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## Evaluation Of Constructivist Learning Approach Through Experimental Studies

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### Abstract

The aim of this study is to provide some findings about inclinations, number of studies, study, data analysis, sampling methods and so on, and to summarize the results of the studies: i) which were published between 2005 when new curricula were introduced and 2016 (until March when data collection was done); ii) were published in a journal indexed in Turkish National Academic Network and Information Center (Ulakbim); iii) that consist one of the following keywords in its title: “constructivism”, “constructivist learning/teaching”, “constructive approach”, and iv) that employed experimental method. This study employs the descriptive method which aims to represent a situation as it is, and documentary analysis will be used as data analysis method. A total of 37 studies that employed the experimental method were published between 2006 and 2016 with one of the keywords in its title and could be reached in a journal indexed in Ulakbim. They will be used as the data source. These studies will be examined on many different aspects in order to find out inclinations and changes about constructive learning and teaching experiences and understand how effective they have been. The year with the most number of studies is 2009 with 6 studies and there are 5 studies in both 2011 and 2012. The samples used in these studies are from all grade levels. Studies examine the impact of some teaching and learning theories and methods that are used in constructive approach and compare them with traditional teaching applications, especially through pre and post-test experimental design with a control group.

**Key words:** constructivism; experimental design; document analysis

### Literature Review

For long years, education has frequently been criticized not resulting in graduates being sufficiently able to apply their knowledge to solve complex problems in a working

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context (Gijbels, Watering, Dochy, & Bossche, 2006). In research for a solution to this problem, instructional methods implementing crucial aspects of the constructivist framework have gained greater theoretical foundation and conceptual precision (Beerenwinkel & Arx, 2016). When compared to traditional way of setting instructional designs, constructivism has different set of hypothesis on learning and it naturally provides different teaching principles. These new instructional practices are radical as they change our current knowledge on learning instead of extending it. That is why instructional designers are challenged to transfer constructivist philosophy into practice in the field of education (Karagiorgi & Symeou, 2005). Of the new practices in education, for example, while direct and active teaching may be effective for achieving objectives related to acquiring knowledge and skills, more constructivist approaches can be more effective for accomplishing aims related to higher-order cognitive activities (Campbell, Kyriakides, Muijs, & Robinson, 2003).

In constructivism, according to Spivey (1997), students should be seen as constructive agents who build knowledge rather than receiving it with a passively, as their conscious processes influence what they learn and understand, so Jonassen (1999) argues that learning environments should offer constructive, active, intentional, collaborative, complex, conversational, contextualized and reflective learning (cited by Smeda, 2014). Students who learn to apply active learning strategies are also expected to acquire more useful and transferable knowledge (Gabrys et al., 1993).

Constructivist curricula may succeed only if four conditions are met. First, problems or assignments given as a starter to small-group discussion and self-controlled learning should promote curiosity and be perceived as relevant to their personal interests by students. Second, activating prior knowledge and elaborating newly learned information should be provided by small-group work. Third, students should be given enough chance to take part in didactic conversations with their teachers and acceptable frameworks should be provided. Fourth, students need plenty of time for self-directed learning, and it shouldn't be unrestricted (Schmidt, Molen, Winkel, & Wijnen, 2009). Constructivist teaching practices are criticized to be problematic at two points (Matthews, 2003): i) its effectiveness lacks empirical effectiveness; ii) employing this approach without an empirical evidence for its effectiveness means not using instructional practices whose effectiveness is supported empirically. However, the constructivist instruction is found to result in better learning than so-called traditional instruction and many researchers point out a more motivating, exciting and challenging education through constructive manners in education (Kroesbergen & Luit, 2005).

Turkish educational system has been practicing the ideas behind constructivism through curricula changes that started in 2005 and the process and results of the practices in all fields and levels have been examined through many academic research since then. Especially experimental studies provide important information about the effect of constructive applications on students' success in and attitudes towards lessons. So, examining them as a whole might provide important information for researchers.

## ***Aim***

The aim is to present the inclinations from the various aspects of the studies which are related to this approach and have been conducted with experimental research method (in the



journals screened in the database of ULAKBIM) since 2005 when people in Turkey started to adopt constructivist education approach.

### ***Problem***

Where are the constructivist approach studies conducted in the national literature since 2005 inclined to?

- (1) How have the national experimental studies researching constructivist approach in education been distributed between 2005 and 2016?
- (2) Which experimental methods were used in conducting the national experimental researches related to the constructivist approach?
- (3) Who constituted the population and sampling of the national experimental studies related to the constructivist learning approach?
- (4) What are the results of the national experimental researches related to the constructivist learning approach?
- (5) Which themes do the national experimental researches related to the constructivist learning approach examine?

### **Method**

Document analysis method was used. Document analysis is a method providing great benefits for the research by covering long-term progresses of situations, events and so on in time (Cohen, Manion and Morrison, 2007). Document analysis method was preferred for this study since the aim was to reveal the processes and inclinations in the efforts examining the impact/effectiveness of the constructivist approach in the education for the period between 2005 and 2016.

Document analysis may be performed with five steps (Foster, 1995, c.b. Yıldırım and Şimşek, 2011: 193): (1) accessing the documents, (2) checking the authenticity, (3) understanding the documents, (4) analyzing the data and (5) using the data. Articles matching the research criteria in the database (ULAKBIM) were combined by independent researchers for this study, and these articles were checked to see if they were appropriate. After eliminating the inappropriate ones, documents were analyzed thoroughly for the purpose of accessing the specifications which could be used as the data. The data were transformed into tables or charts/figures with the aim of presentation after the data analysis was performed as instructed in the next chapter.

### ***Data Analysis***

Descriptive and content analysis methods were used in the study. Descriptive analysis method is a qualitative data analysis method including the process of summarizing and interpreting the data obtained with various data collection methods under the themes determined before. Content analysis method is not seen in content analysis and analysis data set but does include the process of revealing the themes and the significant relationships between these themes by coding and categorizing (Yıldırım and Şimşek, 2003).

Miles and Huberman's (1994) compatibility calculation method was used to ensure the reliability in the data analysis. Accordingly, various coding (independent from each other)

were performed by the researchers, and general compatibility coefficient was found to be 86%. Therefore, coding was deemed reliable since that figure was higher than the minimum value (70%) estimated by Miles and Huberman (1994). Afterwards, researchers discussed on various non-compatible points and made a decision.

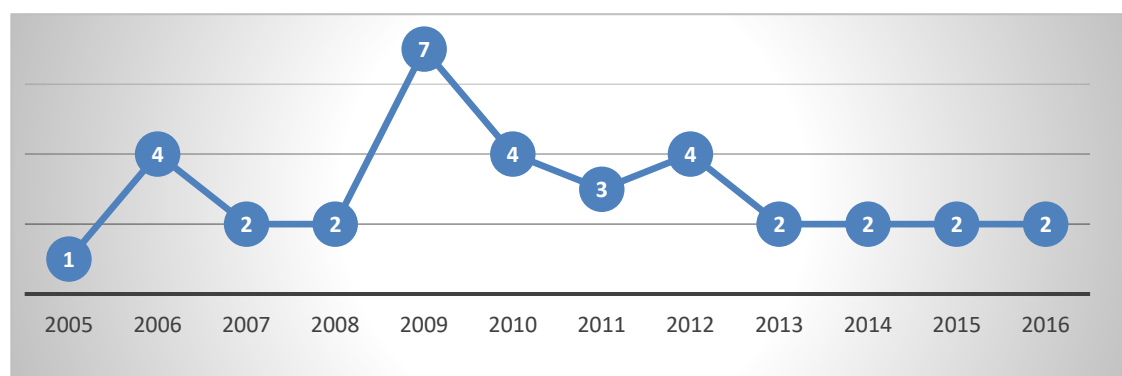
### Population and Sampling

The following criteria were observed while selecting the studies to be analyzed in this study: Published in the journals (searched in ULAKBIM database) between 2005 and 2016 (until May when the data were collected) with the titles including the following keywords: Constructivism, Constructivist Education, Constructivist Approach. Studies conducted with experimental research method. Purposive sampling method was used in selecting the studies since it has certain selection criteria for sampling. Thirty-five studies were found after the searching process.

### Findings

#### *Sub-problem 1: How have the national experimental studies related to constructivist approach been distributed between 2005 and 2016?*

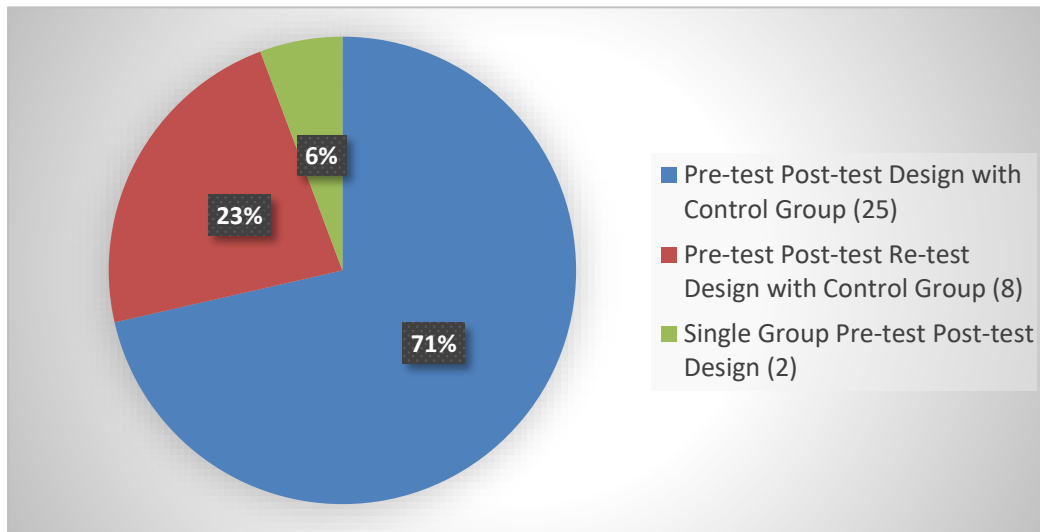
Figure 1. Studies by Years



The number of studies examined in this study is 35. The year with highest number of studies is 2009 with 7 studies (20%). There are three years -2006, 2010 and 2012- with 4 studies in them (11% each). In 2011 there are 3 studies (9%). There are two studies (6%) in 6 years (2007, 2008, 2013, 2014, 2015 and 2016). There is only one study (3%) in 2005.

#### *Sub-problem 2: Which experimental methods were used in conducting the national experimental researches related to the constructivist approach?*

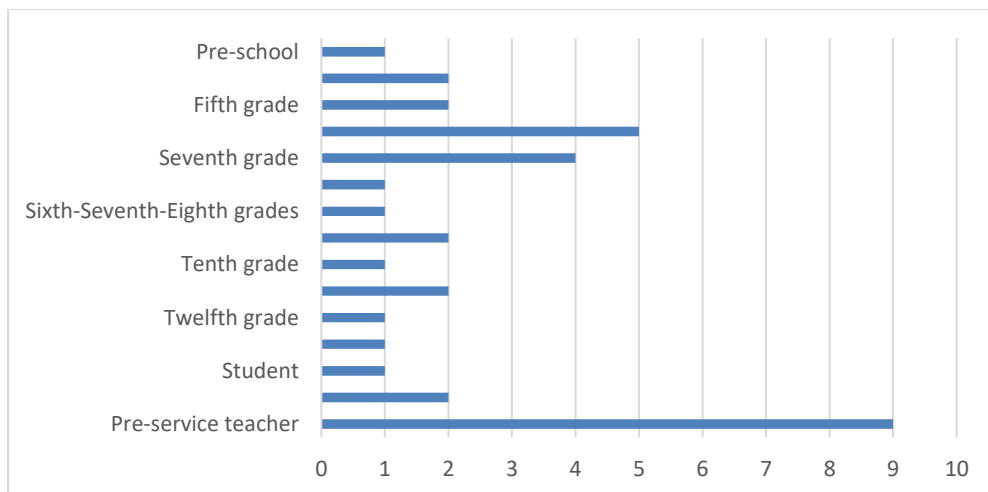
**Figure 2. Studies by Design**



Experimental design was implemented most with the methods including pre and post-test control group (N=25; 71%). The number of the studies including pre and post permanence test and control group was found to be eight (23%). Two studies (6%), in which the impact of the experimental action was only studied with the experimental group, were found.

***Sub-problem 3: Who constituted the population and sampling of the national experimental studies related to the constructivist learning approach?***

**Figure 3. Studies by Sampling**



Experimental studies were conducted most with the pre-service teachers included in the sampling (N=9; 26%). The reason for this situation may be that these researches were generally conducted by the academicians working in universities. This group is followed by the sixth grade students in five studies (14%) and the seventh grade students in four studies (11%). Fourth, fifth, ninth, eleventh grade students and undergraduates constituted the sampling group in two studies. Pre-school students, sixth-seventh-eighth grade students (all together), eighth, tenth and twelfth grade students, high school students and students whose

grade were not specified constituted the sampling group in one study. These studies were found to be articles derived from the master's or Ph.D. theses.

The group of sample used most in the experimental studies is student teachers in 9 studies (26%). The other mostly used groups are 6th grade in 5 studies (14%) and 7th grade in 4 studies (11%). The sample are 4th, 5th, 9th, 11th grade and undergraduates in two studies each (6%). Preschool students, 6th-7th-8th grades, high school students and a group of students whose level were not stated have been the sample in one study each (3%). These studies are generally a summarized version of masters or doctorate thesis.

***Sub-problem 4: Which themes do the national experimental researches related to the constructivist learning approach examine?***

**Table 1.** Themes of the Studies

Theme	N	%
Traditional vs. Constructive Education	31	88,57
The Effectiveness of Constructive Methods	4	11,43
Total	35	100

The studies examined can be grouped into two themes. A big majority of the studies deal with the traditional practices versus constructive ones (N=31; 88,57%). The other theme that is dealt with 4 studies in total (11,43%) is the effectiveness of constructive methods which examines how effective the different constructive practices are.

***Sub-problem 5: What are the results of the national experimental researches related to the constructivist learning approach?***

**Table 1.** Results of the Studies

Results Related to	N	Significant Difference			
		Yes		No	
		N	%	N	%
Attainment	31	30	96,77	1	3,23
Attitudes	11	8	72,72	3	27,28

Of the 35 studies examined, 31 studies deal with if constructive practices result with statistically significant difference in student attainments compared to traditional practices. While there is found to be a significant difference in 30 of them (96,77%), in only one study (3,23%) the results do not indicate a significant difference. In 11 studies, there is a comparison of traditional and constructive practices in terms of the effect on attitudes towards the lesson. Of them, constructive practices are found to be causing a significant difference in students' attitudes towards the lesson in 8 studies (72,72%) while no significant difference is observed in 3 studies (27,28).

## **Results and Discussion**

After the distribution of the experimental studies published in the national literature related to this constructivist approach was analyzed for the period between 2005 and 2016, when the curricula in Turkey was altered in accordance with this approach, it was realized that the studies were conducted most in 2009. All of these studies were conducted to compare the effectiveness of the traditional methods based on subjects/teachers and of constructivist approach methods.

Traditional and constructivist methods were compared in all of the studies published in 2006. There are four studies, three of which compare the traditional methods with constructivist methods and one of which compares two constructivist approaches with one another, in 2010. Three of the four studies published in 2012 compare the traditional methods with constructivist methods and one of them evaluates the impact of constructivist activities on the attitude towards the courses. There is a 2005 study comparing the traditional and constructivist methods. Impact of the courses taught with traditional and constructivist methods on students' success was analyzed in three studies published in 2011. Traditional and constructivist approaches were compared in two studies published in 2007, 2008 and 2013. Comparisons were performed in one of the two studies conducted in 2014, and the effectiveness of the two constructivist approach methods were compared in the other study. Subject-based teaching and constructivist method were compared in terms of students' success in one of the two studies published in 2015, and the constructivist approach and the courses' impact on students' success were evaluated in the other study. Effectiveness of constructivist methods was analyzed in two studies published in 2016.

Outline of the thirty-five studies is as follows: a statistically significant variation favoring the experimental group was found in thirty of thirty-one studies examining and comparing the constructivist methods to traditional teacher/subject-based teaching methods and their impacts on students' success. There are findings indicating that traditional methods increase the memorability of the knowledge.

Various results indicating that constructivist approaches were and were not effective in students' attitudes towards the courses were found. A significant variation was found in the attitude towards the courses after constructivist approach was compared to the traditional approach in eight studies (of eleven studies). It was found in three studies that two approaches did not generate a significant variation in terms of the attitude towards the courses.

Constructivist approach was engaged with the technological opportunities such as online or offline virtual platforms or computer programs, and the effectiveness of this was analyzed in five of thirty-five studies.

The most frequent themes in the studies were found to be those which compared constructivist approaches to traditional approaches in terms of students' success, memorability of the knowledge and/or the attitude towards the courses. This theme can be seen in thirty-one of thirty-five studies. Following themes were employed in the studies: effectiveness of the constructivist methods in two of the remaining studies; constructivist methods' impact on the attitude towards the courses in one of the studies and comparison between the two constructivist approaches in one study.

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