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Öğretmen Adaylarının Yapılandırmacı Yaklaşımı Temel Alan Uygulamaları

Practices of Prospective Teachers Based on Constructivism

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Abstract

The purpose of this study is to determine the relevance of activities applied by prospective teachers, in a real classroom setting, to the constructivist approach. The study sample consists of third year students taking Life Studies and Social Studies Teaching courses at a faculty of education in Turkey. Among the 5E learning model cycles, prospective teachers mostly exhibited behaviours associated with "the explanation" cycle. It is thought-provoking that the elaboration cycle, considered one of the most important of the 5E learning cycles, was among the least observed.

Keywords: constructivism, 5e model, prospective teacher, life studies teaching, social studies teaching.

Özet

Bu çalışmanın amacı, öğretmen adayları tarafından gerçek sınıf ortamında gerçekleştirilen etkinliklerin yapılandırmacı yaklaşıma uygunluğunu belirlemektir. Çalışma, bir eğitim fakültesinde Hayat Bilgisi ve Sosyal Bilgiler Öğretimi derslerini alan 3. sınıf öğrencileri ile gerçekleştirilmiştir. Öğretmen adaylarının sınıf içi uygulamaları 5E modeline uygunluk açısından değerlendirilmiştir. Öğretmen adaylarının bu model aşamaları arasından en çok açıklama aşamasına uygun olan davranışlara yöneldikleri gözlenmiştir. Bunun yanı sıra 5E modelinin en önemli aşamalarından biri olan bilgiyi derinleştirme aşamasına ilişkin davranışlar en az gözlenmiştir.

Anahtar Kelimeler: yapılandırmacılık, 5e modeli, öğretmen adayı, hayat bilgisi öğretimi, sosyal bilgiler öğretimi.

1. Introduction

Our ability to cope with and express oneself in our society depends considerably on the education system we grow up with and the learning practices we adopt. Today's education aims to promote the growth of individuals who are aware of the ways to acquire information, differentiate facts and scientific knowledge and apply it to serve their own purposes. Thus, there is interest in the application of learner centered learning approaches, which put emphasis on the individual constructing necessary information and skills on their own.

Constructivism, defined as an epistemology for explaining the nature of learning or as a philosophical explanation, has had a considerable influence on recent research in the field of education (Richardson, 1997; Matthews, 1997; Tsai, 1998; Simpson, 2002). Constructivism refuses the idea that there only exists a scientific factuality that is required to be identified and confirmed. Proponents of this approach assert that knowledge cannot be transmitted from outside our minds, instead knowledge is formed in the minds of individuals (Schunk, 2004). In other words, knowledge is determined by the experiences of an individual (Driver Asoko, Leach, Mortimer & Scott, 1994; Fensham, Gunstone & White, 1994).

The objective of a constructivist learning approach is not to assist the goals of learners according to a certain preset hierarchy, but to provide learning opportunities that enable learners to construct information mentally (Wilson, 1996). Constructivists emphasize the role of prior knowledge, the importance of multiple forms of information and the social nature of learning (Leinhardt, 1992). Learners in a constructivist classroom play an active role in constructing knowledge by linking new and previous learning. For this reason, the main function of teachers is to have learners consider alternative conceptualizations and to assist them to make better sense of the world (Carr et al., 1994).

Constructivist teachers do not see themselves as the only sources of knowledge because they guide learners towards various sources, support learner autonomy and participation, encourage them to ask questions and come up with challenging arguments, while at the same time working with their students and getting them to communicate with each other while experiencing information first hand. Additionally, constructivist teachers are aware of the lives and experiences of learners and define these in association with the subject to be learned. They also seek to organize the learning environment in a way that helps to reconstruct or shape learners' existing knowledge. For this reason, the constructivist teacher organizes materials and sources, observes the learning of students, and uses various assessment strategies in order to give them feedback about the process as well as the outcome. Teachers who internalize these insights and practices provide a learning environment where learners cooperate, use technology, express what they have learned or discover in various ways, and work on problems related to a given subject. They also create opportunities for learners to interact with complex and meaningful problems, present their own process of understanding, and encourage learners to express their ideas through speaking, writing, drawing and so on. Teachers encourage their learners to use their knowledge in real environments, state their opinions, comment on texts, qualify events and arguments

based on evidence, become reflective and think independently (Brooks & Brooks, 1993; Vermette et al., 2001).

While the constructivist approach is applied, various learning cycle models may be used. The learning cycle model is flexible as it is congruent with people constructing knowledge naturally. Any teacher who thinks about the effectiveness of their teaching will have considered a learning cycle perspective (Lawson, Abraham & Renner, 1989). The Learning Cycle approach was devised over 40 years ago by Karplus particularly for science lessons. It consists of three phases: exploration, concept introduction, and concept application. Students should also experience three stages to make learning occur. These stages allow students to explore content through firsthand experiences, interact with their teachers, peers and learning materials, and use their experiences and resulting knowledge in new situations (Karplus, 1980). The learning cycle model suggested by Karplus has led to the development of the 5E and 7E methods.

The 5E model used in this study was presented in a Biological Sciences Curriculum Study (BSCS) in the late 1980s. Each "E" in the 5E model symbolizes a stage in the cycle; Engagement, Exploration, Explanation, Elaboration and Evaluation (Bybee & Landes, 1990). Starting with the *Engagement* cycle, the teacher should tap into students' prior knowledge through short activities that arouse their curiosity and reveal their prior knowledge, and should spark their interest in a new concept. The activity in this cycle should enable students to connect their past and present experiences, reveal their prior knowledge, and organize their thoughts. The model continues with the *Exploration* cycle wherein students should be encouraged to explore their concepts, misconceptions and skills. In this way, conceptual change is facilitated. Students at this stage are free to create new ideas using their previous knowledge and experiences, and they can for example design and conduct a basic research study by determining questions and possibilities. The third stage, *explanation,* provides opportunities for students to present their conceptual understanding and skills or to practice these behaviours. At this stage, the teacher may directly explain a concept, process or skill and the students explain what they understand in relation to the concept. The explanations made here need to direct students towards a deeper understanding. In the *elaboration* cycle, the teacher emphasizes the conceptual understanding and skills of students and tries to develop them. Opportunities are provided for students to apply what they have learnt in new situations. In the final *evaluation* stage, students assess their own learning and the teacher appraises their development (Bybee et al., 1989; Bybee & Landes, 1990; Boddy, Watson & Aubusson, 2003; Bybee et al., 2006).

In Turkey today, prospective teachers are expected to use the 5E model in their studies. One reason for this is that since the 2005-2006 school year, primary school Turkish, Mathematics, Life Sciences, Social Studies, and Science and Technology curricula have been implemented in accordance with a constructivist teaching approach. These curricula apply to grades 1-5 of primary schools overseen by the Ministry of Education in Turkey and were implemented by the Board of Education and Discipline's resolution dated 12.07.2004 and numbered 114-18. Another reason is that several studies observing the effectiveness of the 5E model based on the constructivist

approach found a positive effect on learners' achievement, high-level cognitive skills and creative thinking abilities (Aydin & Yilmaz, 2010; Dikici, Turker & Ozdemir, 2010; Er Nas, Coruhlu & Cepni, 2010; Al Majali, 2013). It should also be noted that the 5E model, while initially developed for teaching science, has also been applied to social studies.

The present study aims to determine the relevance of activities used by prospective teachers in a real classroom setting to the 5E learning cycle model. The study sample consists of third year students taking the Social Studies Teaching course at a Department of Elementary Education in Turkey. In accordance with the aim of this study, answers to the following research questions were sought:

- How often do 3rd year students of Elementary Education practise the behaviours of the 5E learning model?
- What learning activities have they practised in accordance with the stages of the 5E learning model?
- What are the strengths and weaknesses of those learning activities?

2. Methodology

In this descriptive study, data regarding prospective teachers' 5E model practices in a real classroom were collected through observation. The practices of prospective teachers were also recorded on video.

A form, which was designed based on the literature, was used to analyze the video recordings. Expert opinion was sought before the form was tested with a sample of the video recordings supplied by the researchers. Necessary revisions were made before the form was finalised. The observation form is given in Appendix A.

While prospective teacher videos were being observed, open-ended notes were also taken. Except for frequencies, descriptive analysis was used for researchers' open-ended notes. The way prospective teachers used the constructivist approach in their instruction was discussed under the themes of engagement, exploration, explanation, elaboration, and evaluation. The data was summarized under these themes and enriched with references. In order to ensure inter-rater reliability, data from videos were analyzed separately by researchers. After determining consistency between researchers, data analysis was continued.

2.1. Study Group

The study sample consisted of 32 prospective teachers enrolled at a faculty of education in Turkey. All were third year students enrolled in the Social Studies and Life Studies Teaching courses as part of their program in the 2012-2013 academic year. These courses included approximately six hours of video material on matters of preparedness for natural disasters, social organization, differentiating between governmental agencies and other groups, plays performed in the past and today, conscious consumption of resources, local government units, the benefits and risks associated

with technology, needs and desires, home accidents and safety rules, discoveries and inventions.

3. Findings

Data were obtained under the title of the cycles of the 5E learning model; *engagement, exploration, explanation, elaboration, and evaluation.* A general observation of the findings according to the cycles of the 5E model is presented in Figure 1.

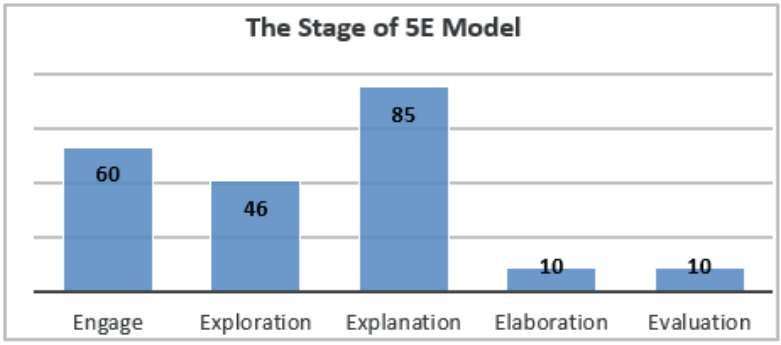

Fig. 1. Distribution of the activities of prospective teachers according to the stages of the 5E model.

Among the stages of the 5E model, prospective teachers mainly displayed behaviours associated with the "Explanation" stage (f=85). It is thought that this finding indicates that prospective teachers give more importance to conveying content within the constructivist approach.

Secondly, prospective teachers displayed behaviours attributed to the "Engagement" stage (f=60). This finding can be interpreted as indicative of the importance prospective teachers place on their instructional plans prior to class, and the importance they place on their own motivation at the beginning of class.

Prospective teachers also displayed behaviours considered necessary for the "Exploration" stage (f=46), followed by the "Elaboration" (f=10) and "Evaluation" (f=10) stages. While the elaboration stage is considered to be one of the most important stages of the 5E model, it was one of the least practised by prospective teachers.

In preparing their findings, the researchers considered both the frequency of the desired behaviours recorded and the strengths and weaknesses of the learning activities employed by prospective teachers.

3.1. Findings related to the "Engagement" stage

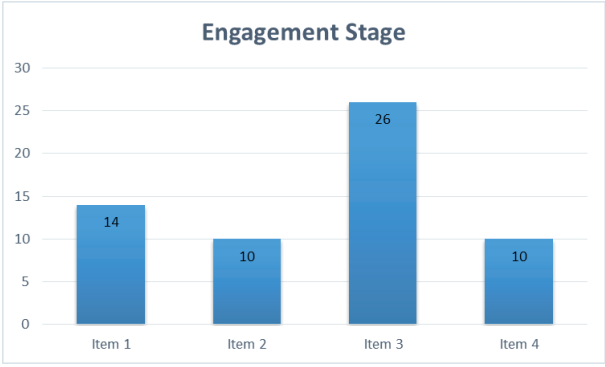

Fig. 2. Distribution of prospective teachers' behaviours in the "Engagement" stage

The behaviours displayed by prospective teachers in the "Engagement" stage of the 5 E model have been observed under four headings. In this stage, prospective teachers aim to reveal the fore-knowledge of learners who learn the most. Accordingly, learners generally benefit from questions that help them to remember their prior knowledge such as; "*What is family?", "What do you know about Atatürk's family?", "What are our basic needs?".*

Item 1 within the "Engagement" stage concerns activities that arouse interest (f=14) which were observed at the second highest level of frequency. In an effort to attract learners' attention, prospective teachers made use of educational games. For example, to stimulate interest in the objective *"S/he is prepared for natural disasters", an acquisition oriented game called "fire, landslide, flood, and earthquake"* was played. In another example, *prospective teachers who were going to teach about family and the division of labour, showed the students a documentary about a penguin family. Questions were then directed to the students about the documentary, e.g. "Who took care of the (penguin's) egg? Why was the mother in the sea?".* These questions were asked to help the class realize that "social organization, government agencies and communities are formed for a certain purpose by people". In preparation for the following analytical stage, some of the prospective teachers shared newspaper clippings regarding a "bread and blanket" campaign. Other applications at this stage included the use of texts such as poems, stories (about desires and needs) and analysis of visual materials (related to government agencies). The activities used in this stage were considered to be related to the subject and sufficient to attract the learners' attention.

The third and fourth items were observed in equal frequencies (f=10). These concern the realization of activities for enhancing the motivation of the learner. Here prospective teachers tended to use visual materials such as *a drawing of a tree prepared by prospective teachers, a film advertisement for donations to a charitable campaign, a documentary on the life of a penguin family, etc.* Prospective teachers then directed information questions that sought to encourage learners to convey correct information and provide short explanations related to identifying their prior knowledge

/ correcting false information. An *example of such engagement activities included a prospective teacher asking a student to relay to the class details about a car accident he had witnessed. The prospective teacher then asked him whether a car accident is the same as an accident in the home. In another example, a student mistakenly said that a landslide is another name for earthquake, whereupon the prospective teacher corrected him by saying that he had misunderstood and explained the meaning of landslide*.

When the strengths and weaknesses of the activities observed in the "Engagement" stage are considered, prospective teachers are seen to be efficient in arousing the interest of their learners and revealing their prior knowledge. However, they could not sufficiently motivate their students, nor enable them to correct their previous false information.

According to the constructivist approach, prior knowledge is required to construct new knowledge. Learners construct their own understanding by using their experiences (Brooks & Brooks, 1999). Thus, both teachers and students need to prepare for the lesson and conduct necessary prior research. Such preparation requires target-setting, which can be facilitated by asking students various questions just before the lesson starts. In a classroom where the constructivist understanding is dominant, learners are encouraged to use their prior experiences in order to reach interpretations and explanations. Therefore, learners are expected to construct their own understanding more than the teachers are (Gray, 1997; Oz, 2006). Once again at the initial stage, learners take responsibility for the methods or strategies that are followed during the learning process and for problem solving, while the teacher acts merely as a facilitator (Wilson, 1996).

3.2. Findings related to the "Exploration" stage

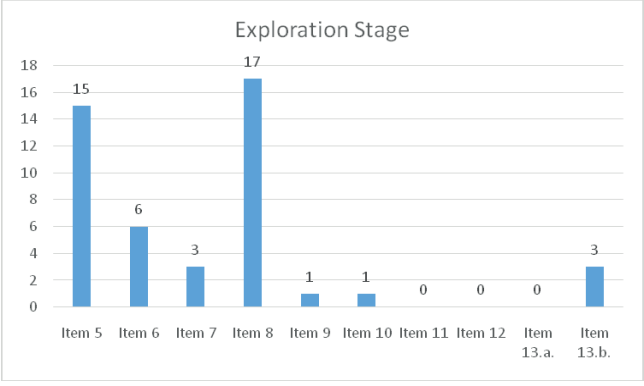

Fig. 3. Distribution of prospective teachers' behaviours during the exploration stage

Prospective teachers displayed the questioning behaviour at the highest level in order to guide the students, offer clues, and motivate them during the "exploration" stage of the 5E model (f=17). Students were encouraged to consider *"What would happen if there were no post offices?", "Are mobile phones always useful, if there are disadvantages, what are they?",* and while presenting visuals to show changes in transportation or objects such as a train or a clock, *"What are the reasons for these changes?"*.

Thereafter, prospective teachers were observed to help "*learners to build new ideas using their prior knowledge*" (f=15). Prospective teachers who set out to teach *"the benefits and harms of technological products",* after sharing newspaper clippings on the relation between *"the death of bees and the use of mobile phones",* started a case study by asking students questions such as *"According to you, are there any other reasons for the death of bees or do you agree with the news?", "Are mobile phones always useful? If not, what harm can they cause?"*. Prospective teachers then distributed a worksheet to compare old and new products. In order to teach about home accidents, they presented a case study of a home accident and analyzed it by asking questions such as *"What were Batuhan and his sibling doing during the accident?", "Could Batuhan and his sibling guess that such an accident would happen while they were playing?", "Why did this accident happen?"* As follow-up to this activity, students worked in groups to determine the situations that increase the risk of accidents at home. Also, while teaching the topic of local administration, prospective teachers invited the local authority to the classroom for students to interview him and benefit from the insights of this person.

Learners were observed to be insufficiently encouraged by prospective teachers to interact in the classroom at the exploration level. During this stage, teachers should encourage students to consider novel situations as suggested in the constructivist approach. In this study, prospective teachers did very little to compare knowledge (f=3), develop problem solving skills (f=1), pinpoint misconceptions or guide students to question their lack of knowledge (f=1). Furthermore, they did not display the behaviours of encouraging students to ask each other questions (f=0) or guiding them to reach relevant sources (f=0).

Prospective teachers were observed to encourage learners to construct new ideas by using previous knowledge and to explore and think. However, during this stage, prospective teachers were unable to encourage learners to perform creative work or to develop higher level thinking skills, which the constructivist approach deems more important than direct teaching.

At the exploration stage of the 5E Model, teachers should make students define their experiences, concepts, misconceptions, processes and skills. Thus, students at this stage can construct new ideas using their previous knowledge (Boddy, Watson & Aubusson, 2003; Bybee et al., 2006).

3.3. Findings related to the "Explanation" stage

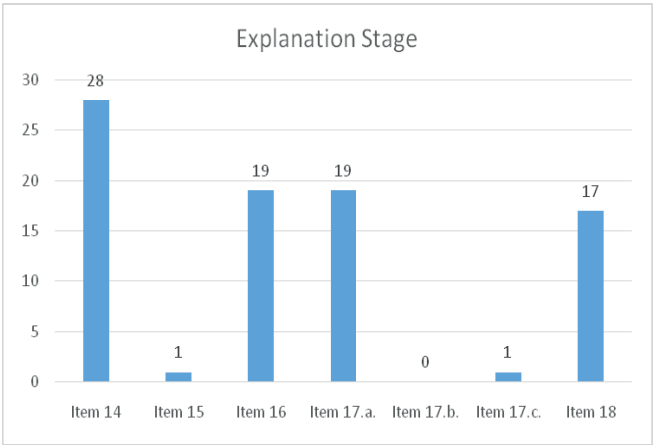

Fig. 4. Distribution of prospective teachers' behaviours at the explanation stage

Prospective teachers mostly displayed the behaviour of making learners explain their opinions about the topic during the "exploration" stage of the 5E model (f=28). They asked mostly knowledge level questions: *"What did Atatürk try to communicate with this statement?", "What big problems could arise if any of these technological tools didn't exist?", "What is a project?", "Do you know about the activities of The Turkish Foundation for Combating Erosion Reforestation and the Protection of Natural Habitats?".* Another behaviour displayed at a high level was *"enabling learners to construct new knowledge based on their opinions"* (f=19). While prospective teachers were displaying this behaviour, they discussed with the class: *"(referring to reading) So it is a cultural necessity, isn't it?".* In another example, students answered *"shoes"* when asked to priorities between buying shoes or a computer game, the prospective teacher then said *"yes, we buy shoes because they are a necessity but the computer game is not, therefore we can leave it for later".* At this stage, it was observed that prospective teachers tended to use approval questions and answered them without waiting for students do so first.

At the explanation stage, one of the most common behaviours was tapping into prior learning during explanations (f=19). For example, one of the prospective teachers said about this behaviour: *"The family is the smallest unit of society. We first learn to love and respect in the family; it is where we get our first education". "There is division of labour in a family". "As you all say, in the past our grandmothers and fathers made tools and played games with them as technology was not yet developed. They played with dolls and pebbles. But today, what kind of toys do you have at home?".*

At this stage one of the behaviours displayed by prospective teachers was to summarize the themes and subjects (f=17). Prospective teachers mostly exhibited the behaviour of summarizing and repeating, a process whereby the teacher was active and

the students were passive.

The behaviours that were observed at the lowest level, if at all, were to ask learners to explain the reasons for their opinions (f=1), compensate for misconceptions, enable learners to construct accurate knowledge and help them to make up for their lack of knowledge (f=1), and enable learners to learn new concepts (f=0).

At the explanation stage, prospective teachers were sufficient at conveying knowledge, summarizing aspects, and associating new knowledge with prior learning. On the other hand, they did not sufficiently correct learners' misconceptions or support their accurate construction of knowledge. Also, they displayed one-sided conveying of information, in opposition to the constructivist approach. At this stage, a teacher may explain the concepts, processes or skills directly and students are expected to explain what they have understood. The explanations made here need to lead the learners towards a deeper understanding (Boddy, Watson & Aubusson, 2003; Bybee et al., 2006). During this stage, teachers can make use of videos and discussions related to the topic, without making direct explanations themselves (Wilder & Shuttleworth, 2005).,

3.4. Findings related to the "Elaboration" stage

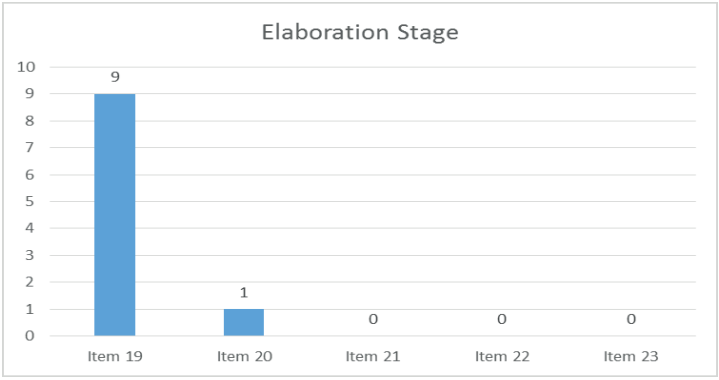

Fig. 5. Distribution of the prospective teachers' behaviours at the elaboration stage

At the elaboration stage, prospective teachers mostly displayed the behaviour of assisting students to apply their knowledge and skills to a new situation (f=9). Prospective teachers were observed to present different application areas to learners, typically applying the station method to undertake an activity, e.g. *(organizing story, poem or motto groups related to the advantages and disadvantages of technology)*. They may have thought this was an appropriate technique suitable for the age level. Apart from this method, role playing *(related to what behaviours to exhibit during an earthquake),* preparing a poster *(local governments and their duties)*, case study analysis *(case studies about government agencies and non-governmental organizations)* and question and answer methods were used. In another example, the branching tree technique was applied to help students materialize the difference between a government

agency and non-governmental organization.

The other behaviours of this stage, namely "(S/he makes an effort in order to get the learners to improve their knowledge and skills in new situations." "S/he makes learners question their knowledge in new situations." "S/he makes sure the activities are related to real life" and "S/he encourages learners to make their own decisions" were not observed. The elaboration stage may be regarded as one of the most important stages of the 5E Model, as it is here that learners have opportunity to apply their acquired knowledge to new situations. However, there is a risk that knowledge-based teaching may impede skills development of prospective teachers, who may end up seeing their learners merely as passive applicants of their instruction.

At this stage, prospective teachers are tasked with enabling students to apply their knowledge to a new situation. Here, the teacher emphasizes the conceptual understanding and skills of students and tries to develop them. Along with these new experiences, the learners develop understanding, and acquire measurably more information and skills. Students can apply their understanding of a concept by conducting additional activities (Settlagh, 2000; Boddy, Watson & Aubusson, 2003; Bybee et al., 2006; Tanner, 2010). Therefore, learners can grow their understanding of newly acquired information and skills. At this stage, the teacher can make use of question-answer sessions, discussion groups and analogies (Newby, 2004).

Here, the role of the teacher is to support the students by organizing an active learning environment. This needs to be suitable to experiential learning, based on problem-solution. The support of the teacher is necessary to provide an opportunity for each student to search for information, make decisions, think critically and apply what they have learned to new situations. In a classroom atmosphere, learners should work together and support their learning. In particular, while learners are undertaking problem-solution activities, they should have access to various tools and information sources. During such activities, learners should be allowed to use their newly acquired knowledge, suggest solutions, make decisions and arrive at logical results (Wilson, 1996; Wilder & Shuttleworth, 2005; Doganay & Tok, 2007).

3.5. Findings related to the "Evaluation" stage

At this stage, prospective teachers focus their efforts on evaluating the learners' acquired knowledge. Here, methods such as answering knowledge related questions, e.g. *(matching a wish, need, or basic necessity with their meanings)*, comparison matrix *(local governments and their duties)* and performance homework *(defining a need and designing its production)* were used. However, the skills that learners acquired in the process, such as making self-assessment, evaluating the performance of other students in their group, and giving feedback to learners based on the outcomes of evaluations, were only observed at a low level (f=8). This may have resulted from the fact that prospective teachers could not manage their time effectively. Furthermore, the behaviour of "giving feedback on the results of evaluation" was observed at a very low level (f=2).

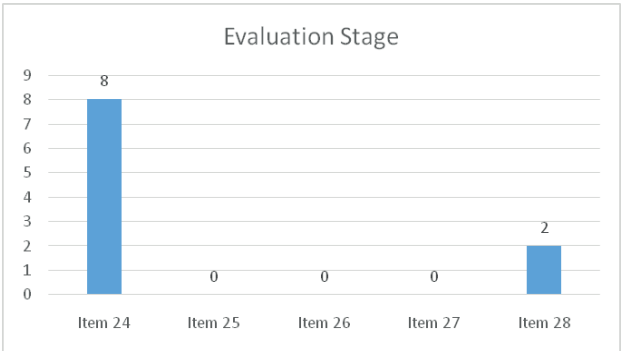

Fig. 6. Distribution of the prospective teachers' behaviours at the evaluation stage

The benefit of the evaluation stage appears as a decision phase, whether learning takes place or not. However, in terms of implementation, as in the other stages, solely valuing the acquisition of knowledge and not allowing students to evaluate themselves and their peers were a weakness in this stage. Moreover, as it is the final step of the evaluation stage, prospective teachers who did not use their time efficiently tended to omit evaluation activities from their lessons.

The objective of constructivist measurement and evaluation is not to assess how much a student remembers knowledge, but to determine how and to what extend the knowledge of the student improves (Atasoy, 2004). For this reason, measurement and evaluation takes place at the beginning, the end and at specific times during the learning process. These assessments may be oral or written and augmented with a variety of tools (Gelbal & Kelecioğlu, 2007). As part of the learning process, teachers need to evaluate how their students construct knowledge and to what extend they develop their cognitive skills by using portfolios, observation, self-evaluation, interviews, rubrics, and so on (Oz, 2006). Measurement and evaluation may be applied within the process by taking an approach that uses real life problems, that are appropriate to various learning styles, that are not limiting, and that support thinking abilities (Ev, 2006). The 5E model cycle also considers the appraisal of student development to be a key outcome of the evaluation stage. Therefore, evaluation becomes a part of the learning process and learners have an important role in the evaluation of themselves. (Brooks & Brooks, 1999; Boddy, Watson & Aubusson, 2003; Bybee et al., 2006; Tanner, 2010). For instance, using rubrics at this stage not only gives information about evaluating the students' level of understanding, but also about what is expected from them to succeed (Llewellyn, 2002).

4. Results and Discussion

The prospective teachers studied here were observed to most commonly exhibit the behaviours that are necessary for the "explanation" stage of the 5E model. They also exhibited many of the behaviours sought in the "engagement" and "exploration"

stages. However, the desired behaviours were significantly less evident in the "elaboration" and the "evaluation" stages. This is an important finding as the "elaboration" stage is considered to be one of the most significant stages of the 5E model.

In constructivist classrooms, the process of transferring knowledge, applying it to a new situation and, in brief, constructing knowledge is given priority, whereas traditional teaching emphasizes the mere repetition of knowledge. The difference is that learners are involved in the process of constructing their knowledge and understanding effectively (Gray, 1997; Richardson, 1997; Un Acikgoz, 2005). The role of the teacher in this process is to find ways of giving opportunities to students to actively explain their views in words and writing, to express themselves and their understanding. Lessons may be conducted in more flexible and creative ways in cooperation with learners. In this way, the classroom environment functions as a democratic place where interaction is important and learners are in the centre (Gray, 1997; Rainer, Guyton & Bowen, 2000; Gould, 2007).

A previous study on the practices of prospective teachers based on the 5E model was conducted by Metin & Ozmen (2009). As in the current study, they found prospective teachers were not using their time efficiently, not applying the stages of 5E in their entirety, not maintaining class discipline, and not linking the lesson to daily life. In addition, in a study of the beliefs of prospective teachers in relation to the 5E Model and the constructivist approach, their self-efficacy was found to be high and they felt capable of preparing and implementing the associated learning and teaching methods and techniques (Demir, Onen & Sahin, 2012). However, the results of this study showed that prospective teachers were not able to do these in practice.

Many of the criticisms directed against prospective primary teachers' constructivist practices by Gokce, Demirhan Iscan & Erdem (2012) were also observable in the present study. For example, in the 2012 study, prospective teachers were found to be insufficiently prepared; often using the questioning method, visual aids or songs and stories at the engagement stage; not practising activities appropriate to the features of the exploration and elaboration stages; generally explaining the subject in detail at the explanation stage; and using product based evaluation at the evaluation stage. These findings were corroborated by the current study in terms of the shortcomings in prospective teachers' behaviours across the five stages.

Practising teachers, as much as prospective ones, have problems in applying constructivist activities. Research by Rainer, Guyton & Bowen (2000) on first and second grade teachers found that half stated that they used the traditional approach. In a study by Savasci & Berlin (2012), teachers reported using constructivist activities; however, their claims were not supported by actual classroom observations. Additionally, in a study by Aykac & Ulubey (2012), teachers could not apply constructivist activities, choose appropriate methods and techniques, or use evaluation techniques appropriate for constructivism. Practising teachers, similar to the prospective teachers in this study, could not fully apply the principles of the constructivist approach and tended to prefer traditional methods (Kaya, 2013; Pinar, 2013).

Based on the results of this study, the following recommendations may be made

for future research and practice: To begin with, future studies should be conducted in a variety of teaching programs, with student groups from different education faculties. Such studies may be supported by interviews prior to and following classroom implementations, and by different tools besides observation. In addition, comparisons between classes should be made by dealing with different lesson techniques. Theoretical and practical pre-service teacher training about the constructivist approach should also be given priority. At the same time, there is evidence of a need for practising teachers to be supported with in-service training on this topic.

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