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Investigation of Effectiveness of the Pedagogical Education from Mathematics Teachers' Perceptions

Mehmet F. ÖÇAL* & Aziz GÜZEL**
Maltepe University, TURKEY

Abstract: The purpose of this study was to investigate how effective the pedagogical education was from the perception of mathematics teachers whose bachelor degree was from mathematics department of science faculty. For this purpose, as a sample, 15 mathematics teachers who had at least two year teaching experiences before taking pedagogical education were chosen with convenience sampling method. With the semi-structured interviews, their perceptions about special instructional techniques, developmental psychology, and curriculum development courses were gathered. In general, the results of this study revealed that teachers perceived that this education was required for all teacher candidates. On the other hand, it was found that there was a difficulty to apply what was learnt in these courses into practice in classroom environment due to various reasons.

Introduction

Pedagogical knowledge is essential in any kind of teaching domain in educational settings (Shulman, 2000). In Turkey's education system, there are some requirements to be certificated as a teacher. To be a teacher in any area, teacher candidates have to take certain courses related to education, some of which are guidance, classroom management, developmental psychology. The teacher candidates must have graduated from faculty of education. However, students of faculty science and art could have "pedagogical formation (PF)" education after their graduation between 1998 and 2010, then, they can be teachers in their subject areas. The reasons for these situations were due to unemployment problems of the graduates from these faculties, education system's need for more teachers in certain areas, and the previous programs' deficiencies (MEB, 2010).

1.1. The Definition and Content of Pedagogical Formation Education

The purpose of this study is whether the graduates of mathematics departments from science faculties perceive PF as necessity to be a "competent" mathematics teacher. First of all, the definition of PF in Turkey is as follows.

> "The purpose of this program is to provide graduates of science faculties with basic knowledge and abilities for being teachers in their areas of graduation. The teacher candidates who completed this program successfully can work in public and private high schools as teacher in their graduation area. The program also makes the candidates beware of new developments in our education system" (MEB, 2010).

According to the aim of this program, teachers should be equipped with content knowledge of their area and instructional skills for effective teacher (Zaki & Rasidi, 2008). Rice (2003) supports this idea by suggesting that teacher experience, teacher preparation program, teacher coursework are directly related to effectiveness of teaching practices. However, in our PF program, the emphasis is given to the instructional skills. The content knowledge is neglected in PF program by indicating that their previous content knowledge is enough to be a teacher.

The literature suggests that teachers should have some pedagogical abilities such as being adequate in classroom management, having knowledge in developmental psychology, having knowledge in instructional methods and being in real teaching environment like classrooms. To prepare teacher candidates with these abilities, the program is designed accordingly. In addition, the program includes related courses and school practicum in which the teacher candidates can involve in real classroom environment as observer or by teaching under experienced teachers.

Atasoy (2004) stated that PF program was necessary for all teacher candidates because this program improves teachers' professional development in teaching and, accordingly, it improves the quality of education, which is provided to students. In addition, this program provides helpful views which have importance in any learning area in education (Şimşek, 2000).

1.2. The Effectiveness of PF Program

Knowing any subject and teaching it cannot be the same. Although it is crucial to have enough knowledge about the subject to be taught, only knowing this subject does not enough to teach it (Senemoğlu & Özçelik, 1987). There are some other factors to be included such as pedagogical knowledge for effective teaching practices (Shulman, 2000). Teachers must know both the content knowledge of specific subject and how to teach it.

The research on the effectiveness of PF program for teacher candidates is an important area. There are numerous researchers who indicated how necessary the PF program for them (Şimşek, 2000; Yavuzer et al, 2006). For example, Yavuzer et al. (2006) conducted a research about how primary education teachers perceive the effectiveness of this program. In addition, the result of the Zaki and Rashidi's study (2008) revealed that teacher candidates should have diverse instructional methods and teaching strategies for them to take up their jobs professionally. Moreover, in Rice's (2003) literature review, pedagogical coursework contributes to teacher effectiveness at all grades, especially when teachers have necessary content knowledge. Researchers estimated that the difference between having

a "good" teacher (qualified with the PF) and having a "bad" teacher can be equivalent to or can exceed one grade level in students' whole education progress (Hanushek, Dean, Eloit, & Ludger, 2008).

2. Research Problem

The education system in Turkey allows both graduates of science and education faculties to be a teacher. If they want, graduates from science faculty can receive PF education and become a teacher in their professional area such as mathematics and biology. One more consideration is that due the lack of number of teachers to work in schools, the ministry of education allows graduates from all departments to be teachers in elementary and secondary schools without requiring PF background.

This issue brings the effectiveness of PF in mathematics teaching into surface. According to this problem, the purpose of this study is to investigate the perception of mathematics graduates who received PF education about the effectiveness of the pedagogical formation education.

3. Method and Participants

This is a case study which investigates the perception of mathematics graduates who received PF education about the effectiveness of the pedagogical formation education. With regard to the aim of this study, 15 graduates from mathematics department who received PF program were interviewed. The convenient sampling procedure was used. Participants' ages were ranging from 26 to 32 with a mean of 28,5. The criteria for choosing the sample is that the participants should have graduated from mathematics department of science faculty and had at least 2 year teaching experience without PF background. Then, the semi-structured interview form, which is subjected to expert opinion on related area, is performed to them. Each interview is conducted with two researchers. Each interview lasted 19 – 48 minutes with a mean of 27 minutes. For the validity consideration, the interviews are audio-taped by getting participants' permission. The interviews were performed in suitable classroom in their schools in Maltepe Region of Istanbul. The transcribed versions of interviews were given to the participants. The transcribed data were shown to the interviewees for confirmation to increase the validity of the study. Each transcription is analyzed by two researchers together by means of pattern coding (Miles & Huberman, 1994). Each researcher created necessary codes for gathered data. Then, the researchers made a consensus for created codes.

4. Findings

In the interviews, the interviewees were asked about the effectiveness and the applicability of three courses they had taken in their PF education. These courses were developmental psychology, special instructional techniques, and curriculum developments. The reason why we chose these courses for the study is as follows. For the developmental psychology, it has impact on other courses in PF education such as classroom management. In addition, teachers need to know students' developmental needs in their learning processes and behave accordingly (Şimşek, 2000). For the special instructional techniques, every student has different learning abilities, and ways to learn (Alkan, 2007). Therefore, teachers need to be prepared for every kind of students (Şimşek, 2000). For the curriculum development, they are all essential parts to be qualified teachers in schools.

The effectiveness can be defined as how teachers' see themselves in school practice, how they take the benefits of the education into account in the lessons, and how effectively apply the knowledge learnt to the students in schools. First of all, participants' views were discussed about the course developmental psychology.

4.1. Teacher's Perceptions about the Developmental Psychology

In the analysis of the interviews, the researchers constructed codes for effectiveness of the courses, applicability in classroom, and whether they are applying the knowledge they learn in these lessons. According to their perception, the researchers tried to find general beliefs about the codes above.

4.1.1. Belief in Effectiveness

The table indicates that majority of the participants (13 out of 15 participants - %87) believed that the developmental psychology course is effective. Only 2 out of 15 (%13) participants told that this course is partly effective for their teaching profession. While they are explaining the reason why it is effective, they stated that knowing students' psychological developments, needs, characteristics according to their age gives advantage to manage communication with them, helps understand their feelings. For example, Ayşe says;

> *I think every teacher candidate should take this course. This is because every student behaves according to their developmental stage, and we should know this stages and how to behave accordingly.*

4.1.2. Belief in Applicability

When the applicability of the knowledge and goals of the course were considered, again, majority of the participants believed that the content learnt can be used in real classroom environment. However, when applications of this knowledge were considered in their classrooms, the discrepancy showed up. On the one hand, 13 participants accepted the applicability of the content of the course, on the other hand, 2 of them said that they were not applying the content in their classrooms and 6 of them said that they are partly using it. When asked, they explained why they cannot use them in their lessons. Participants who stated that they are not using knowledge or that they partly use indicate that especially crowded classrooms and heavy work load created obstacle to use them in education settings. For example, Dursun indicated the statement below as, while suffering from the crowded classrooms;

> *"If you make a good relationship with students, you can pull anywhere in good or bad direction. We can help them to adapt doing what is needed by making them feel and believe it. However, they need to be realized. Our worst mistake is that. We are not realizing students and we are not giving value to them. Therefore, we cannot even have a chance to know names of all of them due to crowd."*

Another participant was also complained of the crowded classrooms.

> *"I have still some insufficiency about creating relations. Actually, I'm effective when I first talk to students. However, since the classroom is very crowded, I'm sometimes angry with students and shout at them in negative manner. I know it is not suitable; however, the classrooms are very crowded."*

4.2. Teacher's Perceptions about the Special Instructional Techniques

Teachers' perceptions were changing for this course. Due to its content, teachers, from their perspective, have more chances to put the theoretical knowledge into practice.

4.2.1. Belief in Effectiveness

When teachers' thoughts about the effectiveness of this course were considered, the situation is similar to the situation in the previous course considered above. 13 out of 15 (87%) teachers had a belief that teacher candidates must take this course to become a qualified teacher. On the other hand, 2 of them (13%) states that this course is not necessary but teachers should take it. When he was advocating the importance of taking this course, Ali stated that;

> *"I faced possible conditions that I had never thought before. Although I think that students understand what I teach with my instructional method, actually they do not."*

This is a good example that summarizes the most of the other teachers' perceptions. However, when they were asked about the applicability the thinks change.

4.2.2. Beliefs in Applicability

Since this course includes very efficient practical methods in classroom environment, teachers' perceptions about the applicability gained importance. While the researchers expected that the applicability of this course should have bigger proportion, it was not. 7 teachers (46, 6%) think that the practical value of this course was not too much. The method or the methods were "hard to apply"

in real classroom environment. On the other hand, 4 of them (26, 6%) thought that this course was definitely useful in applicability, while rest of them (26, 6%) thought that it was not useful at all.

The reasons why this course has not practical value were that the classrooms were very crowded, that they had to follow and complete the subjects in the limited time, that they had lots of responsibilities in their schools, and due to school administration's policies.

When they were stating whether they were using these methods in their classrooms, 8 out of 15 participants (53%) said that they were using these methods rarely. In addition, 5 of them (33, 3%) stated that they did not use these methods which they have learnt in accordance with this course. The interesting finding here was that although 2 participants said that the methods or the theoretical knowledge were definitely applicable, they did not apply them in their lessons.

Another important finding was that a few of these teachers thought that they knew the knowledge they learnt in this course with experience in their previous teaching practices. For example, Hande stated

> *"I learnt some of the knowledge or the methods taught in this course with my teaching experience. Actually, I knew them but I did not know the name of the methods. This course gave me the awareness of the methods that I learnt with my experience. I just gave name to them."*

4.3. Teacher's Perceptions about the Curriculum Development

When compared to previous course, this course was not too much practical value in classroom environment. However, it was still useful for preparation for lessons and other documentary works related to lessons in schools.

4.3.1. Belief in Effectiveness

In general, the teachers believe that this course was effective. 11 of these teachers (73%) thought that this course was effective, while the rest (27%) thought that it was partly effective. Effectiveness could be considered as that teachers should be aware of the concepts, general application in school, the documentary works, and general curriculum issues in Turkish Education system related to curriculum. A teacher stated that this course gave the teacher candidates awareness of the practices and self confidence in curriculum issues. The general belief was that teachers saw this course less effective than the other courses taken in PF education.

4.3.2. Beliefs in Applicability

The teachers' beliefs in applicability and how they behave in real classroom environments showed great difference. While most of the teachers (12 of 15 with 80%) said that the content and theoretical knowledge could be applied in the classroom when the appropriate conditions were met, they did not apply the content learnt in their classrooms. Here, 7 of them (46, 6%) stated that they did not use the knowledge in their lesson and 6 of them (40%) stated that they partly (or rarely) put them into practice in their classrooms. In fact, this situation could be attributed to the several reasons. From the interviews, the reasons were as follows. First of all, teachers figured the possible applications out from their teaching experience, so the lesson did not contribute to enhanced applications. Secondly, they had lots of subjects to teach in limited time. Thirdly, they stated that there were numbers of procedural works in schools. Lastly, teachers' owned personal characteristics, and other factors.

However, their perceptions were positive for applicability that the content of the course was appropriate for classroom application. One specific example that summarizes this situation is below. Hande stated that

> *"I think the course was effective and every teacher candidate should take it. I think it is useful to apply what we learnt in this lesson. However, it did not change my behavior, and I did not use them in my lessons"*

4.4. Teacher's General Beliefs to PF Education

In general, teachers found the PF education as effective when they compared their experiences before and after they took PF education. Nobody in this sample saw the PF education as ineffective according to general knowledge that they should know, the classroom activities, procedures that they should follow, and other factors. Only 2 of them (13, 3%) saw it partly effective by stating that the PF education just gave them awareness of what was happening in classroom and helped them give name to these situations. When the application was considered, 13 of them (83, 3%) stated that the knowledge that could be gathered from PF education could be put into practical applications in classroom environment.

All of the participants except one said that every teacher candidate should attend PF education program for being professionally qualified teacher in mathematics. One person stated that there was no need for this education, however, teachers should prepare themselves for teaching, improve their teaching skills, become knowledgeable about the students' psychology, and learn classroom management skills. Therefore, teachers should gain the information by themselves which is provided with PF education.

5. Conclusions

Taking everything into consideration, mathematics teachers thought that every teacher candidate should take PF education to be a qualified teacher. Since they had teaching experience before and after taking this education, their comparison was valuable for this study. In general, their perceptions about this education, when the selected courses were considered, were positive. They all perceived that this education was effective for their professional development. Especially, the developmental psychology was of great importance among them. From their interviews, they were benefited much from this course to understand students' behavioral and psychological conditions. In addition, most of them also thought that each course had its own beneficial contribution to their development in their profession.

However, when the application of theoretical knowledge in real classroom environment was taken into account, the conditions changed. The percentages of teachers' perceptions for applicability of these courses and their action in classrooms were decreasing for each course. They explained these situations by referring some problems regarding our education system. These problems were crowded classrooms, limited time for preparation to lessons, limited time to complete the subjects that must be covered for the specific grade level, teachers' work load in schools, and administration policies in schools. In general, the teachers perceived that the PF education expects very idealist student profile, classroom environment, school administration, teacher for applying what is taught in the PF education to classroom environment. Therefore, there was a difficulty to fully apply the theoretical knowledge gathered from this education into practice.

Reference

Alkan, C. (2007). *Özel öğretim yöntemleri.* Ankara: Anı Yayınları.

Atasoy, A. (2004). Öğretmen eğitiminde nitelik ve pedagojik formasyon. *Bilim ve Aklın Aydınlığında Eğitim Dergisi*, *51*, 7-11.

Hanushek, E., Dean, T. J., Eloit, J., & Ludger, W. (2008). Education and economic growth: It's not just going to school but learning that matters. *Education Next*, *8*(2), 62-70.

Meb. (2010). *Öğretmen atama ve yer değiştirme daire başkanlığı.* Retrieved on 25 January, 2010 from http://atama.meb.gov.tr/daireler/ogretmen_atama/index.html.

Miles, M. & Huberman, A. (1994). *Qualitative data analysis*. Thousand Oaks: Sage.

Rice, J. K. (2003). *Teacher quality: Understanding the effectiveness of teacher attributes.* Washington, DC: Economic Policy Institute.

Senemoğlu, N. & Özçelik, B. (1987). Öğretmen adaylarına "öğretmenlik bilgisi" kazandırma bakımından fen-edebiyat ve eğitim fakültelerinin etkililiği. *Çağdaş Eğitim*. Retrieved on 24 January, 2010 from http://yunus.hacettepe.edu.tr/~n.senem/makaleler/ ogretmenlik_bilgisi.htm.

Shulman, L. S. (2000). Teacher development: Roles of domain expertise and pedagogical knowledge. *Journal of Applied Developmental Psychology, 21*(1). 129-135.

Şimşek, H. (2000). Ortaöğretim alan öğretmenliği tezsiz yüksek lisans programına devam eden öğrencilerin öğretmenlik mesleğine yönelik tutumları. *Y.Y.Ü Eğitim Fakültesi Dergisi*. *2*(1). 1-26.

Yavuzer, Y., Dikici, Çalışkan, M., & Aytekin, H. (2006). Sınıf öğretmenliği mezunlarinin öğretmen yetiştirme programindan yararlanma düzeylerine ilişkin görüşleri. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*. *32*(2). 35-41

Zaki, S., & Rasidi, M. Z. (2008). Targeting pedagogical effectiveness in higher education through diverse instructional techniques. *The Fifteenth International Conference on Learning*. Chicago, USA: University of Illision.

About the Author(s):

* ***Mehmet Fatih ÖÇAL*** was born in Arhavi/Artvin, Turkey in 1983. Studied in Secondary School Mathematics Education in Boğaziçi University and graduated in 2007. Now, studying in Secondary School Mathematics Education in Middle East Technical University since 2008. The research interests are visualization, mathematical intuition and pedagogical education. fatihocal14@yahoo.com

. ** ***Aziz GÜZEL*** is a graduate of Psychological Counseling and Guidance program at Hacettepe University. He is in pursuit of his M.A degree in Psychological Counseling and Guidance program at Ankara University. Currently, he works as a research assistant at faculty of education at Maltepe University He is interested in psychological counseling, educational policies and critical pedagogy. azizguzel@maltepe.edu.tr

