Students', Pre-service teachers' and In-service Teachers' Views about Constructivist Implementations

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Abstract – This study aimed to examine an implementation of constructivism in elementary school science lessons from the view points of pre-service teachers, in-service teachers, and students. A qualitative research method specifically case study was employed in this study. The participants were 3 in-service science teachers working in 3 different public high schools, 3 pre-service elementary school science teachers and 9 7th grade elementary school students. The data were collected through semi-structured interviews. The individually conducted interviews were lasted about 30 minutes. In order to analyze the data, first, the data gathered from the interview of participants were transcribed. Then, the categories were assigned to meaningful data segments in line with the purpose of the study. Pre-service teachers', in-service teachers', and students' views about the constructivist instruction were examined in terms of five categories which are presentation of content, role of teacher, role of student, decision about objectives, and learning environment.

Key words: views about constructivism, pre-service teachers, in-service teachers, elementary science education

Introduction

Current curriculum reform movements in the world (CMEC, 1997; NRC, 2000; MEB, 2013; QCA, 2005) emphasized the construction of knowledge by individuals. This new approach to learning and many other fundamental changes in the instruction are theoretically grounded in constructivism.

Constructivist view of learning has become the most powerful theory during the last three decades (Ernest, 1993; Tobin, 1993). Piaget's genetic epistemology is highly effective in

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the construction of constructivism, which emphasized that knowledge cannot be separated from knowing. According to constructivist point of view, knowledge cannot be transferred into the students; instead students construct their own knowledge. Constructivism mainly involves two principles; psychological and epistemological. Psychological principle explains that knowledge cannot be directly transferred from teachers to students. Students do not receive knowledge in a passive way; instead they construct their own meaning.

Epistemological principle is about reality. In constructivism, reality is determined in a subjective way. Since individual constructs knowledge in a subjective way, outside reality either does not exist or if exist cannot be known by the individual. Therefore, reality is determined in a personal or subjective way (von Glasersfeld, 1990). Constructivist puts the notion of viability in place of outside reality. Rather than searching for the absolute truth, constructivism searches for usefulness and viability of knowledge.

The paradigm of constructivist epistemology has inevitable implications in the instructional designs (Tenenbaum, Naidui Olugbemiro, Jegede, & Austin, 2001). These implications are apparently incompatible with the philosophy of traditional teaching and learning. Jonassen (1991) argues that constructivist learning environments should include the following elements;

1. Based on the learning context, a real world environment should be presented.

2. Realistic approaches should be provided to solve real-world problems.

3. The role of the instructor should be a guide.

4. Content should be presented by giving multiple representations and perspectives.

5. Instructor and students should discuss the goals and objectives.

6. The learning environment and materials should be presented in a way that they facilitate learners to interpret the multiple perspective of the content.

7. Learners should be owner and mediator of the learning process.

Since constructivism depicts that knowledge is constructed by the individuals through experiences and prior knowledge instead of receiving directly from teachers, the role of teachers in classroom have to change dramatically. Watts and Jofili (1998, p.175) defined the characteristics of constructivist teachers as follows: (a) giving value to the quality of learning instead of quantity and focusing on the learner not the subject; (b) promoting social interactions, providing meaningful experiences, and helping learners elaborate on their prior knowledge; (c) monitoring and evaluating learning process, and establishing learning environments that encourage learners to learn in productive ways; and, (d) encouraging "a plural, tentative and contingent view of scientific knowledge".

Teachers have critical roles in creating constructivist learning environments. Therefore teacher education and professional development programs aim to give necessary knowledge and skills to pre- and in- service teachers to implement constructivist principles in their classrooms. Even so teachers especially novices have some problems in the implementation of constructivist principles in their classrooms. In the literature there are some studies investigating the constructivist learning environments. However, most of these studies conducted with only teachers (Ocak, 2012), only students (Ozkal, Tekkaya, Cakiroglu, 2009) or only pre-service teachers (Uzuntiryaki, Boz, Kirbulut, & Bektas, 2010). This study is believed to be helpful since it takes teachers, students and pre-service teachers' into consideration concurrently.

The main aim of this study is to examine an implementation of constructivism in elementary school science lessons via the eyes of pre-service teachers, in-service teachers and students. Principles of constructivism are highly emphasized in the national curriculum reform movements (Ministry of National Education [MNE], 2005; 2013) in parallel with the National Science Education Standards (NRC, 1996). However, Baviskar, Hartle and Whitney (2009) noted that the implementation of constructivism is highly dependent on the teachers' understanding, since it is the theory about learning not teaching. Therefore misunderstandings and misapplications related to its implementation in the classrooms are inevitable. To this end this study aimed to explore (i) in-service science teachers' beliefs about constructivism and (ii) how the learning environment was considered by in-service teachers, students and pre-service teachers.

Methodology

A qualitative research method specifically case study was employed in this study (Bogdan & Biklen, 2007; Patton, 2002). A qualitative case study is "an intensive, holistic description and analysis of a single instance, phenomenon, or social unit" (Merriam, 1988, p.21). Yin (1994) defines case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p.13).

Participants

The participants were 3 in-service science teachers working in 3 different public high schools with middle socio-economic status , 3 pre-service elementary school science teachers and 9 7th grade elementary school students. Students were attending the in-service science teachers' science lessons (3 students were attending the first in-service science teacher, 3

students were attending the second in-service science teacher and the others were attending last in-service teacher). Students were selected purposefully with respect to their achievement in science lesson. The authors asked the in-service teachers to divide the students in 3 categories as high, middle and low achievers with respect to their grades in science lesson, and from the list based on students' achievement levels we randomly selected 1 student for each category. The same procedures were conducted for the other 2 in-service teachers' students.

The pre-service teachers (2 females and 1 male) have observed the in-service teachers' science lessons which are totally 14 hours during a one semester. These pre-service teachers were taking a "constructivist science education and its application" course from the elementary science education department of a public university in their last year of 4- year teacher certification program. In the first year, they are required to take general chemistry, principle physics, and mathematics courses. Following year courses are the complementary of the previous one (such as organic and analytical chemistry, optics and modern physics) and two education courses (instructional principles and methods and science and technology curriculum). Students take physiology, genetic and biotechnology, geology and environment sciences courses plus more education courses in the third year (educational statistics, laboratory application in science, methods of scientific research, measurement and assessment). The last year courses are mainly related to education (school experience, guidance, classroom management, instructional technology and material development). Also in the last year, students should take two elective courses among the alternatives (nature of science, constructivist science education and its application, misconceptions in science education, project based science teaching, history of science, problem based science teaching, technology in science education etc.). When they participated in this investigation, all of the participants were almost at the end of the constructivist science education and its application course. The in-service science teachers (2 women, 1 man) have teaching experiences varying from 6 to 21 years. They graduated from a 4 year elementary school science teaching program. The detailed description of the characteristics of the participants is given in Table 1 and Table 2.

Table 1 Characteristics of In-service Teachers (IST)

	Gender	Age	Teaching experience	Faculty of graduation	Courses given	School of working	Number of courses related with constructivism taken in the university	Attendance of in-service training related with constructivism
IST1[*]	Female	30	6 year	Education	Science lesson	Public school	2	No
IST2[**]	Female	44	21 year	Education	Science lesson	Public school	0	No
IST3[***]	Male	38	17 year	Education	Science lesson and Technology and Design	Public school	0	Yes (once)

* In-service teacher 1 ; ** In-service teacher 2; *** In- service teacher 3

Table 2 Characteristics of Pre-Service Teachers (PST)

	Gender	Age	GPA (out of 4)	Grade for "constructivist science education and its application" course
PST 1[*]	Female	22	3.12	AA
PST 2[**]	Female	23	3.08	AA
PST 3[***]	Male	21	3.22	BA

* Pre- service teacher 1; ** Pre- service teacher 2; *** Pre- service teacher 3

Data Collection Tools

The data were collected through semi-structured interviews constructed by the researchers for in-service teachers, pre-service teachers, and students (See Appendix I). The researchers adopted the main protocol with respect to students and both in- and pre-service teachers. The individually conducted interviews were lasted about 30 minutes. The interview questions were prepared in a way that they trace the elements of constructivist learning environment argued by Jonassen (1991). When necessary, some additional probing questions were asked to the participants.

Data Analysis

In order to analyze the data, first, the data gathered from the semi-structured interviews were transcribed. Then, the codes were assigned to meaningful data segments in line with the purpose of the study. Codes like "linking daily life", "textbook", "active", "cooperative learning" were drawn from the data to organize the beliefs of the participants. After that, these codes were categorized to generate meaningful categories such as "presentation of content", "role of student", "learning environment" reflecting beliefs on constructivism.

Results

Case 1: The classroom of the IST1

According to IST1, constructivism is a theory about learning. She noted that according to constructivism knowledge is constructed by individuals and students' misconceptions are the basis of instruction. Moreover, she defined learning as an acquisition of new knowledge. In Table 3, the interview results about IST1 class were presented. In general, it can be said that she knew the contemporary views about learning and constructivism. Moreover, she tried to apply her pedagogic knowledge to her teaching. However, the views of the pre-service teachers and students indicated some contradictions with IST1. It is clear that she tried to organize some activities to activate the students, but contrary to this aim, the pre-service teachers agreed that the activities made students bored. Actually, in the following excerpt, PST1 explained this contradiction;

"It seems that she was aware of the importance of eliciting students' prior knowledge. She tried different techniques such as concept maps and pre-tests for this. But she cannot do anything with them. She conducted these activities as a tradition to start the lesson. The students seemed bored during these activities... "

The role of the teacher in the class was asked to the students and pre-service teachers. Contrary to the claims of IST1, they agreed that she was not a guide in the class. According to the students, she acted like an expert in the class. Similarly, pre- service teachers indicated that she drew an authoritarian figure. The following excerpt (from the middle achiever student in IST1's class) is an example for the claims of the students and pre-service students.

"I think she is an expert in the class. She begins the lesson by stating the day's topic. Then, we generally form groups and do some activities. The activities are prepared by the teacher before the lesson. She forms groups of 4-5 and tells what we should do. During the activity, she warns us to stay with the task. We have no choice to decide group members or the activity to do. Everything is arranged by the teacher beforehand."

Although the students perceived the teacher as an expert in the class, they thought that they were active in the class. They stated that they did group work, discussed about the topic, did homework etc. On the contrary, the pre-service teachers except PST2 (she said students were active in a way that they followed the instructions) thought that the students were passive in the class. PST1 and PST3 agreed that the students were not mentally active; they were only doing what they were supposed to do. They followed the instructions and they came to conclusion that teacher expected.

Table 3 Categories Born Out from the Interviews for the Classroom of BT1

Categories	IST1	PST1	PST2	PST3	S1 (low achiever)	S2 (middle achiever)	S3 (high achiever)
Presentation of content	Textbook	Textbook	Textbook	Textbook	Textbook	Textbook	Textbook
	Prior knowledge	Linking daily life	Linking daily life	Linking daily life	Homework	Not scientific	Projects
	Asking probing question	Asking question	Asking question	Asking question	Confusing		
	Different representations		Different representations	Different representations			
	Cognitive conflict	Cognitive conflict	Cognitive conflict	Cognitive conflict			
Role of teacher	Guide	Authority	Authority	Authority	Expert	Expert	Expert
Role of student	Active	Passive	Active Following instruction	Passive	Active	Active	Active
Decisions about objectives	Based on curriculum	Based on curriculum	Based on curriculum	Based on curriculum	Teacher decided	Teacher decided	Teacher decided
Learning environment	Democratic	Democratic	Relaxed	Argumentation	Discussion	Discussion	Discussion
	Inquiry	Noisy	Argumentation	Cooperative learning	Group work	Group work	Group work
	Discussion	Argumentation	Cooperative learning		Exhaustive	Boring	Enjoyable
	Group work	Cooperative learning					

The in-service teachers and pre-service teachers were in a consensus that the decisions about the objectives were taken according to the curriculum. The students noted that the objectives were determined by the teacher. Actually, it can be said that their view about the expert role of teacher in the class is supported by this idea.

When the learning environment was asked about, the classroom teacher mentioned an environment that was consistent with constructivism (democratic learning environment, using inquiry, discussion, group work). The pre-service teachers confirmed that the teacher used all the teaching strategies she mentioned. It is interesting to note that although the high achiever student found the learning environment enjoyable, the low and the middle achievers described it as exhaustive and boring, respectively. The following excerpt was taken from the low achiever student:

> *"In the lessons we have many things to do. Although the teacher explains all the steps and rules, sometimes I confused. To discuss, to state opinion, to do group work, to write, to read....that is to much for me. So, I feel exhausted at the end of the lesson… "*

Case 2: The classroom of the IST2

The IST2 was not sure about the meaning of constructivism. She mentioned that the curriculum reforms had emphasized the importance of constructivism in science teaching. She concluded from the discussions with her colleagues about curriculum that it may be related to the use of different instructional strategies which take students to the centre. When her view about learning was asked, she defined it as linking new knowledge to existing knowledge and using them to solve real-life problems. The detailed information about the interview results was seen in Table 4.

Although her view about constructivism was not comprehensive, her definition of learning is compatible with the contemporary views of learning. All of the participants stated that she began lessons by considering students' previous knowledge. Also they all agreed that she used daily life examples to explain the subject. The students and pre-service teachers said that she presented numerical problems at the end of the lesson (The classroom teacher called these problems as real world problems).

Except PST1, all the participants thought that the teacher was a guide during the instruction. For instance, the classroom teacher explained her role as:

"I know that in the learning process students should be active. My role in this process is to create the most suitable environment with daily life examples, real world problems...... I never teach the subject by reading from book or writing on the board. I want my students to learn the concepts in their mind. During their knowledge construction I can only guide them."

However, PST1 said that she acted as an expert in the class. She justified her view by stating that the classroom teacher had an implicit learning outcome in her mind. Through the lesson, all the activities and discussion aimed to accomplish her learning goal. *"... although she seems to behave as a guide, actually her role is more than that"*

From Table 4, we can conclude that students were active in the class. Moreover, the in-service teacher and pre-service teachers accepted that the decision about the objectives is taken with respect to the curriculum. However, PST1 and PST3 commented that the teacher considered students' prior knowledge. The following excerpt was taken from PST3:

"Of course it is impossible to ignore the curriculum in determining objectives. The teacher follows the curriculum in general. However, she makes some arrangements in the sequence of the objectives and the time allocated for them with respect to students' previous knowledge. For instance, there is an objective like students know the properties of first 20 elements of the periodic table. When she noticed that the students were already familiar with the concept, she mentioned the properties of periodic table although there is not such an objective in the curriculum. "

The pre-service teachers said that concept maps and cooperative learning strategies were used in the classroom although these strategies were not referred by the teacher. Moreover, the strategies such as group work (pair work) and inquiry were mentioned by the in-service teacher and pre-service teachers. It is interesting to note that although the in-service and pre-service teachers described learning environment as disciplined, the students said it was friendly, motivating and relaxing. For example, the high achiever student defined the classroom environment as:

"I really do not realize when the lesson begins and ends, the time goes very quickly....I never feel tired at the end of the lesson, and on the contrary I feel recovered. I feel myself very good during the lesson........it is like a theraphy....I learn much things and enjoy.. "

Table 4 Categories Born Out from the Interviews for the Classroom of IST2

Categories	IST2	PST1	PST2	PST3	S4(low achiever)	S5(middle achiever)	S6(high achiever)
Presentation of content	Previous knowledge of students Real-world problems. Daily life examples	Previous knowledge of students Using different sources Solving questions Technology enhanced presentations Daily life examples	Previous knowledge of students Solving numerical questions Daily life examples	Previous knowledge of students Solving numerical questions Daily life examples	Asking question Solving numerical Daily life examples	Link with previous lesson Solving numerical questions Daily life examples	Link with previous lesson Solving numerical questions Daily life examples
Role of teacher	Guide	Expert	Guide	Guide	Guide	Guide	Guide
Role of student	Active	Active	Active	Active	Active	Active	Active
Decisions about objectives	Based on curriculum	Based on curriculum Students' prior knowledge is considered	Based on curriculum	Based on curriculum Students' prior knowledge is considered	Teacher decided	Teacher decided	Teacher decided
Learning environment	Disciplined Pair work Inquiry	Concept maps Disciplined Cooperative learning Inquiry Group work	Concept maps Disciplined Cooperative learning Reflection on learning Inquiry Group work	Concept maps Disciplined Cooperative learning Reflection on learning Inquiry Group work	Pair work Motivating	Pair work Friendly	Pair work Relaxed Enjoyable

Case 3: The classroom of the IST3

The IST3 defined constructivism as a student centered approach. He mentioned that unlike behaviourist learning theories, constructivism depicts that knowledge is constructed by students individually by using their previous knowledge. According to him, learning is the acquisition of new knowledge. The interview results about IST3's class were given in Table 5. As he participated an in-service training related to new curriculum, he was aware of the meaning of constructivism. However, it is seen that his view about learning was more in line with behaviourism. The notable point in the data about IST3 is that all the categories emerged from the pre-service teachers interview results were the same and the categories emerged from the students' interview results were very similar. When the definition of concept was asked to the participants all of the pre-service teachers mentioned that the teacher defined concepts, gave daily life examples, solved questions and assigned projects. In students' answers, using textbooks was very prominent. For example, in the following excerpt of the low achiever student this finding is clearly seen:

> *".....the teacher starts lesson by saying the day's topic from the textbook.....at the end of the lesson we solve questions from the book......he gives homework to us from the textbook... "*

Unlike the other participants, the classroom teacher claimed that he linked the new concepts with students' prior knowledge and used different representations in presenting the subjects. When he was asked what kind of representations he used in the class, he said that

> *"I know it is important to consider all students having different intelligences. Some of them (students) can learn by pictures, some other by graphics and some others by videos or models. So, I try to use as much form as possible when explaining the concept."*

Regarding teacher role, all of the pre-service teachers thought that he was active and the in-service teacher and students indicated that he was an expert in the class. Therefore, it can be said that their views were compatible in a way that the teacher's role was not in agreement with constructivism. Furthermore, the pre-service teachers and the high and middle achiever students noted that the students had a passive (listener) role in the class. On the contrary, the low achiever student and the IST3 claimed that the students were active in the class.

Table 5 Categories Born Out from the Interviews for The Classroom of IST3

Categories	IST3	PST1	PST2	PST3	S7(low achiever)	S8(middle achiever)	S9(high achiever)
Presentation of content	Prior knowledge, Different representations, Solving questions	Definition of concepts, Daily life examples, Projects, Solving questions	Definition of concepts, Daily life examples, Projects, Solving questions	Definition of concepts, Daily life examples, Projects, Solving questions	Daily life examples, Textbook, Projects, Solving questions	Definition of concepts, Textbook, Projects, Solving questions	Definition of concepts, Textbook, Projects, Solving questions
Role of teacher	Expert	Active	Active	Active	Expert	Expert	Expert
Role of student	Active	Passive	Passive	Passive	Active	Listener	Listener
Decisions about objectives	Based on curriculum	Based on curriculum	Based on curriculum	Based on curriculum	Teacher decided	Teacher decided	Teacher decided
Learning environment	Democratic, Inquiry, Cooperative learning, Experiments	Democratic, Group work, Experiments	Democratic, Group work, Experiments	Democratic, Group work, Experiments	Worrying, Nervous, Group work, Experiments	Boring, Group work, Experiments	Funny, Group work, Experiments

Similar to the other teachers' classes, the IST3 and the pre-service teachers thought that the objectives were determined with respect to the curriculum, and the students thought that the teacher determined the objectives.

All of the pre-service teachers appreciated that the classroom environment was democratic and the teacher used group work and experiments during the instruction. The students also admitted that they did group work and made experiments. However, the IST3 claimed that he used inquiry and cooperative learning. The most contradictory result is seen in the students' answers about learning environment. The low achiever student described the environment as worrying and nervous, the middle achiever described as boring, and the high achiever as joyful.

Discussion

Constructivism has been accepted as a major philosophy that drives current reform efforts in science education (Sampson, Enderle & Grooms, 2013). The literature presents variety of studies aimed to investigate constructivist learning environments in different contexts. Wilson (1996) defines a constructivist learning environment as "a place where learners may work together and support each other as they use a variety of tools and information resources in their guided pursuit of learning goals and problem-solving activities" (p.5). This study aimed to investigate how the same learning environment is perceived by in-service teachers, pre-service teachers and students from a constructivist perspective.

Unlike many other studies aiming to evaluate learning environments (especially constructivist learning environments) by using likert type scales (Tenenbaum, Naidu, Jegede, & Austin, 2001), in this study, the data were collected through the interviews. Individual type responses to open ended questions generate themes in greater detail than those obtained from traditional multiple choice instruments (Neuendorf, 2002). Therefore, the questionnaires or interviews such as those in this study allow researchers to produce deeper insights. Moreover, this study is unique in that the authors attempted to evaluate a classroom by using multiple data sources coming from the classroom teacher, pre-service teachers and students. The general tendency of the learning environment research is to get data from only one of the groups of these subjects. The classroom observation period (one semester) of in-service teachers also makes this study valuable since the results presented in the literature based on the data collected from in-service teachers after one or two hour observation period.

The results of the interviews indicated that the experienced teacher, IST2, who had not participated any in-service training have limited understanding about constructivism. However, her implementation was compatible with the constructivism in all categories except "decision about objectives". According to constructivism, teacher and students should discuss the goals and objectives; however it is clear that she decided the objectives based on the curriculum.

It is not unexpected that the relatively inexperienced teacher, IST1 has the most compatible view about learning and constructivism with the contemporary view and she has much knowledge about the constructivist teaching strategies. However, the data from pre-service teachers and students pointed that the teacher could not succeed in the implementation. Moreover, a similar failure in the implementation (not that much) was observed in the classroom of the teacher who have participated training about constructivism. Therefore, it can be concluded that both the courses taken before the graduation and the in-service training had a positive effect albeit not to the extent we had hope.

Finally, it is worth to mention that the evaluations of the pre-service teachers and students are parallel in general and they are quite different from those of the in-service teachers. This finding illustrates that the in-service teachers' intentions and thoughts and their actual classroom practice may not be compatible. The relationship between teachers' beliefs and their classroom practices is not straightforward. The literature presents some evidence that teachers' classroom practices are parallel with their beliefs (Crawford, 2007; Richmond & Anderson, 2003). On the contrary, there are some studies showing a discrepancy between teachers' beliefs and their practices (Moss & Kauffman. 2003; Uzuntiryaki, Boz, Kirbulut, & Bektas, 2010). There might be some factors affecting how teachers transfer their beliefs into practice in classroom, such as school culture, culture of the classroom, the nature of the curriculum, and assessment techniques (Jenkins, 2000; Lederman, 1992; Munby et al. 2000).

Recommendation

Without any doubt, there is an ample evidence that classroom environment is very important in students' learning (Fraser, 1998) and suitable learning environment can promote achievement and attitudes of students（Fisher, Henderson & Fraser, 1995). This study aims to determine how different students, in-service teachers and pre- service teachers perceive the same classroom environment. Further researches can be done to determine characteristics of successful classroom environment.

Although this research achieved its aim, there were some unavoidable limitations. Firstly, the research was conducted with a very small sample size because volume of data makes data analyses procees very labor intense. More subjects representing different cases may enhance the generalizability of the results. Secondly, only the interviews were used to gather data. Other data sources such as observation, field notes, lesson plans may enrich our results.

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Appendix 1. Interview Questions

In-service teachers' interview questions

1. What is learning according to you?

2. What do you know about constructivism?

3. How do you present the content in your classes?

4. What are the roles of the teacher and the students in your classroom?

5. How do you determine the goals and objectives of the lesson?

6. How is the learning environment created in your classes?

Pre-service teachers' interview questions

1. How does the teacher (IST1, IST2, and IST3) present the content in the classes?

2. What are the roles of the teacher and the students in the classroom (of IST1, IST2 and IST3)?

3. How does the teacher ((IST1, IST2, and IST3)) determine the goals and objectives of the lesson?

4. How is the learning environment created in the classes (of IST1, IST2 and IST3)?

5. If you have a constructivism scale from 1 to 10(1 represents the class having least constructivist elements and 10 represents the class having most constructivist elements), what is your point for the classes (of IST1, IST2 and IST3)?

Students' interview questions

1. How does the teacher present the content in the classes?

2. What are the roles of the teacher and the students in the classroom?

3. Does the teacher take your ideas in determining the goals and objectives of the lesson?

4. How is the learning environment created in the classes?

Öğrencilerin, Öğretmen Adaylarının ve Öğretmenlerin Yapılandırmacı Uygulamalar Hakkındaki Görüşleri

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Özet – Bu çalışma, ilköğretim fen dersindeki yapılandırmacılığa dayalı uygulamaları öğretmen adayları, öğretmenler ve öğrencilerin bakış açılarından incelemeyi hedeflemiştir. Bunun için nitel araştırma yöntemi ve özellikle durum çalışması kullanılmıştır. Katılımcılar 3 farklı devlet okulunda çalışan 3 öğretmen, 3 ilköğretim fen bilgisi öğretmen adayı ve her bir öğretmenin sınıfından 3'er kişi olmak üzere toplam 9 yedinci sınıf öğrencisidir. Veriler yarı yapılandırılmış görüşmelerle toplanmıştır. Her bir görüşme yaklaşık 30 dakika sürmüştür. Verileri analiz etmek için öncelikle katılımcıların görüşmeleri çözümlenmiştir. Öğretmen adayları, öğretmenler ve öğrencilerin yapılandırmacılığa dayalı uygulama hakkındaki görüşleri 5 kategori açısından incelenmiştir. Bu kategoriler içeriğin sunumu, öğretmenin rolü, öğrencinin rolü, hedeflere karar verme ve öğrenme ortamıdır. Elde edilen sonuçlar katılımcıların uygulamaları farklı şekillerde değerlendirdiğini göstermektedir.

Anahtar kelimeler: yapılandırmacılık hakkında görüşler, öğretmen adayları, öğretmenler, ilköğretim fen öğretimi

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Genişletilmiş Özet

Yapılandırmacı öğrenme son yıllardaki en güçlü öğrenme teorilerinden birisidir. Piaget'nin genetik epistemolojisi yapılandırmacılığın oluşmasında önemli bir katkı sağlamıştır. Psikolojik ve epistemolojik prensipleri içeren yapılandırmacılığa göre, bilgi öğrenciye transfer edilemez, öğrenci kendi bilgisini yapılandırır. Bu süreçte öğretmenler yapılandırmacı öğrenme ortamları yaratmadaki önemli bileşenlerdir. Bu yüzden, öğretmen eğitimi ve hizmet içi eğitimler öğretmen adaylarına ve öğretmenlere bu konuda gerekli bilgi ve becerileri vermeyi hedeflemektedir. Alanyazında yapılandırmacı öğrenme ortamlarını

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inceleyen araştırmalar bulunmaktadır. Bununla birlikte, bu araştırmaların çoğu ya öğretmenlerle, ya öğretmen adaylarıyla ya da öğrencilerle yapılmıştır.

Bu çalışmanın amacı ise, ilköğretim fen sınıfındaki yapılandırmacı uygulamayı hem öğretmen adaylarının, hem öğretmenlerin hem de öğrencilerin bakış açılarından incelemektir.

Yöntem

Bu çalışmada, nitel araştırma yöntemi ve özellikle durum çalışması kullanılmıştır. Katılımcılar 3 farklı devlet okulunda çalışan 3 öğretmen, 3 ilköğretim fen bilgisi öğretmen adayı ve her bir öğretmenin sınıfından 3'er kişi olmak üzere toplam 9 yedinci sınıf öğrencisidir. Öğrencilerin seçiminde fen derslerindeki başarıları dikkate alınmıştır. Öğretmenlerden öğrencileri başarı seviyelerine göre yüksek, orta ve düşük olmak üzere 3 kategoriye ayırmaları istenmiş ve her bir kategoriden bir öğrenci rastgele seçilmiştir. Aynı işlem diğer iki öğretmenin sınıfında da yapılmıştır. Öğretmen adayları, öğretmenlerin 14 saatten oluşan bir dönemlik fen derslerini gözlemlemiştir. Öğretmen adayları bu süreçte bir devlet üniversitesinin 4 yıllık eğitim fakültesindeki öğrenimlerinin son yılındaydılar ve "yapılandırmacı fen eğitimi ve uygulamaları" isimli bir dersi alıyorlardı. Öğretmenler ise fen eğitiminde 6 ile 21 yıl arasında değişen deneyime sahiplerdi ve hepsi 4 yıllık fen eğitimi programından mezunlardı. Bu çalışmada veriler, araştırmacılar tarafından öğretmenler, öğretmen adayları ve öğrenciler için ayrı ayrı hazırlanmış yarı yapılandırılmış görüşmelerle toplanmıştır. Her bir görüşme yaklaşık 30 dakika sürmüştür. Verileri analiz etmek için öncelikle katılımcıların görüşmeleri çözümlenmiş, sonra, çalışmanın amacına bağlı olarak anlamlı veri grupları için kategoriler belirlenmiştir.

Bulgular

Öğretmen adayları, öğretmenler ve öğrencilerin yapılandırmacılığa dayalı uygulama hakkındaki görüşleri 5 kategori açısından incelenmiştir. Bunlar içeriğin sunumu, öğretmenin rolü, öğrencinin rolü, hedeflere karar verme ve öğrenme ortamıdır. 1. öğretmene göre, yapılandırmacılık bir öğrenme teorisidir ve öğrenme bilginin öğrenciler tarafından yapılandırılmasıdır. Öğretmen adayları ve öğrenciler öğretmenin söylediğinin aksine, onun sınıfta bir rehber olarak değil de, daha ziyade bir uzman ya da otorite olarak rol aldığını düşünmektedirler. Öğrenciler, sınıf içinde yaptıkları etkinliklere dayanarak derste aktif olduklarını, öğretmen adayları (bir tanesi hariç) ise öğrencilerin sınıfta zihinsel yönden aktif olmadıklarını sadece kendilerinden yapılmasını istenen şeyleri yaptıkları için aslında pasif olduklarını iddia etmektedirler. Hem öğretmen hem de öğretmen adayları hedeflerle ilgili kararların müfredata göre alındığını söylerken öğrenciler bu hedefleri öğretmenin belirlediğini

düşünmektedirler. Öğrenme ortamına ilişkin olarak ise, yine hem öğretmen hem de öğretmen adayları yapılandırmacılığa uygun bir ortamdan bahsetmektedirler. Başarı seviyesi yüksek öğrenci bu öğrenme ortamını eğlenceli bulurken, başarı seviyesi orta ve düşük öğrenciler bu ortamı sıkıcı bulmuşlardır. 2. öğretmen yapılandırmacılığın anlamını tam olarak bilmediğini ancak yapılandırmacılığın öğrencileri merkeze alan bir anlayış getirdiğini söylemektedir. Öğretmen adayları ve öğrenciler bu öğretmenin derse, öğrencilerin eski bilgilerini ortaya çıkararak başladığı konusunda hemfikirdir. Öğretmen adaylarından biri dışında diğer katılımcılar bu öğretmenin rolünü rehber olarak tanımlamışlardır. Katılımcılar öğrencilerin derslerde aktif olduğunu düşünmektedirler. 3. öğretmen öğrenmeyi yeni bilgi kazanmak olarak tarif ederken, yapılandırmacılığı öğrencinin bilgiyi yapılandırması olarak tanımlamıştır. Öğretmenin konuyu işlerken kavramların tanımını verdiği, günlük hayattan örnekler kullandığı, sayısal soruları çözdüğü katılımcılar tarafından bahsedilmiştir. Öğretmen ve öğrenci rolleri ile ilgili sorulan görüşme sorularına farklı cevaplar alınmıştır. Öğretmen, öğrenciler ve öğretmen adayları öğrenme ortamını deneylerle desteklenen ve grup çalışmasına uygun bulduklarını dile getirmişlerdir.

Sonuç ve Tartışma

Yapılandırmacı bir öğrenme ortamının öğretmenler, öğretmen adayları ve öğrenciler tarafından nasıl algılandığını araştırmayı hedefleyen bu çalışmada yapılan diğer çalışmalardan farklı olarak veriler likert tipi ölçekler yerine görüşmelerle toplanmıştır. Böylece, konu hakkında daha ayrıntılı bulgulara ulaşılmıştır. Ayrıca, bir sınıf ortamı öğretmen, öğretmen adayı ve öğrenci olmak farklı veri kaynakları kullanılarak değerlendirildiği için de bu çalışma önem taşımaktadır. Dahası, sınıf gözlemi sadece birkaç ders boyunca değil bir dönem boyunca yapılmıştır. Görüşme sonuçları, herhangi bir hizmet içi kursa katılmayan deneyimli öğretmenin (2 nolu öğretmen) yapılandırmacılık hakkında kısıtlı bir anlamaya sahip olduğunu ortaya çıkarmıştır. Bununla birlikte bu öğretmenin hedefler hakkında karar alma kategorisi dışındaki kategorilerde yapılandırmacılıkla uyumlu olduğu görülmektedir. Daha tecrübesiz olan 1 nolu öğretmenin ise öğrenme ve yapılandırmacılıkla ilgili görüşlerinin daha gelişmiş olması ve yapılandırmacı öğretim teknikleri hakkında daha fazla bilgiye sahip olması şaşırtıcı değildir. Bununla birlikte bu öğretmenin sınıfındaki öğrenciler ve sınıfı gözlemleyen öğretmen adayları uygulamada öğretmenin başarılı olmadığını düşünmektedir. Yapılandırmacılıkla ilgili hizmet içi kursa katılan diğer öğretmende de benzer bir başarısızlık gözlenmiştir. Öğretmen adayları ile öğrencilerin değerlendirmeleri genelde paralel olmakla birlikte öğretmenlerin değerlendirmelerinden oldukça farklıdır. Bu bulgu, öğretmenlerin hedefleri ve düşünceleri ile gerçekte sınıfta yaptıkları uygulamaların uyumlu olmadığını

göstermektedir. Alanyazında öğretmenlerin sınıf içi uygulamalarının görüşleri ile paralel olduğunu gösteren çalışmalar olduğu gibi paralel olmadığını gösteren başka çalışmalar da vardır. Öğretmenlerin görüşlerini sınıf içinde uygulamaya dönüştürmelerini etkileyebilecek okul kültürü, sınıf kültürü, müfredatın doğası ve değerlendirme teknikleri gibi faktörler vardır. Sınıf ortamı öğrenci başarısını etkileyen önemli bir faktördür. O yüzden bu çalışma aynı sınıf ortamının öğretmen, öğretmen adayı ve öğrenci açısından nasıl farklı algılandığını ortaya çıkarmayı hedeflemiştir. Bununla birlikte çalışmanın bazı sınırlılıkları vardır. Çalışma küçük bir örneklem ile gerçekleştirilmiş ve veriler sadece görüşmeler yoluyla toplanmıştır.