

Elementary School Teachers' Opinions on Instructional Methods Used in Mathematics Classes

Sınıf Öğretmenlerinin Matematik Dersinde Kullanılan Öğretim Yöntemlerine İlişkin Görüşleri

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Abstract

The aim of this research study was to determine the perspectives of elementary school teachers on the instructional methods used in Mathematics classes. Open-ended interviews were utilized to collect the data. Content analysis was used to analyze the data. Participants were thirty-four elementary school teachers working in public schools in an inner city in Turkey. Results showed that "Question-Answer", "Problem Solving", "Direct Instruction" are the most commonly used methods in Mathematics classes by the participants. When selecting a teaching method to use, the participants look for "enabling permanent learning" the most.

Keywords: Mathematics class, instructional methods, elementary school teachers.

Öz

Bu araştırmada, sınıf öğretmenlerinin matematik dersinde kullanılan öğretim yöntemlerine ilişkin görüşlerinin tespit edilmesi amaçlanmıştır. Bu amaç doğrultusunda verilerin toplanmasında yapılandırılmamış görüşme yöntemi kullanılmıştır. Verilerin çözümlenmesinde içerik analizi yönteminden yararlanılmıştır. Araştırmaya 34 sınıf öğretmeni katılmıştır. Çalışmada şu sonuçlara ulaşılmıştır: Katılımcıların matematik dersinde en çok kullandıkları yöntemler sırayla, "soru-cevap", "problem çözme" ve "düz anlatım"dır. Matematik dersinde kullanılan yöntemlerin seçiminde, yöntemin, "kalıcı öğrenmeyi sağlama" yönü en çok aranan özellik olmuştur.

Anahtar Sözcükler: Matematik dersi, öğretim yöntemleri, sınıf öğretmenleri.

Introduction

There have been significant changes in ideas and innovations in Mathematics regarding what it is, and how and to what extent it is supposed to be taught at the elementary education level (Piaget, 1953; Skemp, 1971; Vygostky, 1978; Verschaffel & De Corte, 1996). Today, the main goal of mathematics education is to provide a system that can help students to comprehend and understand it (Smith, 2000; Franke & Kazemi, 2001).

The Turkish Elementary School Mathematics curriculum has been changed in 2004 in accordance with the improvements and changes throughout the world, and has been officially used in all elementary schools since 2005-2006 school year. This curriculum is based on enabling the students to be actively involved in the process of learning Mathematics. It is also noted that students in this age range build up their own ideas while interacting with their environments, concrete objects, and peers (Pesen, 2005). The purpose of the improvements and changes in the way math is taught is to help people apply mathematics and have a better understanding of it.

People who excel in maths will have significant opportunities in the future. Mathematics

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opens new doors to opportunities whereas a lack of mathematical skills closes these doors. All students should be supported and provided with the opportunity to study mathematics thoroughly (NCTM, 2000, p. 50). Also, the emphasis on teaching the students more effectively as well as on how they learn makes us understand the question of what learning is and how it happens.

Psychologists, educators, and researchers have long been arguing about the definition of learning and how it takes place. In most of the research studies, it has been stated that there is compliance between the views of the teachers and the teaching applications (Grant, 1984); the teachers' opinions on mathematics and the teaching of mathematics; in-class applications (Stipek, Givvin, Salmon, & Mac Gyvers, 2001; Thompson, 1984), affect the students' opinions (Carter & Norwood, 1997) and success (Muijs & Reynolds, 2001) in mathematics.

Stones (1994) noted that effective teaching is essential for meaningful learning. Some characteristics of effective learning were sorted by Husband (1947) as follows:

- a) draw and develop a strong interest in the area of education,
- b) encourage the students to obtain information regarding the domain,
- c) promote reasoning,
- d) encourage students to do research and construct their own ideas regarding the area,
- e) guide them to prepare materials,
- f) motivate them to do research about the sources on the area from all the perspectives,
- g) develop logical relationships related to the area.

The proximity between the characteristics defined by Husband in 1974 and today's instructional methods, strategies and techniques deserves attention. It can be seen that recently regenerated programs are prepared on a student-based approach (Ersoy, 2005). Although these approaches have some differences, for the most part, they can generally be considered as a part of constructivist learning theory (Klahr & Nigam, 2004).

According to Weinstein and Mayer (1986), a good education consists of teaching students how to learn, remember, think and motivate themselves (as cited in Açıkgöz, 2005, p. 79). In order to achieve a quality education, one should employ different learning and teaching approaches. In order to achieve better results in education, many different educational and teaching theories and strategies have been offered, improved and applied (Skemp, 1987) including the constructivist approach, learning through discovery, learning through inquiry, and question-answer method, Van Hiele's theory and similar methods and techniques (Usiskin, 1982; Fuys, Geddes, & Tischler, 1988; Serra, 1997; Swafford, Jones, & Thornton, 1997; NCTM, 2000; NCTM, 2007).

One of the innovations is "*mathematics literacy*" which aims to help more people achieve mathematics knowledge and basic skills (for example, AAAS, 1989; NCTM, 1989; de Lang et al., 1993; Niss, 1996; Ersoy, 1997, 2002a; as cited in Ersoy, 2005). Thus, the amount of mathematics literacy could be increased by using different teaching and learning perspectives in classes.

Various teaching perspectives have drawn attention and have been accepted at different times regarding different subjects. Different instructional methods are based on their different perspectives which have been developed (Temizöz & Özgün-Koca, 2008). The instructional methods we use play a significant role in causing this situation. In addition to the characteristics of the students, structural characteristics of the domain are critical factors in acquiring the behaviors in this subject area.

Experimental and theoretical studies have shown that a single teaching method is not always effective or successful for every instructional objective. Some instructional methods might be effective on certain instructional objectives, for example, whereas a method is sufficient when teaching numbers, other methods should be applied for extensive and

conceptual interpretations (NCTM, 2007).

TIMSS (1995) has revealed the effects of usage times and handling of instructional methods in a report. Comparing 8th grade math classes in Japan and the USA, it has been noted that the students in Japan are at a higher level than the ones in the USA. Upon investigating the differences between the methods that teachers use in these two countries, it has been found that teachers employ different methods (e.g. inquiry-based learning), which have different levels of effectiveness (NCTM, 2007).

Instructional methods can be defined as the path followed in order to achieve goals in educational activities. The methods used in education have gained significance after the importance of time and quality has been realized in obtaining knowledge (Altun, 1999).

Information taught in mathematics classes can serve a purpose when it is comprehended and applied (Altun, 1999). Some of the main methods used in mathematics classes are direct instruction, definitions, teaching through discovery, scenarios, analyzing, showing and observing, rules, experimental activities and games.

Each of these methods is effective, but they are all limited in certain ways. Therefore, it is important to be careful when choosing a method. These methods do not serve as an alternative to one another, and should be used for different situations. It is possible that multiple methods can apply to the same situation. The teacher, as well as the students, should be able to decide which methods are most suitable since they are familiar with the education environment. The result expected from the method applied is that it leads the students to develop positive attitudes towards mathematics, while allowing the students to participate as much as possible, which contributes to increased success (Altun, 1999).

Uğurel (2003) stated that modern instructional methods for mathematics are "Direct Instruction, Question-Answer, Teaching through Discovery, Discussion, Teaching through Analysis, Observation, Teaching through Scenarios, Teaching through Games, Projects, Cooperative Learning and Problem Solving Method". Method, strategy and technique are related terms (Gözütok, 2006). These three terms are occasionally used interchangeably. Especially in education, method and technique are highly related. Therefore, the terms 'method' and 'technique' are generally called 'instructional methods'.

The literal meaning of the word method is "the path followed in order to achieve a goal" (TDK, 2008). Instructional methods can be defined as the course of action taken to make the best out of the class (Hesapçioğlu, 2008). It is normal to have individually different students in the class. This should be considered when teaching the class. Each student has their own learning style and manner. Teachers should consider their students' learning styles when choosing the teaching method. Marshall (1990) indicated that in case the students are not able to learn through the method used, the students' learning styles should be considered while teaching. According to Demirel (1999), the question of how to get the students to develop new behaviors directs teachers to choose a method. It is possible to achieve the class goals by choosing the appropriate method. Multiple methods can be used for each class. The effectiveness of the learning-teaching process in the classroom is directly proportional to choosing the appropriate methods. In order for the teacher to be selective about the method, they need to recognize and use various methods. A teacher who is rich in methods might have a hard time choosing one.

In achieving educational goals, the effectiveness of the teaching-learning processes depends highly on the teachers and what they can manage to do in the teaching environment (Açıkgöz, 2005). According to Mc Neil and Wiler (1990), all teachers should consider all possible methods that can be used to make learning more efficient.

It is necessary to know the subject well to be able to teach it. However, it is evident that just knowing the subject well is not enough for teaching. Therefore, in addition to knowing the subject well, knowing how to teach the subject is a must (Cemiloğlu, 2001). This requires

the teachers to be competent in planning and applying educational activities. Another requirement is to organize the classes in a way to achieve effective learning. This is possible when the teacher knows the strategies, methods, and techniques to use in educational activities and can apply them efficiently.

It is expected that teachers know about and use other general instructional methods as well as the methods mentioned in order to get the students to acquire specific skills and habits. When the teachers ask themselves "How am I supposed to teach?" instructional methods are involved. Therefore, it is important to determine teachers' opinions on the methods they know about and use in their classes.

Therefore, the purpose of this research study is to present elementary school teachers' opinions on instructional methods used in mathematics classes. In accordance with this main purpose, answers to the following question have been sought:

1. What are the instructional methods that elementary school teachers use in mathematics classes?
2. What are the reasons that cause elementary school teachers choose the teaching method they use in their classes?
3. What are the instructional methods about which elementary school teachers know, but are not able to use?
4. What are elementary school teachers' reasons for not using the mathematics instructional methods with which they are familiar?

Method

Model of Research

This research utilizes a survey model since it is intended to determine the opinions on the instructional methods that elementary school teachers use in mathematics classes. Karasar (2000) defined the survey method as describing a situation that existed in the past or still exists as it is. Interviewing techniques have been used in data collection for this research. According to Punch (2005), interviews in qualitative research can be structured, semi-structured or unstructured. The semi-structured interviewing method was used in this research, since the information related to the subject that the interviewers were willing to give was not limited.

Study Group

Participants consist of elementary school teachers that taught or have been teaching mathematics to grades 1 to 5 at public schools in an inner city in Turkey in 2009–2010 school year. Maximum variety has been aimed in the process of participant selection. Participants were chosen among elementary school teachers employed in city center. Thirty-four elementary school teachers volunteered to participate in the study.

Table 1.

General Information About the Participants of the Study Group

Participants		f
Professional seniority	1-5 years	3
	6-10 years	1
	11-15 years	3
	16-20 years	1
	20 years and more	26
Graduation School	Faculty of Education(Department of Elementary School	22
	Faculty of Education(Other Departments)	2
	Faculty of Science and Art	1
	Other	9
Grades	1. Grade	8
	2. Grade	6
	3. Grade	6
	4. Grade	10
	5. Grade	4
Gender	Female	11
	Male	23

Data Collection and Analysis

Research data were collected through semi-structured interview forms in the second semester of the 2009–2010 school years. According to Patton (1987), interviews can be done as chats, through interview forms, and/ or as standardized open-ended interviews. The interview form approach is applied through a list that consists of analyzed subjects and questions. In this approach, the interview form is used to obtain the same kind of information from the interviewees on similar subjects (cited in Yıldırım & Şimşek, 2005). For this research, a semi-structured form was prepared by the researchers. In order for the form to be valid, experts in the area were consulted. Two experts in the area had examined the interview questions, and necessary corrections had been made up. After that, the interview form's last shape had given. For the validity of the research questions, pilot study was performed on 5 elementary school teachers outside the study group. This amount was adequate since there were a few questions and they were clear. Interview questions were introduced to the participants after the necessary arrangements. The content analysis method was used in analyzing the data. According to Yıldırım and Şimşek (2005), the main purpose in content analysis is to reach the concepts and relationships that can explain the collected data. In the content analysis, themes or concepts are presented to the reader clearly. For this reason, data related tables are created and frequency values are specified in these tables. The findings were analyzed by two different researchers' and compared with the researchers' findings. The results of the comparison showed 95% overlap.

Results

1. *The First Sub-problem*

Findings and comments related to the instructional methods used by the elementary school teachers in mathematics classes:

Table 2.

Opinions on the Teaching Methods Used by Elementary School Teachers in Mathematics Classes

Number	Method	F
1	Question-Answer	23
2	Solving Problems	22
3	Direct Instruction	13
4	Learning through Experience	9
5	Drama	8
6	Teaching through Discovery	7
7	Deduction/Induction	6
8	Learning through Research-Investigation	6
9	Reasoning	4
10	Brainstorming	4
11	Cooperative Learning	4
12	Discussion	4
13	Learning through Presentation	3
14	Multiple Intelligence Theory	2
15	Constructivism	1
TOTAL		116

Upon reviewing Table 2, we see that the elementary school teachers who participated in the study stated that they use fifteen different instructional methods. They have mentioned these methods 116 times in total. Thirty-four elementary school teachers participated in the study, and there are eight methods per teacher. This amount can be accepted as an average value considering the variety of instructional methods that are used and can be used in mathematics classes.

Among elementary school teachers' views on instructional methods used in mathematics class, we see that "Question-Answer" method is repeated twenty-three times. Also, "Problem Solving" is used twenty-two times and "Direct Instruction" is used thirteen times. Participants mentioned "Reasoning", "Brainstorming", "Cooperative Learning", "Discussion" and "Learning through Presentation" four times. Constructivism is mentioned once. Participants stated that there are fifteen different instructional methods used in mathematics classes. However, in the table, we see that some of the instructional methods are approaches while the others are strategies and techniques.

When the answers given by thirty-four teachers are reviewed, 'Teaching through Presentation, Teaching through Discovery, and Teaching through Research-Investigation' that are listed as method names are considered as teaching strategies in literature. Thirteen of the participants know about and use these teaching strategies as instructional methods. Also, it has been realized that the teachers who participated in the research study confuse contemporary learning approaches with instructional methods. Thirteen of the participants noted learning approaches such as 'Learning through Experience-Multiple Intelligence Theory-Constructivism' as methods. Four elementary school teachers have noted 'Reasoning' as a method.

2. *The Second Sub-problem*

Findings and comments related to the instructional methods used by the elementary school teachers in mathematics classes:

Table 3.

The Reasons That the Elementary School Teachers Prefer the Teaching Methods Used in Mathematics Class

Number	Opinions	f
1	Enabling permanent learning	10
2	Making learning easier	6
3	Motivating the students to learn	4
4	Ensuring that the method is related to the subject	3
5	Giving the opportunity of reinforcement	3
6	Embodying the class	3
7	No answer	3
8	Enabling the student to lead the way	2
9	Being simple and clear	2
10	Motivating reasoning	2
11	Enabling the whole class to participate in class	2
12	Appealing to students' multiple senses at the same time	1
13	The opportunity to transfer information regularly and in order	1
14	Being associable with daily life	1
15	Increasing success rate	1
16	Making students enjoy mathematics	1
TOTAL		45

Upon reviewing Table 3, we see that there are sixteen different opinions about the reasons why elementary school teachers choose the methods they use. It indicates that 'enabling permanent learning' is the most preferred reason to use these methods. "Making learning easier" is the second mostly mentioned reason for elementary school teachers to employ the instructional methods in mathematics classes. The utilization frequency of the rest of the options ranges from four to one. We can see that the teachers mentioned "Ensuring that the method is related to the subject", "Giving the opportunity of reinforcement" and "Embodying the class" three times. Three of the teachers have not given any information related to the reasons of choosing instructional methods by saying "No answer". It is indicated that elementary school teachers preferred "Enabling the student to lead the way", "Being simple and clear", "Motivating reasoning" and "Enabling the whole class to participate in class" twice as reasons to select instructional methods used in mathematics classes. "Appealing to students' multiple senses at the same time", "The opportunity to transfer information regularly and in order", "Being associable with daily life", "Increasing success rate" and "Making students enjoy mathematics" are preferred once.

We see that in Table 1, the teachers did not adequately select the appropriate methods for "enabling permanent learning" which is mostly preferred in Table 2. In their studies on effective learning and teaching, which they carried out with teachers, Cooper and McIntyre (1998) investigated the teachers' criteria for method selection. The teachers noted that there are several factors that affect their choice of method. They stated that even though they think one method is appropriate for the class and their students have other methods to choose from, they are not able to use the method they wanted. One of the teachers stated the reason of this as: 'I cannot use methods that take time since there is only two weeks left till the end of the semester and the chapter needs to be finished in two weeks. Instead, I have to use the teacher centered methods that will allow me to complete the education in a short time.' This indicates that teachers occasionally have to determine the methods depending on the external circumstances.

3. Third Sub-problem

During the interviews, the teachers stated the reasons why they do not use all the methods they know of:

Table 4.

Teaching Methods Acknowledged But Not Used in Mathematics Classes by Elementary School Teachers

Order	Opinions	f
1	I use all of them	9
2	No answer	8
3	Project Based Learning	4
4	Creative Drama	3
5	Discussion	2
6	Six Thinking Hats	2
7	Showing and Observing	1
8	Station	1
9	Buzz Groups	1
10	Teaching through Educational Games	1
11	Teaching through Scenarios	1
12	Computer Supported Education	1
TOTAL		34

Upon reviewing Table 4, nine of elementary school teachers noted ‘I use all of them’ and eight of elementary school teachers said ‘no answer’. Elementary school teachers noted, in mathematics classes, the reasons they cannot use the method project based learning which they know of as: that it is too hard for the class level, not being able to provide the necessary environment and tools, that it is not completely understood by the teachers, and student oriented problems (e.g. the student lacks sense of responsibility, does not deliver the projects on time and has a hard time reaching the materials).

The elementary school teachers who participated in the research stated that they know of the discussion method, however they cannot use it since the prior knowledge of the students is not adequate for the discussion method, it is hard to motivate the students, it is hard to apply, the students get distracted easily and it gets harder to control the class.

Another method that the participants know but do not use in mathematics classes is creative drama. Cooper and McIntyre (1998) specified in their studies that drama is an important method in efficient learning and teaching. The students in their study stated that their past experiences are efficient in their learning, whereas the teachers stated that the methods are efficient when they used them in their classes. The teachers noted that teaching the same subject again in class after the students learn it through the drama method has a positive effect on reaching a high level in education. The reasons that the participants gave for not using this method are that it distracts the students, it is hard to apply and it takes more time.

About the six thinking hats technique which the elementary school teachers noted as a method, they said they experience problems with it since the students do not bring the necessary materials and it takes time. The elementary school teachers that participated in the research referred to the teaching through educational games method which they cannot use, as it is not appropriate for crowded classrooms and that the teachers do not have enough information about it. Elementary school teachers stated the opinions about the teaching through scenarios method which they know about but cannot use, as it is not possible to build scenarios appropriate for every subject. They have a hard time building scenarios and the teachers need to have high level of writing skills to use this method.

4. The Fourth Sub-problem

Findings and comments about the reasons why elementary school teachers acknowledge the instructional methods but not use them in mathematics classes:

Table 5.

The Reasons Why Elementary School Teachers Acknowledge the Teaching Methods But Not Use Them in Mathematics Classes

Number	Opinions	f
1	No answer	10
2	The presence level of the students is low	7
3	The school has limited facilities	7
4	Applying the method takes a lot of time	4
5	I do not have enough information about the method	4
6	The students have problems reaching the necessary materials	4
7	The method is hard to apply	2
8	The classrooms are crowded	2
9	The students have a hard time working cooperatively	2
10	It is hard to dominate the class during the application of the method	2
11	It is hard to relate the method with daily lives	1

Upon reviewing Table 5, we see the reasons why elementary school teachers do not use the instructional methods they know of in mathematics classes. We see that in the table they did not make any comments and did not give any responses (No answer: 10). The secondary reasons they gave are that "The school has limited facilities" and "The prior knowledge of the students is low". The reasons "Applying the method takes a lot of time", "I do not have enough information about the method" and "The students have problems reaching the necessary materials" are mentioned four times. The reasons "The method is hard to apply", "The classrooms are crowded", "The students have a hard time working cooperatively" and "It is hard to control the class during the application of the method" are each stated twice. The statement "It is hard to relate the method with daily lives" is mentioned only once by the teachers. Among the reasons that the teachers stated, there are five entries and thirteen statements that are teaching method oriented. They expressed their opinions about "The reasons why elementary school teachers acknowledge the instructional methods but not use them in mathematics classes" with statements that can be seen on the table without giving any method names. It is remarkable that the teachers gave reasons like the students' presence level is low.

Discussion and Conclusion

Participants stated that there are fifteen different instructional methods used in their mathematics classes. However, we see that some of the instructional methods are approaches while the others are strategies and techniques. Methods, strategies and techniques are closely related terms. These three terms are occasionally used interchangeably in some sources (Gözütok, 2006). We see that the participants also use these terms interchangeably.

We see that the elementary school teachers expressed their opinions on the instructional methods they know but they do not use as "I use all of them". This conclusion corresponds to the NCTM's (2007) statement in that a teaching method has multiple characteristics that interact with each other in almost an indefinite number of ways.

The teachers stated the instructional methods they know but do not use as project based learning and creative drama. These conclusions match with the data in Dede's (2006) research that states the teachers do not use group and individual projects in their classes very often. When we take a general look at the reasons related to the teachers' knowing of the method but not using them, we see that they gave the reasons "the students' presence level is low", "the school has limited facilities", "it takes a lot of time to apply the method" quite often. One other conclusion of this research is that the teachers are not able to apply some instructional methods and techniques due to the lack of information on the subject.

As a part of the research done by Temizöz and Özgün-Koca in 2008, the teachers were asked to specify the instructional methods they use in their classes. Question-answer technique and direct instruction method were the responses they got the most from the research participants. The instructional methods that the teachers who participated in this research used in the lesson plans were parallel to these two methods that they mentioned. When we look at the observation reports, we see that the question-answer technique, teaching through presentation approach, discussion and direct instruction are the most used ones in classes. Thus, the research shows that what most of the teachers mentioned about the instructional methods and teaching are consistent with the teaching applications.

Pesen, Odabaş and Bindak (2000) pointed out that in elementary schools, direct instruction and question-answer methods are excessively used and this promotes rote learning which prevents the education from being permanent. Similarly, in this research, it is concluded that question-answer and direct instruction are the methods selected the most by teachers. According to studies conducted in the American classrooms, approximately 80% of the oral discourse is taken up by teacher talk and that this is one way that teachers control what happens in their classroom (Wertsch & Toma, 1995 as cited in Azer, 2009).

According to Toptaş (2007), using the direct instruction method for geometry sub learning areas causes the teachers to be active whereas the students are passive during the class. It is stated that in this situation, the students lose interest in the class and have difficulty learning. It is noted that the reason for this situation is that the students cannot show the required success for learning spatial relationships and geometric shapes even though the teachers transfer the intended information in relation to the subject. It is specified that when teachers start the class with a method including a game, students participate actively during the lesson. This affects students' desire for learning in a positive way. Also, it is underlined that by teaching through the play method, students' desire for learning increases as a result of the increasing participation in the class and this affects their teaching in a positive way. Consequently, among the instructional methods used by teachers in sub learning areas, direct instruction method has resulted in students failing to achieve the expected level of learning.

It is determined that in terms of using the instructional methods during teaching process, teachers do not pay attention to students' levels and presence and do not help them as much as they need in classifying geometric shapes. However, research about the students' level and presence show that the students' level and presence is very important (Pusey, 2003; Toptaş, 2007). Thus, the relevant literature posits the significance of determining the geometrical levels of the students and teaching accordingly.

Different methods have been tested in studies about geometry sub learning areas and it is emphasized that there is an increase in students' learning upon using these methods. For example, Erdoğan and Sağan (2002) have noted that teaching through constructionist approach increase the student's level of success in mathematics more compared to the classic teaching method. When instructional methods are applied, Kay (1986) noted that students learn geometrical terms hierarchically when teaching is performed from the more specific to the general.

According to the results of the research, it is necessary to review the learning area synchronization in Math programs in order to enable teachers to teach more efficiently and

frequently. The efficiency of the education environment will increase in case a program based on the results of the research obtained from the teachers is developed.

Another point that the teachers have trouble with while using the methods is the students' prior knowledge. Modern instructional methods support the students' flexibility, creativity and reflective thinking. Paramount clause to this is to create learning consciousness in student. Students that lack preliminary information should not be expected to perform the method mentioned. For this reason, the teachers should be told about the importance of determining "students' introduction behaviors" and making up for the learning deficits. Although it might seem like a waste of time in the short term, increasing the presence of the students will help teachers in the long run.

Upon having difficulties, the teachers prefer giving up on the method instead of searching for ways to make the method efficient. Providing that the teachers use these methods in classroom environment as both the person applies it and the person who it is applied to, they are going to be able to develop empathy both as a teacher and a student. The teachers' experiencing the method both as a teacher and a student will help them manage time, environment, student introduction behaviors, etc. To raise awareness of the teachers, they should get in-service training. Faculties of education in universities should carry out coordinated studies with the Ministry of Education and periodically, give teachers lessons about innovations in education field so that the teachers keep up with the innovations in education field and make up for deficiencies.

The journals which include articles that promote instructional methods and approaches should be enriched by professionals, in terms of quality and quantity, in order to keep the teachers updated about the innovations in the education field. It is recommended that the academies carry out practices similar to those in the research that question themselves in order to increase their professional competency. Practices like this enable teachers to think about their professional knowledge, review the education environment they create, carry out evaluations and perform cause and effect analysis. This increases the students' reflective thinking abilities.

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