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Implementation and Evaluation of Technology Mentoring Program Developed for Teacher Educators: A 6M-Framework

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Implementation and Evaluation of Technology Mentoring Program Developed for Teacher Educators: A 6M-Framework

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Abstract

The purpose of this basic research is to determine the problems experienced in the Technology Mentoring Program (TMP), and the study discusses how these problems affect the process in general. The implementation was carried out with teacher educators in the education faculty. 8 doctorate students (mentors) provided technology mentoring implementation for one academic term to 9 teacher educators (mentees) employed in the Education Faculty. The data were collected via the mentee and the mentor interview form, mentor reflections and organization meeting reflections. As a result, the problems based on the mentor, on the mentee and on the organization/institution were determined. In order to carry out TMP more effectively and successfully, a 6M-framework (Modifying, Meeting, Matching, Managing, Mentoring - Monitoring) was suggested within the scope of this study. It could be stated that fewer problems will be encountered and that the process will be carried out more effectively and successfully when the structure in this framework is taken into consideration.

Keywords: technology mentoring, mentor, mentee, teacher educator, technology integration

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Effective integration of technology into the training and education process by teacher educators in higher education institutions contributes to educating better-qualified teachers (Sugar, 2005; Surry, 2005). Although teacher educators demonstrate positive attitudes towards technology integration in educational environments, it could be claimed that many instructors are incompetent in using technology (Helland, 2004; Pelgrum, 2001). It is also observed that instructors experience problems in integrating technology into education in terms of time, limited access, lack of organizational support and inadequacy of technological tools in their faculties (Bell & Hofer, 2003; Butler & Sellbom, 2002; Pelgrum, 2001; Strudler, McKinney & Jones, 1995; Wisniewski, 2010). Okojie, Olinzock and Okojie-Boulder (2006) point out that technology integration is a part of the process of instructional preparation and that educators should utilize technology in their classrooms and their lives as a supporting and facilitating instrument. Faculties of Education are important organizations since they train future teachers. When we think of the roles of beginning teachers in expediting technology integration (Gao, Wong, Choy, & Wu, 2011), we see the importance of technology integration in effective training of preservice teachers in education faculties.

Enhancing technology use in faculties and improving the technological infrastructure is a responsibility that falls under the responsibility of faculty or university management (Georgina, 2007). Technology adaptations of many faculties are undergoing a slow process due to such reasons as fear of failure, disinterest or aversion to change.

It is stated that instructors generally experience problems such as organizational, administrative, pedagogical and personal constraints (Leh, 2005). Georgina (2007) cites the problems in technology integration as unwillingness to learn new approaches by many of the teachers, time, insufficiency of equipped classrooms, unequal access to technology, difficulty in technology integration without adequate support, not receiving one-to-one support and lack of belief on the part of the faculties on the importance of technology integration. Balki and Saban (2009) identified the problems related to technology integration as those resulting from the technical equipment of the school, from lack of tools and materials at school and from lack of instructor knowledge and experience.

Different implementations such as technology mentoring program (TMP), in-service training, projects, courses and seminars have been put into effect to ensure technology integration and to facilitate the process. One of the implementations with the biggest contribution is the use of TMP, which is mostly implemented in K-12 schools and universities (Chuang, Thompson & Schmidt, 2003). According to Brown's (2000) definition of "Technology Mentorship Program", a staff development program organized by school division personnel is designed to empower lead teachers to share their knowledge and expertise in integrating technology in the curriculum. Pamuk (2008) used the term 'mentoring' in his study "to refer to a relationship formed (but not limited to) by two persons (a graduate student and a faculty member) and characterized as a process of exchanging knowledge, experiences, and expertise through open dialogue that helps both participants to grow in academic, professional, and social aspects". Pamuk stated that "the primary goal of the mentoring program is to help faculty members with their individual needs in integrating technology into their teaching and professional activities". Sugar (2005) stated that "the goal of situated professional development technology program is to serve teachers' specific technology needs within their specific environment (e.g., classroom)".

One of the stakeholders of the technology integration process at universities within the scope of TMP is the teacher educator (see Figure 1). TMP can be utilized to overcome the possible issues experienced by teacher educators in the context of technology integration. Mentoring is defined as the process of guidance or facilitation of a learner's educational development (Witte & Wolf, 2003). Mentoring is the establishment of one-to-one relationships for such purposes as learning between experienced and less experienced or between informed and less informed individuals (Murray, 2001). Mentoring is a process addressed in schools by private organizations or by faculties at universities. The mentoring process has three important stakeholders that are mentors, mentees and the mentoring program management (organization). The mentor can be defined as a guide, sponsor, teacher and advisor. The individual who receives help, service or guidance is called the mentee, and the individual who provides the help, service or the guidance is defined as the mentor. There are models in which mentoring programs are undertaken in different combinations. While there are implementations where undergraduates are mentees and graduates are

mentors or where students are mentees and adults or faculty members are mentors, there are teacher-to-teacher or student-to-student programs as well (Brightman, 2006; Butler & Chao, 2001; Chuang & Schmidt, 2006; Jones, 2002; Kratcoski, Swan & Mazzer, 2007; Smith, 2000).

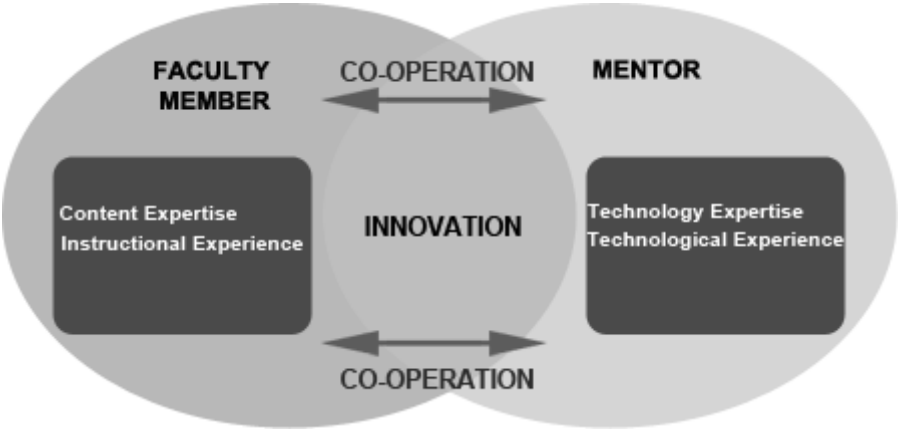

Figure 1. The structure of one-to-one mentoring for professional development in ICT (Source: Kabakci, Odabasi, & Kilicer, 2010)

Literature states that TMP presents participants and stakeholders with such benefits as diffusion of innovations and adoption and diffusion of instructional technologies (Corso & Devine, 2013; Jones, 2002; Sahin, 2006; Tracy, Jagsi, Starr & Tarbell, 2004). Also, a successful TMP ensures benefits such as providing visions for technology use, increasing technological competencies, breaking down hierarchical structure, establishing open dialogue and collaborative relationships, providing mutual benefit for mentors and mentees and establishing learning communities (Ballantyne & Mylonas, 2001; Chuang & Schmidt, 2006; Corso & Devine, 2013; Pamuk, 2008; Smith & O'Bannon, 1999). However, some problems have also been observed during the TMP process. It is believed that the problems experienced may result in benefiting from the technology consultation process to lesser degrees. Hence, it is imperative to identify the problems experienced during the process and to determine the steps suggested to improve the situation.

In this context, the purpose of the present study is to determine the problems experienced in TMP and to discuss how these problems affect the process in general. The concept of "problem" used in the study is considered as a combination of concepts such as barrier, challenge, trouble and obstacle. In the study, the following research questions were directed:

Research Questions

1. What are the problems experienced regarding TMP developed for teacher educators?
   a. What are Mentee-based problems?
   b. What are Mentor-based problems?
   c. What are organizational/institutional problems?

Method

The basic purpose of the present study was to determine the problems regarding TMP by using multiple methods. For this purpose, the study was designed as an evaluative case study, one of qualitative research methods. A case study is defined as detailed examination of current events or situations (Yin, 2003). In this study, the case study method was used for such reasons as examining a real-life phenomenon within its own natural envrionment, answering the question of "what happened?", monitoring "how" and "why" TMP-related problems occur, doing detailed and holistic investigation, data involving a period of time and avoiding being limited to a single methodological tool (Barkley, Cross & Major, 2005; Denzin, 1984; Feagin, Orum & Sjoberg, 1991; Yin, 2003). In this respect, in-depth research data regarding TMP were collected from the participants in a period of 12 weeks; the feedback related to TMP carried out were evaluated; and a 6M-framework was suggested for a successful TMP.

Participants

An implementation was undertaken with teacher educators in the faculty of education of a university. 8 doctorate students (mentors) from the Department of Computer Education and Instructional Technologies provided technology mentoring implementation within the framework of

TMP to 9 teacher educators (mentees) employed in the Education Faculty of a state university in the Spring Term of the academic year of 2011-2012. In this context, only one doctorate student was matched with two mentees.

Process

TMP was carried out via an interaction among the organization/institution, mentees and the doctorate course (the mentors and the faculty member in charge) during one academic term (see Figure 2).

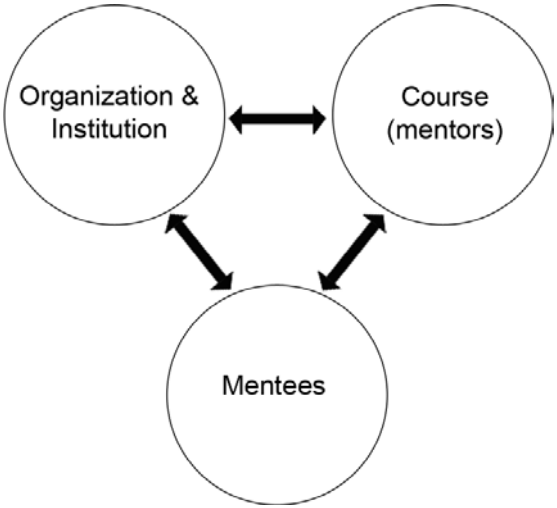

Figure 2. The interaction among TMP's stakeholders

TMP planned and carried out within the scope of a doctorate course within the program of Computer Education and Instructional Technologies required cooperation and interaction between the institution and the faculty. The TMP organization involved the faculty member in charge of the doctorate course, the Dean of the education faculty and the director of the Institute of Educational Sciences. The mentees were selected among the teacher educators from the education faculty. Due to the fact that the doctorate course was executed in the body of the Institution of Educational Sciences; that the teacher educators were from the education faculty; and

that technology mentoring was performed by doctorate students taking a doctorate course, the whole process was carried out with the cooperation and interaction of these three stakeholders.

As a result of the meetings held, the TMP organization planned the process, and the necessary permissions were obtained. After the institution was informed about the process, the individuals willing to participate as mentors in the process within the scope of the doctorate course were determined. Following the agreement on the execution of TMP on the basis of a one-to-one mentoring process, the number of the mentees was restricted based on the number of the mentors determined (n=8). While determining the mentees, the institution was informed about the TMP process and about those who wanted to benefit from the program. It was seen that there was a high demand and need for TMP; however, the fact that the number of the mentors was limited to eight made it necessary to restrict the number of the mentees to eight, who were all selected among the applicants on random basis. As the faculty administrator wanted to take part in the process as a mentee, the total number of the mentees increased to nine, and only one of the mentors was matched with two mentees. In this context, TMP implemented one-to-one with mentors (doctorate students) and mentees (teacher educators) continued for one academic term (12 weeks). TMP was generally provided for an hour a week. The mentors and the organization came together once in one or two weeks to evaluate the process. The mentoring hours were conducted on one-to-one basis in the mentees' offices at the faculty and sometimes in classroom for practical purposes. At the end of TMP carried out in one academic year (12 weeks), the mentors and the mentees were asked for their views about the program.

Data Collection Tools

In the academic year during which TMP was carried out, data were collected from the TMP stakeholders. The data were collected via the mentee interview form, the mentor interview form, mentor reflections and organization meeting reflections. The validity of the present study was achieved with data triangulation. Data triangulation, which entails gathering data through several sampling strategies, so that slices of data at different times and social situations, as well as on a variety of people, are gathered

(Denzin, 1984). The data collection tools used in the study and the data collection process are presented below (see Table 1).

Table 1.
The data collection process in the present study

Date	Data Type	N	Record Type	Record Duration
10.08.2012-16.08.2012	Mentee interview	9	Audio record	15 to 30 min. (each one)
06.06.2012-13.06.2012	Mentor interview	8	Audio record	10 to 21 min. (each one)
01.03.2012-01.06.2012	Mentor reflections	8	Paper	1 to 2 hours (each one)
01.03.2012-01.06.2012	Organization meeting reflections	8	Paper	1 hour (each one)

Mentee interview form

A semi-structured interview form developed by the researchers was used during the interviews held with the mentors at the end of the process. Each interview held with the mentors lasted 15 to 30 minutes. The questions and the probes in the semi-structured interview form included ‘What was your purpose in taking part in the technology mentoring program?’, ‘What are the problems you encountered in the TMP process?’, ‘What are your suggestions for the planning and functioning of TMP?’, ‘What are your suggestions to sustain TMP effectively and successfully?’.

Mentor interview form

A semi-structured interview form developed by the researchers was used during the interviews held with the mentees at the end of the process. Each interview held with the mentees lasted 10 to 21 minutes. The interviews were held on one-to-one basis in a quiet environment to avoid any distraction of attention. The questions and the probes in the semi-structured interview form included ‘what are the problems you experienced in the process of technology mentoring?’, ‘How did the problems and obstacles

you encountered influence the process of technology mentoring?', 'Considering the problems you encountered, what are your suggestions for the improvement of the technology mentoring process?'.

Mentor reflections

Generally, once a week during one academic term, 8 mentors made reflections before and after their mentoring with their mentees. In these reflections, the mentors took notes of everything they made with the mentees during the mentoring process. Therefore, the reflections included various data regarding the activities carried out, the achievements and failures, the communication and interaction between the mentor and the mentee, the observations regarding the mentees' feelings and thoughts, the problems encountered and the ways for coping with these problems.

Organization meeting reflections

The mentors and the organization held regular meetings every week or every two weeks and evaluated the process. The feedback provided and the evaluations made were noted down by the researchers. The notes taken regarding the problems experienced in the process as well as regarding the solutions to these problems were used not only to determine the themes and the sub-themes but also to support the other data in the "Recommendations" part of the study

Data Analysis

The data were collected via the reflections made by technology mentors during the whole process and via the individual interviews held with both mentors and mentees at the end of the TMP implementation, which continued for one academic term. The data were analysed with the content analysis technique. The common problems experienced during the process are presented below with some comments made by the mentors and mentees. The data regarding all the records were analyzed by two educational technologists to determine the themes and sub-themes. Until reaching consensus on all the themes, the categorization process continued.

Totally 3 themes and 15 sub-themes were determined. The problems related to the process are displayed in the structure below (see Figure 3).

Results

Figure 3 classifies the problems experienced in the TMP as mentee-based, mentor-based and organization/institution-based. The problems based on the mentees were classified under the headings of time, administration, planning, commitment, goal/content, motivation and personal characteristics, while the problems based on the mentors were classified as, time, experience and motivation. Organizational/Institutional problems were identified as matching, time, infrastructure, technology and physical dimensions.

Figure 3. The problems of technology mentoring program

Mentee-Based Problems

Time. The teacher educators who participated in the process as mentees in TMP experienced time constraints due to other responsibilities in the faculty. It was observed that the teacher educators experienced problems related to time during the TMP process due to intensive teaching loads and participation in faculty meetings and conferences and had problems in organizing meetings with their mentors. Some mentees participated in the process although they had heavy workloads at the beginning of the academic term and experienced difficulties in terms of the meeting they held with their mentors. Mentor B.C. stated in her interview that: "*My mentee told me that he was very busy this* academic term *hence he could not really demonstrate as good performance as he liked*".

Administration. It was identified that three mentees in TMP had administrative duties such as the dean and the department head. It was observed that some of the mentees who experienced a very intensive process between their administrative duties and their teaching loads reflected their administration-related responsibilities on to mentoring. Due to their administrative duties, some mentees had to attend urgent meetings (technology mentoring), host important visitors from outside the faculty and take care of emergencies in the faculty, and these actions resulted in incomplete mentoring and loss of concentration during mentoring. One mentor reflected this situation in his reflection:

> S.G. "The door is often knocked and someone comes in. I believe it is one of the disadvantages of being an administrator".

Planning. Planning is one of the important steps that should be undertaken at the beginning of TMP together with the mentor and the mentee especially in line with the needs of the mentee. Problems in planning or disloyalty to the planned actions were found to affect the other factors in the process. Mentee A.C. expressed a self-criticism by saying in his interview that: *"I think the biggest problem here is my not adhering to meeting times (technology mentoring)"*.

Problems in planning affected many other factors such as time and motivation. Due to the emerging matters and canceled issues at meetings,

the mentor was caught unprepared, which resulted in a waste of time due to moving to a new subject matter without fully completing the previous one.

It was suggested that the mentees realize what they need at the beginning of the process and that their goals and expectations from TMP be clear (Warring & Lindquist, 1999). Although some mentors and mentees did the planning at the beginning of the process, it was observed that these plans were not followed through.

Commitment. In general, TMP was implemented for an hour in a specific day of the week. It was stated that the time was insufficient; however, the meeting time was scheduled to be for an hour due to the intensive workloads of both the mentors and mentees. It was reported by the mentors that the meetings were often delayed or cancelled and that only a small portion of the time was used. Poteat, Shockley, and Allen (2009) mention that satisfaction of the mentor and the mentee can only be achieved with mutual high levels of commitment. It is also stated that mentee and mentor commitment with regards to meetings are affected from each other. It was observed that some mentees forgot the meeting dates and times and that some others demonstrated such behaviors as accepting incoming calls, meeting with visitors and having their visitors wait in the meeting room during the meetings. They were also observed not to take or want to take necessary measures to ensure the success of the meetings. Regarding these subjects, the mentors mentioned similar problems in their reflections:

> F.T. “When he saw me, my teacher educator told me with a sad expression ‘I forgot about you, F.T’. I have an appointment with someone else”.
> O.F. “When I knocked on the door, the teacher educator was in the room but had a visitor. We had a short meeting. He told me that his visitor came from abroad and requested not to work that week”.

It can be said that the mentees were not fully committed to TMP or that they regarded TMP as a process in which meetings were held when they had no other business.

Goal/Content. The fact that TMP was implemented in the faculty for the first time caused difficulties in taking the required measures at the

beginning of the process. As the mentees were not provided with the details of the program in detail and as some of the mentees participated in the process only out of curiosity, some problems were experienced during the process. Lack of full understanding of the goal and content of the program by the mentees resulted in not really caring for and adhering to the program. Mentor S.G. expressed in his reflection that his mentee's knowledge of technology use was rather good and that the mentee did not actually need TMP that much, saying: *"I talked to my mentee about the project and about the technology mentoring plan of this academic term. My mentee said that she demanded the program out of curiosity"*.

Motivation. It can be said that the factor most influenced by the problems experienced during the process was motivation for both mentees and mentors. The mentees who aimed at learning new things during the process and who made efforts for this purpose lost some of their motivation from time to time when they did not experience success or reached the expected levels. One of the main reasons for this type of motivation loss is related to the fact that technology use skills for each mentee were not identified and that an appropriate program was not developed in line with the needs for each mentee in TMP. The mentees who wanted to learn from their mentors every technological issue that they heard about wanted to acquire higher levels of technological subject matters by skipping the basic ones. Hence, it was reported that some of the mentees were frustrated and sad and experienced loss of motivation throughout the applications they failed to accomplish during the process. Mentor O.O. reflected his observations in his reflection: "*My mentee teacher educator was really frustrated because of the problems experienced today*".

The fact that even mentors had difficulty regarding some of the technological issues that the mentees already found complex and difficult also caused the mentees to lose their motivation. The fact that the mentors were not competent in every subject and that some problems related to software or hardware occurred out of the mentors' control was sometimes ignored.

The fact that the mentors experienced fear of failure and many other problems related to software and hardware during the process decreased their motivation. In these situations, the mentors were reminded that they needed to keep mentee motivation at high levels at all times and that they

needed to provide positive reinforcement for the mentees even for the smallest gain. One of the mentors stated in his/her reflection that:

> S.G. "…I wanted my mentee to do a few of the examples and I did not interfere. I guess she was successful and said 'I learn fast, right?'. I answered; 'yes, your interest in technology and willingness to learn helps' ".

Personal characteristics. Since the mentees were adults and teacher educators at the same time, the mentors reported that they approached to them with caution at the beginning of the process. However, later, breaking down the hierarchy between teacher-learner was observed (Thompson, 2006a), and many meetings resulted in honest and close communication. Since the mentees were adults with various technology experiences (Wan, 2009) resulted in some disagreements in some of the meetings (Kouadio, 2006) which caused problems in the acquisition of some of the skills.

Mentor-Based Problems

Time. Just as the mentees, the mentors had intensive programs as well. The eight mentors participating in TMP both were doing their doctorates and were in the position of research assistant in the faculty; hence, they had responsibilities regarding the doctorate process and faculty-related tasks. This heavy workload necessitated meeting for TMP on specific dates and at certain times of the week. The fact that mentor-mentee matching was done at the beginning of the process without taking these issues into consideration made it difficult for both parties to meet. Although time constraints were valid for both mentors and mentees, lack of experience in time management on the part of the mentors created more problems regarding time.

Experience. In this study, where the mentors were selected among doctorate students, some problems regarding experience were observed in providing technology mentoring to teacher educators. It was identified that the mentors had problems in managing the process and overcoming the problems they faced due to the fact that it was their first participation in TMP. Mentor D.O. explained this problem in her interview saying: "*My*

lack of experience created some problems. If I were to provide technology mentoring in the next academic term, I would not be that inexperienced". An interview with another mentor O.F. revealed lack of experience as the cause of problems: "*There were some problems originating from me which were my lack of experience and the problems I experienced regarding management/planning*". Another mentor O.O. stated in his interview that he felt personally inexperienced at the beginning but solved the problem in the process: "*At the very beginning, I considered my lack of experience as a problem. However, after a while, I increased communication with my mentee and we solved the problem together*".

Motivation. As a mentor, the mentor student is not expert in everything about technology (Chuang, 2006). The fact that the mentees believed the mentors would know all the subject matters and the answers to all the questions caused a decrease in mentor motivation. Some of the mentees were unaware of this problem, and they believed that their mentors knew everything about technology, while other mentees understood that their mentors had their own fields of expertise regarding technology. Mentee A.E. summarized this saying in his interview that: "*It is not possible to know everything in any given field*".

It was seen that the motivation levels of the mentees affected the mentors as well. One of the mentors lost confidence in herself for a certain period of time and felt hopeless, which was mentioned in her reflection as follows:

> B.C. "We could not meet my teacher educator again this week. Let's hope for the next week. He is a bit busy these days. I have not met him for the past two weeks. I think I feel tense. I guess I am not an effective technology mentor".

Organizational/Institutional-Based Problems

Matching. Mentor-mentee matching is one of the steps that affect the success of TMP and the other factors (Sherman, Voight, Tibbetts, Evans, & Weidler, 2000). Hence, the fact that matching was not undertaken in an appropriate manner in the study resulted in many problems such as loss of time, failure and loss of motivation. Mentor-mentee matching was

randomly done at the start of the process, and the competences and expertise of the mentors were not taken into consideration. In this context, the fact that some of the mentees were more competent and had higher levels of skills than the others created difficulties for the mentors. Some mentors were observed to delay some subject matters for subsequent weeks in order to study them. This caused some mentors to feel inadequate, inexperienced and useless for their mentees during the process. It was suggested that mentor-mentee matching should consider subject-area interests, potential compatibility and technology experience levels for both parties (Thompson, 2006b).

Both the mentors and mentees expressed the need to identify and consider the fields of expertise of the mentors during matching. One of the mentees stated in his interview that:

> A.E. "The needs of the mentees as well as their demands, should be identified and also the fields of expertise of the individuals we would ask for guidance. Everyone has a dominant field. I mean the fact that the mentor studies technology does not mean he/she has to know every field in technology".

Time. Time is one of the problems of TMP, which is the hardest to overcome (Sherman et al., 2000). It was observed that the time-related problems affect TMP in various ways directly or indirectly. Time issues are problems related to time management, ineffective use of time and mentee- and mentor-based problems, while the lack of time set aside for TMP is another problem experienced during the course of TMP. The need for more time to teach new information (Kouadio, 2006) was evident with the experience that one academic term in this program was insufficient. Interviews with the mentees highlighted the fact that one academic term (12 weeks) was insufficient for TMP:

> A.B. "The duration could be a bit longer, and maybe it can be done in two academic terms."
> E.G. "It could have been longer, but not hours; one hour a week is sufficient. There is no problem in hours but the process could have been longer.

Infrastructure. Among the most important problems related to faculty, related literature cites inadequacy of technology tools, lack of staff to solve technical problems with technology tools and infrastructure (Georgina, 2007; Kouadio, 2006). Some problems were experienced in TMP caused by the infrastructure of the faculty such as lack of strong wireless connection that can be accessed from each location at the faculty, inadequacy or lack of certain technological tools, lack of a technology center open to collective use with all required technological tools and lack of faculty staff that can provide technological support.

Technology. Literature review demonstrates that certain problems such as the problems with Internet access and difficulties experienced in Blackboard computer software were reflected in this process just as they were evident in previous technology mentoring programs (Cullimore, 1999; Johnson, 2006). Two mentors in TMP, D.O. and S.G., had problems with Blackboard due to the fact that the software was new in the faculty and that it did not have a suitable version correctly translated into Turkish. D.O. stated this problem in her interview saying: "*it is something caused by the software itself. Bad translation, bad set-up and bad interface design. We had to overcome the problems*".

Physical. Although some of the mentees had their won offices, they normally shared them with another colleague. In this case, it was observed that neither the mentor nor the mentee was comfortably alone in the office room for meetings. However, lack of a technology center at the faculty made it a necessity to hold the meetings in the mentees' office rooms. It was also observed that the layout of the offices was not very suitable for meetings. Most of the time, two computers had to be placed on one table and the mentee had difficulty intervening due to lack of space while the mentee was conducting the applications.

Without doubt, overcoming problems such as physical problems is among the duties of the faculty or the university. Resources of each faculty may not be sufficient, and finding solutions may also take time. However, doing some arrangements to minimize the effects of unfavorable physical situations on the process will contribute highly to the process.

It was observed that the problems cited above are not independent and affect each other in the process. Hence, the problems experienced during

the process and the stakeholders of the process occurred as a whole. The fact that the problems occurred as parts of a whole provided ideas to think of the solutions in a holistic manner to improve the process.

Discussion

At the end of the TMP, the mentors, mentees and other stakeholders pointed out that they were happy with the program and that they received benefited from it personally. Literature review states that technology mentoring programs provide mutual benefits for both mentors and mentees, provide benefits for the colleagues of the mentees, increase the communication between the mentor and the mentee and bring benefits not just for the faculty but in the wider community (Butler & Chao, 2001; Chuang & Schmidt, 2006; Jones, 2002; Pamuk & Thompson, 2009; Sahin, 2006; Tatistcheff, Church & Carberry, 2008; Thompson, 2006b; Tracy et al., 2004).

The common problems identified at the end of the program implemented were classified under three such headings as mentee-based, mentor-based and organizational/institutional. The mentee-based problems were related to time, administration, planning, commitment, goal/content, motivation and personal characteristics; the mentor-based problems were related to time, experience and motivation; and the organizational/institutional problems were related to matching, time, infrastructure, technology and physical problems. Literature review shows that similar problems were expressed and experienced both in technology integration and TMP such as time, lack of technological tools or resources, lack of motivation, organization or institution, support, irregular mentor-mentee meetings, experience, personality factors, unclear goals and unsuitable matching (Bell & Hofer, 2003; Brinkerhof, 2006; Butler & Sellbom, 2002; Earle, 2002; Leh, 2005; Lumpkin, 2011; Pelgrum, 2001; Strudler et al. 1995; Wisniewski, 2010). Also, Hew & Brush (2007) modeled the direct barriers include: (a) teachers' attitudes and beliefs towards using ICT, (b) teachers' knowledge and skills, (c) institution and (d) resources (e.g. availability and access to ICT, support and so on).

Planning and managing the TMP process from the beginning to the end will prevent many problems. The results of the study demonstrated that certain steps affected the process to a great extent such as mentee

participation in the program by fully comprehending the goals and content, the need for mentor–mentee matching to be done according to certain criteria, provision of time management, provision of required care and diligence for the process by the mentees and selection of mentors among experienced individuals in technology mentoring. Similarly, Lumpkin (2011) suggested that steps below should be taken into consideration for the success of the faculty mentoring programs: (1) having a clear purpose, goals, and strategies; (2) selecting, matching, and preparing mentees and mentors for their new roles; (3) conducting regular meetings to nurture interactions among mentees and mentors so both can achieve their goals and benefit from their interactions; and (4) evaluating the program effectiveness.

Finally, some suggestions are put forward in line with the data obtained from TMP implementation. These suggestions are important since they reflect the views of the mentors and mentees who personally experienced the process. Taking these suggestions into consideration will contribute to more successful implementation of the process.

Conclusions and Recommendations

As a result of TMP conducted in the present study, the problems based on the mentor, on the mentee and on the organization/institution were determined. In order to carry out TMP more effectively and successfully, a 6M-framework was suggested within the scope of this study. It could be stated that fewer problems will be encountered and the process will be carried out more effectively and successfully when the structure in this framework is taken into consideration. The present research provides parallel findings with the literature review. In line with the data obtained through individual interviews with both the mentors and mentees at the end of TMP and mentors' reflections throughout the process.

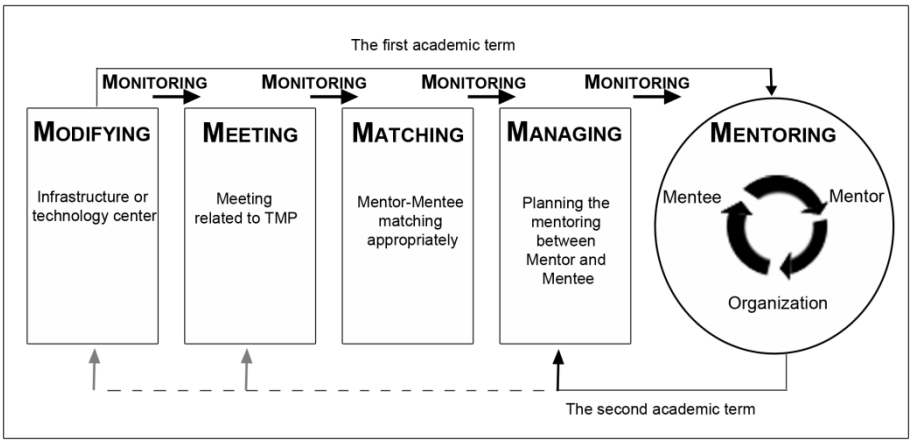

Figure 4. 6M-Framework for effective and successful TMP (at least for two academic terms)

As can be seen in Figure 4, the 6M-structure to contribute more successfully to execution of the process in TMP was presented as a framework. According to this, in TMP, the process is carried out as **M**odifying, **M**eeting, **M**atching, **M**anaging and **M**entoring, respectively. **M**onitoring is included in each step as case evaluations and reflections regarding TMP throughout the process.

In the step of Modifying, the technological infrastructure of the institution such as wireless internet connection is improved, and if possible, a technology center is established. Thompson (2006b) mentioned the establishment of a Technology Center, which is thought to prevent many problems likely to occur in the first place. In this technology center established, all the practices regarding TMP can be carried out. In addition, in this step, the room in which the mentor and mentee meet for the mentoring process should be arranged so that the desk and computers will have space for two individuals to work together. The Meeting step involves informing about TMP. A meeting could be held with the stakeholders (mentees, mentors and organization/institution) and the goals, boundaries and the content of TMP could be clearly explained to the stakeholders. The better the goals of TMP are presented in this step, the more the teacher educators who are in need of the process participate. The Matching step is

the one to which utmost attention could be paid and which requires meticulous work in terms of the TMP organization. Mentor-mentee matching cannot be undertaken through random matching but done by considering the needs of the mentees and the competences of the mentors (fields of expertise). In addition, the mentee's weekly course schedule and his or her responsibilities in the faculty as well as the mentor's responsibilities in the doctorate process should be taken into consideration. In this respect, for most appropriate criticism, such concepts as time, needs and specialization could be attentively evaluated. In the Managing step, even though the mentor has an important role, this process is carried out with the cooperation of the mentor and of the mentee. In this respect, mentees could be aware of their needs and plan the process together with the mentor at the beginning of the process. Mentoring meeting could be planned for teacher educators by considering their other responsibilities in the faculty. Georgina and Hosford (2009) suggested developing technology assessment tools on the user level, provision of technology education according to specific goals, i.e., according to the needs of the individual and provision of technology education to one-to-one or similar small groups. Kouadio (2006) stated that acquisition of technology use skills requires a specific time limit and that mentors and mentees should be patient during the process. In addition, Sherman and colleagues (2000) suggested that teacher educators should recognize the time limitations and plan the process accordingly.

All these steps could be said to be preparatory steps for technology mentoring. These steps change depending on the number of the stakeholders, and it is a process that lasts a few weeks. In the Mentoring step, the principle step, the mentor and the mentee carry out the technology-related mentoring on theoretical and practical basis. Stakeholders could get together throughout the process in regular periods, and the process could be evaluated and synergy could be created. The Mentoring process could be provided on a one-to-one basis due to the differences in individual needs. Planning and meeting times could be dependent on at all times except emergencies. The mentoring process could be extended to two academic terms.

As a result of the implementation carried out in the present study, the stakeholders commonly reported that TMP was not sufficient for one academic term and that it could cover at least two academic terms.

Therefore, if new mentors and mentees will not participate in the second academic term, this structure might recycle by turning back to the "managing" step. If there are mentors and mentees willing to be involved in the process besides other previous participants, this structure recycles with the "modifying" step or with the "meeting" step, in which new participants take part.

Implementation of other TMPs by taking these suggestions into consideration will contribute both to technology dissemination in educational environments and to technology integration. Also, implementations of more TMPs for analysis of the problems experienced in different implementations and research methods such as action research are suggested for future studies. Finally, the 6M Framework can tested and discussed practically in further research and papers.

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