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# Turkish prospective teachers' images of the constructivist view of teaching: are they compatible with the epistemological foundations of constructivism?

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## Abstract

This study aimed to find out how the prospective teachers visualize constructivist view of learning. It also aimed to uncover their reasoning behind their image for constructivist view. The study was designed with the qualitative research method. The study conducted with 4<sup>th</sup> grade prospective teachers employed a total of 226 participants from classroom teacher and chemistry departments. They were provided a caricature on the transmission view of learning and asked to make a caricature to represent the constructivist view of learning together with its explanation. The results of the analysis of the prospective teachers' drawings and explanations indicated that the prospective teachers' visualization involves five features of the constructivist view. These were related to learners' role, teachers' role, philosophy of constructivist view, instructional materials and learner's acquirments. The findings also showed that in their visualisation there were both common and different elements of constructivism.  
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## Introduction

As an epistemological theory, constructivism has been influential in science and social sciences for past two decades and becoming epistemological framework for education since 1980's (Tobin & Tippens, 1993). It has broad implications in many countries and in many subject areas. Curricular reforms have been announced, textbooks have been rewritten, classroom atmosphere from teaching activities to interactions has been re-described and assessment methods have been dramatically changed in the line of this new epistemology. Turkish educational system has also undergone such radical changes in 2004, starting from elementary level in a stepwise fashion. As a logical consequence of this, in Turkey teacher training programs both at undergraduate or graduate level have re-designed. Not only the content of the program has been subject to change but also the pedagogy adopted by the university lecturers have started to change from the narrative, lecture type methods towards more constructivist approaches.

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Research shows that the way students perceive learning environment influences her/his learning approaches and subsequent learning outcomes (Fraser et al., 1987; Entwistle & Tait, 1990; Gijbels et al., 2006). Therefore, some of the researchers have concentrated their efforts on the perception of learning environments (Schommer, 1990; Tsai, 1998). After the renovations towards the constructivist view, studies were carried out to find out perceptions of constructivist learning environment (Taylor, Fraser & White, 1994; Tenenbaum et al., 2001; Johnson & McClure, 2004). In these studies, perceptions were generally determined via a survey (5-point Likert scale questions) that is used to measure the degree to which a classroom's learning environment is in agreement with constructivist epistemology (Lee & Fraser, 2001; Aldridge et al., 2000; Johnson & McClure, 2004). Most of these studies are focused on students' perception of learning environment rather than perception of teachers/prospective teachers. At the age of an epistemological change, there is a need to find out prospective teachers' perception of constructivist view. As teachers of the future, they will possibly organize classroom environments on the base of their perception. In the previous research aforementioned the perception of constructivist learning environments is determined on the basis of their tendency to agree with the statements provided. Asking prospective teachers to explain the constructivist view in their own terms and to make a drawing to visualize the constructivist view might produce a more detailed picture of their perception. Therefore, the present study aimed to find out how prospective teachers visualize the constructivist view and how compatible it is with the epistemological foundations of constructivism. The study also aimed to uncover their reasoning behind the image held for constructivist view. In this respect, the research questions of the present study can be stated as;

1. How do Turkish prospective teachers visualise the constructivist view of learning and teaching?
2. Which kind of reasoning is used by the prospective teachers to support their image of constructivist view?
3. Do prospective teachers' subject areas make a difference in conceptualizing the constructivist view of learning?

## 2. Methodology

The study was designed as a case study which derived its principles and assumptions from the qualitative research method. Two groups of the prospective teachers formed the sample of the study. Elementary prospective teachers (n= 101) formed the first case study whereas the second case study consisted of Science and Chemistry prospective teachers (n= 125). The selection of participants for the case studies was carried out in a way that they had different discipline background. Elementary teacher training involves both social studies and science subject areas whereas science/chemistry involves only the science subject area. The study conducted with 4<sup>th</sup> grade prospective teachers (n= 226), 137 of whom were female students and the rest 89 were male students. The reason for choosing senior students was that they completed all the courses which would help them to develop a perspective about the constructivist view of learning and teaching. In these courses, the prospective teachers were informed about constructivist view of learning and its different brands. Having completed their general pedagogy and teaching method courses, during their examination period, both groups of the prospective teachers were provided a caricature that visualises the transmission view of learning and teaching (Visual 1). They were then asked to make a drawing/caricature to represent the constructivist view of learning and teaching. They were also required to explain their drawings verbally as detailed as they could. They did not feel time constraints as the exam was ended when they handed in their exam papers. These exam papers provided the main data for the study. Document analysis was used in the research since the data is composed of the prospective teachers' drawings and explanations as exam papers. The content analysis was benefited in analyzing the caricatures and its verbal explanations of the prospective teachers. Pictorial and verbal data were analysed together.

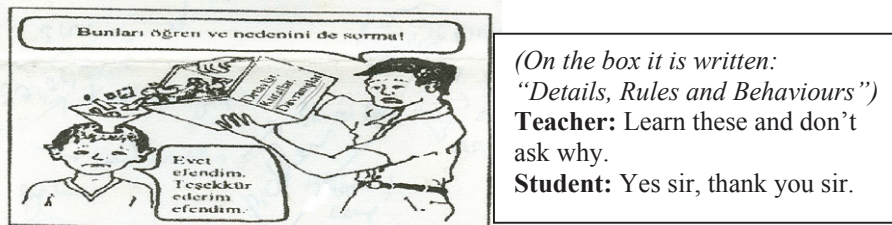


Figure 1. The caricature presented to the prospective teachers together with its translation (Taken from: A. Saban (2004) Öğrenme-Öğretme Süreci, Ankara: Nobel, p. 166)

### 3. Findings

#### 3.1. Turkish prospective teachers' image of constructivist view

In this initial analysis, the data were examined in terms of features of the constructivist and positivistic/behaviourist view. These categories were presented together with the number of the cases in Table 1.

Table 1. The main categories used in the analysis

Category	Respondents' number (elementary)	Respondents' number (science/chemistry)	Total / %
Constructivist features	97	110	207 (91.6)
Positivist features	1	7	8 (3.6)
Mixed	1	4	5 (2.2)
No response	2	4	6 (2.6)
<b>Total</b>	<b>101</b>	<b>125</b>	<b>226 (100)</b>

According to Table 1, 207 (% 91.6) prospective teachers' drawings referred to the features of the constructivist theory of learning and teaching while 8 of them provided positivistic explanations. Some of the prospective teachers (n=5) appear to be in between. Their explanations included features of both view. The rest (n= 6) did not reply the question. One of the caricatures which showed positivist features is presented below together with its translation.

#### Prospective Teacher 71 (Science)

**Dialogue in the picture;**  
**Teacher:** (She does an experiment) Since you have seen what has happened in the experiment, you can solve the questions you have in your mind.  
**Student:** Yes miss. I understand the reason now.  
**Explanation:** In the drawing, teacher solved the problem that the student has in his mind in the line of the constructivist approach. She illustrated how the scientific event happened via the experiment.

As can be seen from the drawing and explanation provided underneath, it seems that the prospective teacher misconceptualizes the constructivist learning theory and its implications. Although teacher in the drawing does the experiment and makes explanation and reiterates the concept to be learnt, the prospective teacher supposes that the instructor in the caricature creates a constructivist learning environment.

#### 2. Underlying reasoning that made up the prospective teachers' visualisation of constructivist view

On the examination of the prospective teachers' visual and verbal responses, different features were uncovered. It seems that these features made up the prospective teachers' reasoning concerning their image of constructivist view. The results are presented in Table 2. It shows that the prospective teachers' caricatures and accompanying explanations involved five basic features of the constructivist view. These are features related to learners' role, teachers' role, philosophy of constructivist view, instructional materials and learner's acquirments.

Table 2. Features that made up prospective teachers' visualisation of constructivist view

Features of constructivist view	Respondents' number (elementary)	Respondents' number (science/chemistry)	Total
Teachers' role	212	291	503
Students' role	188	183	371
Philosophy of constructivist view	4	62	66
Instructional materials	12	38	50
Learner's acquirments	24	16	40
<b>Total</b>	<b>440</b>	<b>590</b>	<b>1030</b>

According to Table 2, the most favourable feature of constructivist view was teachers’ role since 503 prospective teachers describe the role of the constructivist teacher in their responses. Second favourable feature aired by 371 prospective teachers was students’ role. From Table 2, it seems that regardless of their subject areas both groups of the prospective teachers focused upon mainly the two characters of the constructivist learning environment.

According to Table 2, philosophy of constructivist view, instructional materials and learners’ acquirements are less favourable. Even though frequencies of these features are similar (n= 66, 50, 40) in range, the distribution of prospective teachers to these features appear to vary in nature. This difference is quite apparent for the philosophy of constructivist view. Majority of prospective teachers (n= 62 out of 66) who stated the feature of the philosophy are science/chemistry education students. Similarly, majority of prospective teachers (n=38 out of 50) who mentioned instructional material are science/chemistry students. This situation turns into opposite as far as the feature of learners’ acquirements is concerned. The number of elementary prospective teachers (n=24) who emphasised this feature is more than those of science/chemistry prospective teachers (n=16). Due to space constraints only the analyses concerning teachers’ role were reported in the present paper.

### 3.2. Prospective teachers’ visualisation of the constructivist view in relation to the teacher’s role

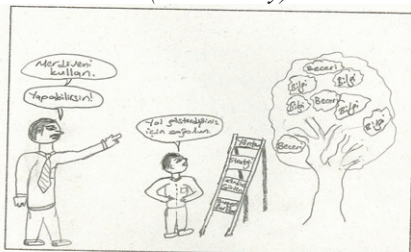
Table 3 indicates the ways in which the prospective teachers visualise the constructivist teachers’ role.

Table 3. The frequencies of the features of the constructivist view in relation to teacher’s role

The Features of Constructivist View in relation to Teacher’s Role	Elementary (N=101)	Science/Chemistry (N=125)	Total (N= 226)
Being a guide/facilitator/mediator/tutor/student-centred	37	65	102
Posing students problems that encourage them search for solution	30	41	71
Appreciating/using students prior/existing experiences	25	35	60
Do not transmit/present the knowledge to be learnt directly	27	23	50
Organizing learning environment to meet students’ needs/features	13	31	44
Presenting cognitive/conceptual conflicts/ambiguities /dilemmas	12	27	39
Knowing and using different teaching methods	8	14	22
Making students to feel that they are trusted	5	12	17
Knowing the importance of/encouraging teacher-student interaction	1	12	13
Making connections between knowledge to be learnt and real life/examples	8	4	12
Being aware that students interpret the same phenomenon/event/concept differently due to the differences in their prior experiences/ideas	6	5	11
Encouraging students to express themselves freely/negotiation	6	4	10
Making students aware of different viewpoints about the phenomena/concept	8	2	10
Providing students different ways/methods to help them construct knowledge	7	2	9
Arise students’ curiosity and develop their scientific/discovery skills	7	1	8
Being aware of the importance of peer learning	0	7	7
Creating learning environments that support skill-acquisition	4	2	6
Revealing and respecting students’ differences	6	0	6
Presenting/developing skills and perspectives related to subject matter/course	2	4	6
<b>Total</b>	<b>212</b>	<b>291</b>	<b>503</b>

As can be seen from Table 3, teacher’s role is described as “a guide/facilitator/mediator in the classroom” by majority of the prospective teachers (n=102). The below excerpt illustrates the role of constructivist teacher.

#### Prospective Teacher 39 (Elementary)



Cizdiğim resimdeki ana fikir: ... Olmazınca... Başarım... Başarım... Analiz... sonuçları...  
 İstediğim... sonuçları... bulduğum... Başarılar... her... sonuçta... Başarılar...  
 sonuçları... Başarılar... her... sonuçta... Başarılar... sonuçları...  
 sonuçları... Başarılar... her... sonuçta... Başarılar... sonuçları...

“Knowledge” and “Skill” are written on the tree. “Individual differences, Self-confidence, Strategies and Methods” are written in the flight of stairs.  
**Dialogue in the picture;**  
**Teacher:** Use the stairs, you can do it.  
**Student:** Thank you for your guidance sir.  
**Explanation:** In the constructivist approach students construct their knowledge. In this process, teacher becomes a guide. In the stairs, there are criteria/clues for student to reach the knowledge/tree. Student constructs/gets knowledge at last. In doing all these, he acquires some skills that are life-oriented.



Some on the other hand shifted towards social constructivist perspectives (Vygotsky, 1978) by paying attention to the importance of negotiation in the class whereas the rest were somewhere in between. This difference does not stem only from different brands of constructivism but their interpretation of these two versions of constructivism. Analysis indicated that the prospective teachers who depended on the personal constructivist view differed in their image by emphasising the role of dilemmas more or less. A similar portrait is true for those who based their image on social-constructivist view. The role of social interaction during learning process appears to vary. To be specific, some thought that learning starts on the social plane and does not occur otherwise whilst to some learning is affected by social environment but happens in any case.

The features determined from the prospective teachers' visualization of the constructivist view appear to overlap with the key features of constructivist learning environment stated by the various researchers (Taylor, Fraser & Fisher, 1997; Tenenbaum et al., 2001). Tenenbaum et al. (2001) determined seven key features for a constructivist learning environment which are arguments, dilemmas, sharing ideas, materials targeted toward solution, concept investigation, meeting student needs and making meaning, real life examples. It is possible to say that these seven key features could be found in Turkish prospective teachers' visualization of the constructivist view. This finding seems to be an important indication of the effectiveness of the Turkish teacher training program. Having said that there are points need to be open up further to be certain for effectiveness of the program. Interviewing with the prospective teachers might be a solution in finding out the meaning they attached to terms that form their image. In this way, for example, it might be possible to see what it means "discovery of knowledge" through the eyes of the prospective teachers.

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