learn what I did not know about my field and transfer it to someone immediately. This made me very happy too. In short, this process has made me very mature in guiding a person and sharing my knowledge and experience with him." - Mentor 8* *At first, I thought I didn't know anything, but at the end of the process, I realized how much I learned." Mentor 9*

factors that develop during the program process	Limited time pressure	*Given the level of computer literacy of the teacher candidates, it was anticipated that there would be lapses in the allotted time and that the social studies teacher candidates would have difficulty preparing multimedia materials."- Mentor 9*
	Execution of the process according to the plan	*"But there was a good process done in terms of planning the process and how it was going to go. " - Dr. Esra*
	Continuous application of what has been learned	*"Of course, in order to master something, it's also important to retain it after a very meaningful introduction. Maybe you can create more application content for that." "- Dr. Esra*
	Compliance with the conditions	*"If the mentee does not have the appropriate technological tool and cannot acquire that tool during the mentoring process, I should consider the applications we will make with the technological tools we have." Mentor 10*
Relationship between mentee and mentor	Mutual exchange of knowledge for joint development	*"Thanks to this harmony, an effective and efficient mentoring process was carried out, the intended goals were achieved, and the transfer of knowledge and experience between mentor and mentee continued throughout this process." - Mentor 3* *At the beginning, I thought I didn't know anything, but at the end of the process I realized I learned a lot." Mentor 9*
	Maintaining communication throughout the process	*"Keeping meeting times was important to strengthen and maintain communication." - Mentor 6* *"It shows that learning continues as long as communication continues." - Mentor 1*
	Giving feedback	*"The mentor and mentee provided feedback to each other during the goal setting and working plan creation phase. During the training sessions, the mentor provided feedback to the mentee at each meeting on integration practices to date." Mentor 10*

The non-gamified group does not meet the normal distribution assumption for the measurements of both scales with respect to the normality assumptions in Table 1. Since the kurtosis values of the non-gamified group also do not fall between the reference range of -2 and +2, the assumption of normal distribution of the data is not met (Tabachnick & Fidell, 2013). Therefore, for the inferential tests, the nonparametric Mann-Whitney U test was performed for independent groups. For the academic achievement tests, the group means were compared.

3 Results

The research questions discussed the goals of faculty members and the factors that guide the process of mentoring for faculty technology integration. Quantification can limit the depth, richness, and significance of qualitative data (Yildirim & Simsek, 2016). For this reason, data were analyzed without quantification.

3.1 Technology integration goals of faculty members

The categories that have emerged in this context are: (a) Competent and interactive teaching, (b) Exploring innovative tools that can facilitate the creation of scientific publications, (c) Developing pedagogical digital skills in prospective teachers, (d) Meeting expectations for technology use in higher education.

3.1.1 Competent and interactive teaching

In the weekly meetings at the beginning of the program, mentors and mentees sought to generate ideas about what kinds of technology integration solutions could be developed for which achievements in which settings. To express this,
"I would like to enrich my course of study with various applications." - Dr. Esra.
Citing the acceleration of the teaching process, especially due to the pandemic, distance learning programs, and the need to use digital teaching materials and simulations and animations for experiments, faculty members said:
"Can we create a gas reaction ... or an animation-style application with my students in the computer environment without ever going to the laboratory?... I have no idea how to do this or what program to use if I want to do it." - Dr. Gül
In addition, teachers strive to help learners interact with the digital instructional materials they have created. To increase interaction and participation, mentees have embraced short-term, quiz-like e-assessment applications where answers can be quickly recorded and edited, and have wanted to use online assessment tools.

"The Quizlet application was mentioned and it was explained how to use it and at what stage of the course. The scope of the application made the instructor very happy and he stated that he wanted to try it out immediately." Mentor 5

3.1.2 Exploring innovative tools that can facilitate the creation of scholarly publications

Two important codes have appeared in this category. Faculty members are eager to use new software developed for collecting and analyzing data in their research and to make research processes more efficient. The other goal is to track publication trends related to new technologies that are being integrated into education and training processes and to produce scholarly publications on these topics. Mentor 8 made the following comments in the case report at the end of the process they conducted with Dr. Ela:
"The goal is to provide information in academic publications about what technologies should be used and how current technologies like this can be used."-Mentor 8

3.1.3 Developing pedagogical digital skills in prospective teachers

Faculty members believe that teachers should find alternative ways and expand their knowledge and experience in both pre-and post-service. Although there were reservations for various reasons, they had the opportunity to try these new applications with the support of a mentor. Since concept maps are commonly used at the K-12 level to implement sustained learning in future classes of prospective teachers, they wanted to educate their students about various online tools such as concept map creation, digital stories, gamification, e-assessment applications, classroom management applications, and MOOCs. It was decided to develop products for the instructional objectives and be relevant to the characteristics of the students, select applications, and share them with prospective teachers to create their digital products.
"There is a lot that students (prospective teachers) do not know in this regard (use of technology). I want them to see very different examples of use."-Dr. Esra



Figure 2: The word cloud of digital educational software used in the FTM process

Although prospective teachers are intertwined with technology, they still need guidance on how to use educational technology effectively. One of the faculty member mentees explains the goal of making people aware of the benefits of using technology in education as follows:
"The more we can give them (prospective teachers) this awareness, both academically and in terms of values, the more they can raise good new generations. I look at it from that perspective as well. " - Dr. Esra
Dr. Esra emphasized that after the epidemic, the formal dimension of the education and teaching process will no longer be completely face-to-face and that the distance education process will be a part of formal education in the future. However, with all the digitized processes, another code has emerged to increase the readiness of teachers in educational environments.

"It was great to learn code org, at least they (prospective teachers) saw that now there is such a learning field where they can learn without getting bored. Thank you very much. Even though they may seem small, they are big steps..." Prof. Mahir.
The need for the use of technological tools and methods in educational environments is the need for the creation of digital content in emergency distance education and then hybrid educational applications with the COVID -19 epidemic. The related statement is about:
"There is a greater need for technology support in the distance education process. Therefore, it should be more integrated into the teaching process." - Dr. Ayse

3.1.4 Meeting expectations for technology use in higher education

The other dimension is that mentees aim to gain flexibility in adapting digital tools to their individual educational goals and to be able to use them in different situations for different purposes.
"I do not know what program, what technical device is used how and in what way (for teaching purposes)."-Dr. Lale
It was noted by faculty members that digitization of institutions and processes is inevitable and that it has accelerated and spread with the epidemic. The goal of a faculty member indicating to be able to quickly engage in the accelerated process of technology integration is: *"The use of technology is the reality of our lives. The thought that let's finish this process, that we should return to the old order, is over. Technology must enter our lives; we are obliged to accelerate this process."* - Dr. Esra

3.2 Factors Shaping the Mentoring Process

Factors influencing the quality of the mentoring process: (a) Expanding technology integration opportunities for the mentee, (b) barriers arising from technological tools, (c) COVID-19 Epidemic effect, (d) the mentoring experience gained by the mentor, (e) components produced in the FTM process, (f) relationship between mentee and mentor.

3.2.1 Expanding technology integration opportunities for the mentee

For the specific needs of each mentee in terms of technology integration, it was necessary to introduce different tools and applications to find out which types of tools are suitable for which purposes.
"Work done at the beginning of the process included providing options from various applications for similar purposes and offering solutions to problems (required for technology integration) expressed by the mentee." - Mentor 4
Second, sharing educational content with mentees that encourages mentees to develop their educational digital skills according to their own needs is one of the elements that define the process.

3.2.2 Barriers arising from technological tools

Paid online apps have usage restrictions that only allow access to the basic features of the app or use for a limited period of time. Therefore, it is not very motivating to use this app to prepare content and incorporate it into lessons for a specific period of time. Another code refers to the inadequacy of the technical tools available to the mentees. Social science faculty members, in particular, usually do not have state-of-the-art computers and tools. Therefore, as Mentor 10 elaborates below, newly developed applications may not work properly with these non-new tools. *"...The tools that the mentee has may not be sufficient for the applications that we will be doing together."* - Mentor 10

The third code reveals a concern that technology may not be used appropriately enough. Mentees may take a more detached attitude toward applications they believe they cannot use well enough.

3.2.3 COVID-19 epidemic effect

Because the implementation of the FTM programme largely coincided with the epidemic COVID -19, one of the most important factors influencing the implementation process was the epidemic itself. The factors that caused this effect related to the epidemic were inadequate preparation for the digital process associated with the COVID -19 epidemic, recognition of the digital apps used mandatorily at the university as sufficient, and the opportunity to receive individual support during the mandatory remote distance learning. The urgent need for distance learning created by the epidemic accelerated the use of technological tools and, as Dr. Esra noted, made it inevitable.

"Lack of experience (of the instructor) in preparing digital materials can be seen as another problem." -Dr. Lale

However, some mentees consider it sufficient to use only the applications prescribed or mandated by the university administration, without rushing to integrate technological tools. The third code states that mentees' work with a mentor compared to their other colleagues and the fact that they get support when they need it has increased their confidence.

"Bu bilgilere ihtiyaç duydugumda bana hemen yardimci olacak birinin olmasi çok iyi oldu" -Dr. Mustafa

3.2.4 Mentors' successes from the mentoring experience

While the younger mentor sought to support the mentee, he or she experienced, researched, and learned a great deal during the program itself. Preparing pilot application examples for the mentee led him to become more familiar with the application and develop ideas on how to use it more effectively.

"It was great to have someone who helped me immediately when I needed this information" - Dr. Mustafa

Because the FTM process is conducted in the courses that the mentees take during the semester, the mentors, who are young researchers, have gained invaluable experience in conducting undergraduate courses.

3.2.5 Factors that develop during the program process

Each of the 10 case studies conducted as part of the course is authentic in its own right. Therefore, the first of the specific codes for this process is that there is not enough time for both the mentees and the mentors. A lot of work had to be done in a short time to conduct the interviews and prepare the content for implementation in the classroom. The second element is the creation of the work calendar after setting the goals in the first week of the meeting, and the goal is to implement the process in accordance with the plan. This plan eliminated the uncertainty of what to do and helped to use the limited time more effectively.

"But there was a good process done in terms of planning the process and how it was going to go. " - Dr. Esra

The code for creating sustainable solutions emphasizes gaining enough experience to be able to transfer technological solutions adapted to needs to other similar needs at other times. Moreover, in the implementation of our program, different challenges have arisen in each situation. There was also a need to make FTM program plans and targeted studies ready for new conditions in the future. There were situations where solutions and support needed to be flexible and adapted to the capabilities of the technical resource and the readiness of the learners. . One mentor, Mentor 10, explained:

"If the mentee does not have the appropriate technological tool and cannot acquire that tool during the mentoring process, I should consider the applications we will make with the technological tools we have." (Mentor 10, case report)

3.2.6 Relationship between mentee and mentor

Because the FTM program is a collaborative process, another factor that guided the process was the relationship between the mentee and the mentor. The mutual exchange of knowledge in this relationship contributed to the development of both parties. Mentor 3 commented as follows.

"Thanks to this harmony, an effective and efficient mentoring process was carried out, the intended goals were achieved, and the transfer of knowledge and experience between mentor and mentee continued throughout this process." - Mentor 3

Another code is to maintain communication to keep the relationship going. For this reason, it was important to stay in touch and keep meeting times.

"It shows that learning continues as long as communication continues." - Mentor 1

The last code represents the mentor and mentee giving each other feedback on their work and preparations. Recognizing the strengths and weaknesses of the prepared training content supports the development.

4 Discussion and Conclusion

This study addresses the technology integration behaviors of 10 faculty members participating in the FTM program, which is part of a postgraduate program at a faculty of education in a large university in Turkey. The study focuses on faculty members' goals for technology integration and the factors that guide the mentoring process. In a conclusion, these goals were classified into four categories. Bu categories are (a) Competent and interactive teaching, (b) Exploration of innovative tools that can facilitate the creation of scholarly publications, (c) Development of pedagogical digital skills in prospective teachers, (d) Meeting expectations for technology use in higher education. Factors influencing the mentoring process: (a) expansion of technology integration opportunities for the mentee, (b) barriers arising from technological tools, (c) COVID-19 epidemic effect, (d) Mentors' successes from the mentoring experience, (e) factors that develop during the program process, (f) relationship between mentee and mentor.

The results show that the applied FTM program helps faculty members find answers to their context-specific individual needs. The most obvious finding that likely contributes to the literature is that the goal of mentees in the FTM process is to develop the pedagogical digital competencies of their prospective teachers is evident. For this reason, faculty members were eager to incorporate more hands-on implementations into their lessons, thus providing teacher candidates with more opportunities for technology integration. The prospective teachers gained knowledge, experience, and ideas about these technological competencies through the studies they prepared as part of the course activities. Most FTM program show that the practice of technology mentoring provides many opportunities for faculty members to use new technologies in the teaching process (Chuang et al., 2003; Gunuc, 2015; Konca & Tasdemir, 2018). In terms of students' digital skills, students' influence leads faculty members to demand technology integration (Cilsalar Sagnak & Baran, 2021; Kabakçi Yurdakul et al., 2015). One of the faculty members pointed out that a technology-savvy generation has grown up and it is seen as an inevitable necessity for prospective teachers to use technology in their classrooms in the future. This emphasis is also found in previous studies that point to the student effect (Ajjan & Hartshorne, 2008; Cilsalar Sagnak & Baran, 2021; Paver et al., 2014; Kabakçi Yurdakul et al., 2015). The positive feedback from the students on the innovations in the integration process motivated the faculty members. So, changing teachers' perceptions and approaches to

teaching with technology should therefore be a central component of professional development activities in order to use educational technology more effectively (Englund et al., 2017). Perhaps effective measures should be taken to prevent new teachers from taking over the understanding of experienced teachers. After the epidemic, it is apparent that the formal education and teaching process will no longer be entirely face-to-face. So, it is clear that digital skills will be more important for prospective teachers in the future.

The fact that faculty members do not find time to learn new technologies encourages them to participate in such programs (Butler & Sellbom, 2002). In addition, it is possible to address concerns about how to plan and execute the entire process of incorporating these technologies into their courses and how to address the problems they will encounter with one-to-one mentoring. Integration efforts require more time and effort from faculty members compared to the normal teaching process. It was found that the technology-integrated process motivates students and promotes creativity because it brings innovation and variety to the course. The structure of the assessment tool for digitally created homework (e.g., a digital story) and the decision to use some Web 2.0 applications are influenced by factors such as class size, student needs, and time available (Salajan et al., 2015). As Peluchette and Rust (2005) noted, faculty members may not want to use some technologies in larger classrooms. Similarly, Cilsalar-Sagnak and Baran (2021) stated that the main purpose of using technology in the classroom is to reduce the teaching load, which is not suitable for crowded classrooms. Another goal of faculty members is to meet the expectations of administrators and students for the use of new technologies and innovative teaching methods in higher education.

The situation referred to in this study as time constraints is a factor that prevents faculty members from developing their pedagogy with new technological approaches. Lack of time is one of the most important problems in the process of technology integration (Butler & Sellbom, 2002; Georgina, 2007; Gunuc, 2015). At the same time, he regrets that due to his teaching, research, and other work (Gunuc, 2015; Watlington et al., 2014), he does not have enough time to incorporate, use, evaluate, and provide feedback on various aspects of instructional technologies in all instructional processes (Oshagbemi, 2000). In our study, this situation shows that besides the need for time to evaluate digital activities, the mentees also need support on how to evaluate them. Mentor development during the program was also one of the factors that attracted attention. Chaudhuri's (2019) statement that the mentor's leadership skills develop during reverse mentoring practice is consistent with the achievements of the mentor doctoral students who participated in the FTM practice in this study.

Mentor-mentee couples should have a functional understanding of what their unique relationship will entail (Burrell et al., 2001). This understanding is necessary for the sincere implementation of mentorship and running successfully. It is essential to demonstrate resources and opportunities for forming intentions (Cilsalar Sagnak & Baran, 2021). In this study, the relationship between mentee and mentor emerged as one of the main factors guiding the mentoring process. The planned work of the mentor taking the lead role ensures that the process supports the development and guides the future goals of technology integration. An integration process that is not started and executed with a plan can have a detrimental effect on time, management, and motivation (Gunuc, 2015). In summary, the faculty mentoring program continued throughout the academic year as a collaborative process in which faculty and mentors achieved shared learning outcomes. For the mentors, this process greatly improved planning and communication skills. Through the implementation of a program that took place over an extended period of time, he acquired skills such as planning, execution, and problem solving, as well as communication skills. While Judge and O'Bannon (2007) focused their attention on incentives, they were apparently not considered in our process. Consideration of incentives that encourage participation and retention in FTM could make the process more efficient.

The fact that educators have a high level of ICT awareness does not mean that they also have the knowledge and skills to use ICT effectively and efficiently in their teaching. As List

(2020) points out, students need purposeful and quality education that is not limited to the use of technology, but in which they have already internalized the use of technology as a fundamental mechanism for learning and interacting with the world. This requires pedagogical digital literacy skills for educators. There are several functional methods to develop these, and it appears that the faculty technology integration program is one of these methods.

At the beginning of the faculty technology mentoring process, it may be beneficial to openly discuss and decide on the job descriptions, responsibilities to be assumed, and mutual benefits so that the process can be carried out efficiently and effectively. In particular, the time, frequency, and duration of meetings should be determined at the outset, and this decision should be adhered to. Otherwise, communication breakdowns are the most important factor that can hinder this process. To prevent this, both parties should make time for the weekly meetings, and voluntary participation could strengthen the relationship and increase achievements. Another important factor that has received attention in the literature is that matches in terms of personal characteristics and common interests are one of the prerequisites for the successful implementation of the mentoring process between the mentor-mentee pair (Cronan-Hillix et al., 1986; Gehrke, 1988). Gonuc (2015) showed in his study that the mentoring process is negatively affected when there is no correct matching in terms of personal characteristics. Also, an open exchange about the fears of mentees that are explicitly addressed can be incredibly rewarding in reverse mentoring (Jordan & Sorell, 2019).

Disseminating the program among colleagues within the faculty can help accelerate the process of technology integration. The mentor, mentoring for the first time someone more experienced than him or herself, was able to learn from the mentee's experience whether IT's tools were appropriate for the context. In addition, mentors gained in the areas of time management, planning weekly tasks, developing collaboration, and sharing responsibilities.

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