

TURKISH MATHEMATICS MENTOR TEACHERS' EXEMPLARS OF EFFECTIVE MENTORING PRACTICES

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Abstract

Teaching practicum is an indispensable part of preservice teacher education, which enables teacher candidates (TCs) to put their theoretical knowledge into practice. In this process, the importance of mentor teachers' (MTs) practices cannot be denied for TCs' learning. According to the literature, effective mentoring practices are not solely based on teaching skills, and should be subject-specific and based on clear standards. Therefore, Hudson and Peard (2006) presented a set of standards under the Five-Factor Mentoring Model for effective mentoring in mathematics teaching. Even though the importance given to mentoring in preservice teacher education has increased by the recent regulations in Turkey, the practices on the mentor education do not match current trends in the literature and there exists limited research on mentoring particularly in mathematics teaching. Therefore, there is a need to examine mentoring practices in the field of mathematics education in Turkey. Using quantitative analysis approach towards participants' answers on open-ended question of a questionnaire on effective mathematics mentoring, this study seeks to investigate participating Turkish mathematics MTs' typical examples of their own effective mentoring practices. In total, 54 MTs from 6 different cities (each from different region of the country) of Turkey participated in the study. Their exemplars for effective mentoring practices were analysed based on the factors of Five-Factor Mentoring Model: Personal Attributes, System Requirements, Pedagogical Knowledge, Modelling and Feedback. Under each factor, there exists a set of practices as the indicators of factors. The answers of each MT were first open coded, then these open codes were matched to the indicators of the five factors. Most of the answers were coded with more than one factor which results in number of codes more than number of MTs. In total there were 43 many codes from participating 30 MTs. In this study the findings will be reported as frequency of participants who discussed factors in their exemplars. The findings indicated that most of the participating mentors (20.4%) gave typical examples related to their mentoring practices associated with pedagogical knowledge. The percentages of MTs stating exemplars of personal attributes, modelling and feedback were 14.8%, 13.0% and 16.7%, respectively. However, there was no MT stating a practice related to system requirements as a typical example of effective mentoring practices. Considering all practices under five factors, the percentage of MTs who evaluated "making the mentee feel more confident" as an effective mentoring practice was the highest (11.1%). In this presentation the findings will be discussed further with the regard of Turkish teacher education system and international perspective on MT practices.

Keywords: Secondary education, mathematics education, mentoring, mentoring practices.

1 INTRODUCTION

In the fast-changing world, education takes an important place in order to raise generations who can deal with the challenges and create a better world. Teachers, among many other educational resources, are the foremost contributors of educating such generations. Therefore, their education, especially pre-service teacher education which is the entry point of the teaching profession is critical. Teachers are expected to have mainly content knowledge, pedagogical knowledge, and pedagogical content knowledge ([7], [8]). Accordingly, there are three major components of pre-service teacher education: subject-matter courses, teaching methods courses, and experience in professional practice ([15], [16], [26]). Professional practice is developed more effectively when it occurs in the workplace [10]. Thus, teaching practicum in schools is one of the most important part of pre-service teacher education programs. It provides pre-service teachers the opportunity of transferring their theoretical knowledge into practice. In this process of teaching practice, the mentor teachers with the role of providing effective guidance and support are pivotal for pre-service teachers' learning to teach [9].

Curran and Goldrick (2002) pointed out two main components of effective mentoring. Firstly, mentoring should be subject-specific. It means that if a pre-service teacher is a candidate for being a mathematics teacher, he/she should be mentored by a mathematics teacher specifically on teaching and learning mathematics. Secondly, mentoring should be based on clear standards. Some

researchers argue that meeting pre-service teachers' needs is at the centre of mentoring. Their needs might differ; therefore, mentors should consider their needs and take actions accordingly. Even though their needs may differ, all pre-service teachers deserve to be mentored effectively. Thus, mentoring should include clear standards in order to enhance effective mentoring for all pre-service teachers [2]. Although many studies support that mentoring should be a systematic manner built on clear standards ([2], [31]), the status of mentoring in Turkish context does not look much systematized [14].

One of the main concerns in Turkey in terms of pre-service teacher mentoring is selection of mentor teachers. Ministry of Education does not have any regulation on determining teachers for mentorship status, except that they should have the Certificate of Teaching Practice Training [13]. A common method of determining mentors, internationally used method is to choose 'good teachers' [3]. However, Smith (2015) questions selection of mentors as "The claim that I make is that mentoring is not the same as teachers' first order professional practice, it is a profession within the profession in which mentoring takes place." (p. 238). So, mentoring as a profession within a profession needs to be examined in Turkish setting.

In the profession of mentoring, implementing effective teaching practices may not be enough for effective mentoring; therefore, mentoring roles and practices should be defined clearly. Even though there exist a number of research studies (e.g. [18], [32], [27]) which pointed out some important mentoring roles, these studies had limited discussion on the practices required for effective mentoring. On the other hand, the Five-Factor Mentoring Model, developed by Hudson and Skamp (2001, 2003), presented a set of standards for effective mentoring with considerations on subject-specific practices. Those standards were grouped under five factors: Personal Attributes, System Requirements, Pedagogical Knowledge, Modelling and Feedback. Therefore, the Five Factor Mentoring Model is the main framework of the current study in order to describe mentors' exemplars of effective mentoring practices. Based on the findings of Hudson and Skamp (2001, 2003), the five factors are defined below along with their indicators [25]:

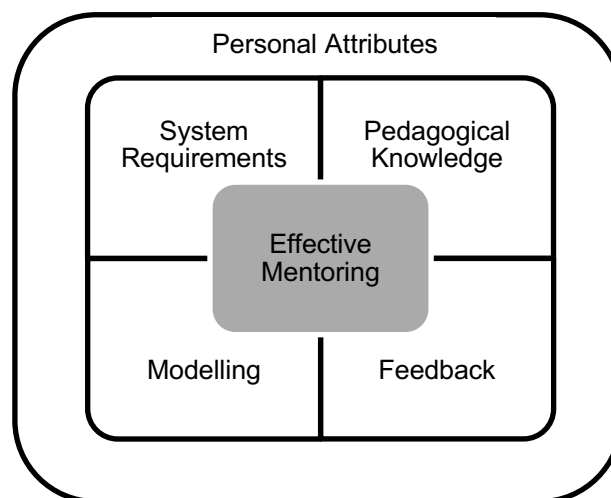


Figure 1. The Five-Factor Mentoring Model

Factor 1 – Personal Attributes: The main personal attributes that a mentor needs to have are being supportive, listening attentively, instilling confidence and positive attitudes for teaching, and encouraging pre-service teachers to offer reflection on teaching practices.

Factor 2 – System Requirements: Most of the education systems have requirements that give a direction for what to teach and how to teach. For an effective mentoring, mentors need to explain to their mentees the curricula, their goals, and school policies.

Factor 3 – Pedagogical Knowledge: Articulating pedagogical knowledge and pedagogical content knowledge is essential for effective mentoring of pre-service teachers. Mentors help mentees in the process of preparation and planning for teaching, and schedule lessons for mentees. They provide the pedagogical knowledge for the implementation of the lesson plans, classroom management techniques, and teaching and assessment strategies. Mentors also need to discuss knowledge about teaching a specific subject, help mentees to improve their questioning skills, and provide problem

solving strategies for mentees' teaching. Moreover, mentors should provide pedagogical viewpoints on teaching in order to develop pre-service teachers' teaching practices.

Factor 4 – Modelling: Mentors should model the teaching process including planning, preparation, implementation, and assessment stages. Mentors are required to show enthusiasm towards the subject and teaching, and to model a rapport with their students, language appropriate for student learning, effective teaching practices, classroom management techniques, hands-on materials, and well-designed lessons.

Factor 5 – Feedback: Mentors should articulate their expectations, review pre-service teachers' lesson plans, and observe their teaching practices. Then, they should provide mentees with oral and written feedback. Also, mentors should help pre-service teachers learn how to evaluate their own teaching, which help them to reflect on their teaching more effectively.

This model has been an interest of educational research on effective mentoring. Some of the research have investigated pre-service teachers' perceptions of their mentors ([4], [20], [21], [22]), and some have explored mentors' perceptions of their own mentorship [19].

In regard to mentoring in Turkey, in 1998, the Higher Education Council stated the decision that mentor teachers would be selected by school coordinators and supervisors [12]. However, the literature indicated that the decision was not implemented as stated [28]. Moreover, a mentor training program was introduced on the 1998 regulation. It also was not carried out as stated. Yet, in the recent years, the Ministry of National Education and the Council of Higher Education regulated the process of teaching practices of pre-service teachers in practicum schools, the partnership between universities and schools, and the roles of pre-service teachers, mentor teachers and supervisors [13]. It was declared that a teacher must gain the Certificate of Teaching Practice Training given by Ministry of National Education in order to become a mentor teacher, which means a mentor training became compulsory. These regulations indicated that the importance given to mentor teachers and their practices has been increasing in Turkey.

In the recent study of Yılmaz and Bıkmaz (2020), mentors' professional learning needs were examined from the perspectives of the three stakeholders (supervisors, mentors, and mentees) within the context of Classroom Teacher Education. The researchers presented those needs under three categories: professional knowledge and skills, core mentoring skills, and social qualifications; also stated the need for mentoring roles and responsibilities to be clearly stated. On the other side, there exist limited research study about mentoring practices particularly in mathematics education in Turkey. This study aims to unveil mathematics mentor teachers' practices that mentors evaluated as effective. Therefore, the following research questions were addressed:

What factors of Five-Factoring Mentoring Model are emerged from the mentors' answers to the open-ended questions on exemplary mentoring?

2 METHODOLOGY

In Turkish education context, there exist two routes of becoming a teacher; completing an undergraduate program in the Faculty of Education, and completing the pedagogical formation programs that are provided for the graduates of an undergraduate program in the Faculty of Arts and Science. In particular, in order to become a mathematics teacher, it is required to graduate from one of the primary school mathematics education or secondary school mathematics education programs, or to complete the pedagogical formation program after graduating from the undergraduate mathematics program. In both ways, teacher candidates are expected to take practicum course. In the Faculty of Education, the practicum courses are usually provided in spring terms. For examining mentors' effective practices, firstly, universities which provided pedagogical formation programs and practicum course in the 2019-2020 fall term were selected purposefully. Among those universities, 6 universities (Akdeniz University, Atatürk University, Marmara University, Ege University, Gazi University, and Gaziantep University) with higher student quotas from different regions of Turkey were determined. Afterwards, MTs who were collaborating those universities were invited to the research. In total, 54 MTs agreed to participate in the study. Open-ended questionnaires were conducted with MTs. In the questionnaires, the participants were asked to share an experience that they evaluate as "an effective mentoring practice."

For the analysis of the open-ended questionnaires, firstly, the responses were read in detail to understand what the participants stated. Then, code words or phrases were assigned to the responses. The assigned codes were matched with the indicators of each factor in the Five Factor Mentoring Model [25]. The indicators were considered as categories to be collected under the themes, and accordingly, the factors of the Five Factor Mentoring Model constituted the themes for the categories. However, the categories different from the pre-determined ones appeared in the data, and they were able to be placed in a pre-determined theme.

In the result section, the participating MTs' responses to the questionnaire were tabulated in terms of the frequencies of the categories and themes. The frequencies represent the numbers of the MTs whose responses were coded under a particular category or theme. The participants' responses can be matched with more than one category. Therefore, the total number of frequencies for categories under a particular theme might be more than the frequency of the theme. Also, the participants' responses can be matched with more than one theme. Therefore, the total number of frequencies for themes was more than the total number of participants whose responses were analyzed.

3 RESULTS

Mentors' responses to the questionnaire asking for their experiences they regarded as "effective mentoring practices" were analyzed quantitatively. In total, out of 54, 30 mentors' responses to the questionnaire were analyzed via open coding, since 6 mentors' answers were not meaningful, and 18 mentors did not respond to the question. It is also important to note that when the expressions of mentors in the open-ended questionnaire were examined, many mentors preferred the verbs such as "teach" and "warn" rather than "help" or "discuss" which are preferred in the Five-Factor Model. Even though they preferred a verb connoting a less-collaborative approach, the sentences were coded under the related items as in the model. The categories obtained from coding were collected under the themes of Personal Attributes, System Requirements, Pedagogical Knowledge, Modelling and Feedback. Table 1 indicates the percentage of mentors who gave an example of mentoring practices related to the factors of Five Factor Mentoring Model.

Table 1. Mentors' exemplars of mentoring practices related to five factors.

<i>Five Factors of Mentoring</i>	<i>Mentors (%*)</i>
Personal Attributes	14.8%
System Requirements	0%
Pedagogical Knowledge	20.4%
Modelling	13.0%
Feedback	16.7%

**Percentage of mentors giving an example of mentoring practices related to the specific mentoring factors.*

As shown on the Table 1, most of the participating mentors (20.4%) gave typical examples related to their mentoring practices associated with pedagogical knowledge whereas none of the mentors provided examples related to system requirements.

3.1 Personal Attributes

Table 2 shows typical mentoring practices related to personal attributes along with the frequency and percentage of mentors who stated that they had specifically implemented those practices. Eight mentors out of 54 (14.8%) expressed their practices associated with personal attributes as effective mentoring practices. In particular, they believed that they made the mentee feel confident as a mathematics teacher (11.1%) and was supportive of mentee for teaching mathematics (5.56%), and only one mentor stated instilling positive attitudes for teaching mathematics as his/her effective mentoring practice (1.85%).

Table 2. Mentors' exemplars: Personal attributes

<i>Mentoring Practices</i>	<i>Mentor Labels</i>	<i>Frequency</i>	<i>%</i>
I was supportive of the mentee for teaching mathematics.	16, 21, 32	3	5.56%
I instilled positive attitudes in the mentee for teaching mathematics.	42	1	1.85%
I made the mentee feel more confident as a mathematics teacher.	10, 11, 16, 19, 21, 43	6	11.1%
Exemplars of effective mentoring practices related to personal attributes	10, 11, 16, 19, 21, 32, 42, 43	8	14.8%

3.2 Pedagogical Knowledge

Table 3 shows typical mentoring practices related to pedagogical knowledge along with the frequency and percentage of mentors who stated that they had specifically implemented those practices. It indicates that 11 mentors out of 54 (20.4%) expressed their practices associated with pedagogical knowledge as effective mentoring practices. In particular, they believed that they assisted the mentee with implementing classroom management (5.56%) and mathematics teaching strategies (3.70%), developed the mentee's strategies for teaching mathematics (3.70%), and discussed with the mentees the knowledge they needed for teaching mathematics (5.56%). Apart from the practices placed in the Five Factor Mentoring Model, two mentors (3.70%) stated that they assisted the mentees with implementing teaching strategies for special education students.

Table 3. Mentors' exemplars: Pedagogical knowledge.

<i>Mentoring Practices</i>	<i>Mentor Labels</i>	<i>Frequency</i>	<i>%</i>
I assisted the mentee with classroom management strategies.	6, 36, 45	3	5.56%
I assisted the mentee with implementing mathematics teaching strategies.	30, 48	2	3.70%
I developed the mentee's strategies for teaching mathematics.	4, 48	2	3.70%
I discussed with the mentee the knowledge the mentee needed for teaching mathematics.	15, 27, 49	3	5.56%
I assisted the mentee with implementing teaching strategies for special education.	22, 40	2	3.70%
Exemplars of effective mentoring practices related to pedagogical knowledge.	4, 6, 15, 22, 27, 30, 36, 40, 45, 48, 49	11	20.4%

3.3 Modelling

Table 4 presents typical mentoring practices related to modelling along with the frequency and percentage of mentors who stated that they had specifically implemented those practices. It indicates that 7 mentors out of 54 (13%) expressed their practices associated with modelling as effective mentoring practices. In particular, four mentors believed that they modelled effective classroom management (7.41%), and another mentor, Mentor11, stated that he/she modelled mathematics teaching. Apart from the modelling practices placed in the Five Factor Mentoring Model, a mentor expressed that he/she implemented some teaching strategies for special education students; and also, another mentor stated that he/she used technology for mathematics teaching as an effective mentoring practice.

Table 4. Mentors' exemplars: Modelling.

<i>Mentoring Practices</i>	<i>Mentor Labels</i>	<i>Frequency</i>	<i>%</i>
I modelled mathematics teaching.	11	1	1.85%
I modelled effective classroom management when teaching mathematics.	13, 20, 45, 46	4	7.41%
I modelled teaching strategies for special education.	40	1	1.85%
I modelled the use of technology in education.	39	1	1.85%
Exemplars of effective mentoring practices related to modelling.	11,13, 20, 39, 40, 45, 46	7	13.0%

3.4 Feedback

Table 5 presents typical mentoring practices related to feedback along with the frequency and percentage of mentors who stated that they had specifically implemented those practices. It indicates that 9 mentors out of 54 (16.7%) evaluated their practices associated with feedback as effective mentoring practices. In particular, eight mentors expressed that they provided feedback after observing the mentee's mathematics teaching (14.8%), four mentors stated that they discussed the evaluation of the mentee's mathematics teaching (7.41%), and only two mentors reviewed their mentees' lesson plans before teaching mathematics.

Table 5. Mentors' exemplars: Feedback.

<i>Mentoring Practices</i>	<i>Mentor Labels</i>	<i>Frequency</i>	<i>%</i>
I discussed evaluation of the mentee's mathematics teaching.	2, 24, 26, 31	4	7.41%
I reviewed the mentee's mathematics lesson plans before teaching mathematics.	12, 48	2	3.70%
I observed the mentee's teaching mathematics before providing feedback.	2, 12, 24, 26, 31, 44, 49, 50	8	14.8%
Exemplars of effective mentoring practices related to feedback.	2, 12, 24, 26, 31, 44, 48, 49, 50	9	16.7%

4 CONCLUSION

In the context of Turkish teacher education, because teaching diploma is guaranteed by universities and faculty members are the teacher educators, it may be necessary for supervisors to provide opportunities for mentors to collaborate as an actor of teacher educators. Implicitly, the expressions of mentors in the open-ended questionnaire seemed not reflecting of a collaborative approach to the mentoring process even though the current trends have instilled mentoring as a collaborative effort, which was in line with the findings of Yılmaz and Bıkmaz (2020). Also, in the Turkish literature, the study of Hangül (2018) supported that teachers do not position themselves as teacher trainers even though they have the mentoring role. It seems that teachers need continuous professional development in mentoring to position themselves as mentors within their teaching profession [32]. On the other side, considering the practices under the factor of personal attributes, the numbers of mentors who gave an example related to instilling confidence as a mathematics teacher were relatively higher (11.1%), which may indicate that there were mentees who instilled teacher candidates (TCs) to position themselves as teachers.

When mentors were asked to give an example of effective mentoring practices, none of them provided an example of practices related to system requirements. This result was congruent with the literature, such that in many research studies, the practices related to system requirements were the lowest on the scale according to mentees' perceptions (e.g. [4], [21], [22]), and mentors' perceptions (e.g. [19]). Considering the Turkish literature, it was argued that mentees needed to be informed about their practicum schools' systems [29], but mentors did not provide enough practices related to system requirements ([1], [17]). Outlining curriculum and articulating its aims might give mentees subject-related directions for their teaching. In the Turkish context, some schools might use mathematics curricula different than the one offered by the Ministry of National Education in Turkey. Therefore,

such mentoring practices along with the articulation of school policies may give mentees school-specific directions [21] in order to understand how mentors have taught mathematics to the students in a specific school context.

The current mentor training program in Turkey mostly includes practices about providing feedback. When we examined mentors' exemplars about Feedback, there was not an example about giving written feedback. This may stem from the convenience of giving oral feedback in comparison with written feedback. It also implies that written feedback is not a formally requested part of the mentoring. However, oral feedback may not substitute written feedback since the recorded version of mentors' feedback might be more useful to the mentee as reflecting on their own teaching performances [22]. Therefore, mentors needed to provide written feedback as well as oral feedback.

Moreover, the practices related to articulating and modelling some practices about inclusive/special education emerged from the exemplars of mentors. In Turkey, inclusive and special education have become an issue of discussion in the recent years. The increasing number of immigrant Syrian children has required many schools to adapt to inclusive education. Therefore, mentors should be able to perform the practices such as modelling and articulating teaching strategies and the classroom management strategies for inclusive/special education in the Turkish context.

Lastly, the practices related to articulating and modelling the use of technology in the classroom emerged from the exemplars of mentors. The integration of technology into education has become a subject of debate in Turkey by a project called FATİH Project (Movement of Enhancing Opportunities and Improving Technology), which aimed to increase the equality of opportunity in education for each student to be able to access the most beneficial resources via technology (FATİH Project, n.d.). Without a doubt, nowadays when the world has been suffering from Covid-19 (corona virus), the need for the use of technology in education has been increased and technology has become an integral part of education almost all around the world. Therefore, teacher candidates should be able to learn how to use technology for teaching their subject in a more effective way. At this point, the effect of mentors' modelling the use of technology is undeniable for mentees to be able to integrate technology into their future teaching [11]. Yet, to be able to model the integration of technology, they first need to learn it. As Yılmaz and Bıkmaz (2020) mentioned, one of the areas that mentors need a professional update is the use of technology in classrooms.

Briefly, different mentoring practices emerged from the exemplars of mentors; however, there were various types of effective mentoring practices that mentors should be aware of. In the Turkish education context, the focus of the mentor training might be extended to be more comprehensive encompassing all the mentoring practices aligned with Personal Attributes, System Requirements, Pedagogical Knowledge, Modelling, as well as Feedback. In addition, since the literature suggests subject-specific and objective-based mentoring [2], the mentor training programs should be redesigned specifically for each subject area, and there should be greater clarity on the objectives of mentoring.

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