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CONSTRUCTIVIST LEARNING ENVIRONMENTS: THE TEACHERS' AND STUDENTS' PERSPECTIVES

Assist. Prof. Dr. İlker CIRIK
Mimar Sinan Fine Arts University
Faculty of Science and Letters
Istanbul-TURKEY

Assist. Prof. Dr. Esma ÇOLAK
Mimar Sinan Fine Arts University
Faculty of Science and Letters
Istanbul-TURKEY

Resrch. Assist. Defne KAYA
Mimar Sinan Fine Arts University
Faculty of Science and Letters
Istanbul-TURKEY

ABSTRACT

In this research, ninth grade mathematics learning environments' coherence with constructivist learning approach was examined according to teachers' and students' views. Thirty-four schools were included into the sampling from the seven regions of Turkey. 208 teachers and 1830 students from these schools participated to the study. Data was collected with "Constructivist Learning Environments Questionnaire" and "Learning Process Questionnaire". The one-way ANOVA, Welch and independent samples t-test was employed to analyze data. According to results of the study there is no significant difference between teachers' and students' views $p > .05$. Students' views, on the other hand, are significantly different according to deep learning levels $p < .05$ but between surface approach levels there is no significant difference $p > .05$. In addition, teachers' views do not differ significantly according to teaching experience and educational level $p > .05$. Based on these results, it can be concluded that developments in our education system started a positive change in classroom implementations.

Key Words: Constructivist learning environment, learning approaches, curriculum evaluation.

"The principal goal of education is to create men and women who are capable of doing new things, not simply of repeating what other generations have done...men and women who are creative, inventive discoverers...The second goal of education is to form minds which can be critical, can verify and not accept everything they are offered." J. Piaget (as cited in Etuk, 2014).

INTRODUCTION

Piaget's statement above reflects today's educational understanding. Although there is a wide consensus on this opinion in theoretical level, it still does not show itself fully in practice. Therefore, one should consider whether schools are for transferring traditional culture to new generations or equipping individuals with skills to challenge the traditional structure (Kohn, 1999). Schoen (2008) points out that in this century, we should rethink about the school concept and question whether the school experiences help to develop skills for coping with real life situations. By this point, Piaget's opinion, which is stated above can be viewed as a guiding principle. If we ask for individuals with the mentioned skills, we should focus firstly on learning environments.

This is because educating individuals with skills such as creativity and higher order thinking is mostly associated with incorporation of constructivism into the learning environments.

Constructivism can be defined basically as a learning approach, which defends that students subjectively construct, interpret and reorganize their knowledge (Windschitl, 1999). In learning environments this approach reveals itself as encouraging students to discover, discuss and interpret knowledge; as organizing learning environments for helping students construct and implement their own theories and as motivating reflection of gained knowledge and skills (Jonassen, 1999). Such a learning environment supports students to take responsibility for their own learning. To expect students take responsibility for learning and construct their knowledge it is important to employ mental processes like questioning, problem solving and researching in classroom settings extensively (Marlowe & Page, 2005). In a number of studies it is emphasized that a learning environment, which is designed according to constructivist principles, has positive effects on creativity (James, Gerard, & Vagt-Traore, 2010; Tezci & Gürol, 2003), meta-cognitive skills (Jager, Jansen, & Reezigt, 2005; Lam, 2011), critical thinking (Maypole & Davies, 2001) and problem solving (Bay, Bagceci, & Cetin, 2012; Wilson, 2010) These research results point out that individuals defined by Piaget, can be raised in constructivist learning environments. From this point on, it is not wrong to tell, evaluating a learning environment's coherence with constructivism is of preliminary importance for raising students with aforementioned characteristics.

There are two main ways to evaluate learning environments for its accordance with constructivist principles. Using instruments which are designed for evaluating constructivist learning environments is one of them and the other one is using students' learning approaches as an evaluation criterion (Alt, 2014). Learning approaches focus on learning strategies and motivational sources on a learning task. According to characteristics of these learning strategies and motivational sources, deep and surface learning are defined as the two main learning approaches. Individuals with surface approach handle learning units separately, have difficulty by making sense out of new information and focus on recalling rather than understanding knowledge. For deep learners, on the other hand, learning is associated with searching for evidence, establishing connections, making meaning and employing higher order thinking skills (Entwistle, 2005; Houghton, 2004). Surface learners passively receive information from teachers or books and tend to forget new knowledge easily, whereas deep learners construct their own meanings by relating existing and new knowledge and transfer their learning to original situations (Hermida, 2015). Regarding the features of two main learning approaches, motivating students to become deep learners is of preliminary importance for constructivist learning. This view is also supported by a considerable amount of studies which point out that the purpose of creating constructivist learning environments is to encourage deep learning (Dart et al., 1999; Fok & Watkins, 2007; Çolak, 2006). In addition to these studies, a constructivist learning environment survey was developed by Alt (2014) with a sub-dimension of "in-depth learning".

To sum up, constructivism redefines the role of students and the teachers and their interrelationships by creating a nurturing, but not a competitive classroom environment (Benudhar & Moumita, 2013). This new learning environment also forms a basis for educational reforms. Student centered environment's aim of helping individuals to become creative, independent, problem solving, lifelong learners, triggers a change towards creating such learning environments (Fok & Watkins, 2007). By this point, reflection of this understanding to actual learning environments maintains its importance. This view forms the rationale of the present study, which has the purpose of evaluating learning environments' accordance with constructivist learning principles. The subject area chosen for the research is mathematics, because within a national reform movement, the mathematics curriculum for secondary school was revised with a constructivist learning perspective in 2011. The new curriculum focuses on students' active construction of mathematical concepts and defines learning environments as spaces which provide opportunities to develop main mathematical skills such as reasoning, problem solving, communication and modelling. The nature of learning mathematics, as a matter of fact, involves problem solving, showing and expressing ideas, discovering patterns and creating meaning from new situations (Trafton & Claus, 1994); discussion and questioning (Burghes, 1989); deep understanding of concepts, relationships and generalizations, and provides individuals with different ways for logical and creative thinking (Huetinck & Munshin, 2004). All of these features signifies constructivist learning.

Jaworski (2002) similarly indicates that the principles of mathematical learning overlap with constructivist learning principles.

In this vein, the purpose of the present study is to determine whether the change of mathematics curriculum towards constructivist learning reflects itself in actual learning environments. To find answers for this main problem, the views of teachers and students from seven regions of Turkey and selected via maximum variation sampling, are studied. Because students' learning approaches are strong indicators for actual constructivist learning environments, the present study also examined learning environments from this perspective. From this point on, the research questions of the study are: (i) is there a significant difference in students' and teachers' views of constructivist learning environments? (ii) is there a significant difference in students' views of constructivist learning environments according to deep and surface learning approach? and (iii) is there a significant difference in teachers' views of constructivist learning environments according to teaching experience and educational level?

METHOD

Population and Sampling

Students and mathematics teachers from ninth grade of general secondary schools of Turkey constitutes the research population. Maximum variation sampling was used as sampling strategy. The purpose of maximum variation sampling is to create a relatively small sample reflecting the variations of the target population in maximum level (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2010; Yıldırım & Şimşek, 2006). For this purpose three cities from each region, and two central schools from each of these cities was selected according to simple random sampling method. With this method, 42 schools were included into the sampling. From each school two ninth grade classes are selected with simple random sampling and both students and teachers attending these classes were included in the sampling. Five schools from Mediterranean, three schools from Eastern Anatolia, five schools from Aegean, six schools from Central Anatolia, five Schools from South-Eastern Anatolia, four schools from Black Sea and six schools from Marmara Region, making up a total of 34 schools, responded to the surveys. The characteristics of the research sampling are presented in Table 1.

Table 1: Characteristics of the Research Sampling

	Teacher		Student	
Region	f	%	f	%
Mediterranean	27	13.1	269	14.7
Eastern Anatolia	25	12	170	9.3
Aegean	34	16.4	257	14.1
Central Anatolia	31	14.8	306	16.8
South-Eastern Anatolia	33	15.9	287	15.7
Black Sea	17	8.2	233	12.8
Marmara	41	19.7	308	16.9
Total	208	100.0	1830	100.0
Gender				
Female	94	45.2	900	49.2
Male	114	54.8	930	50.8
Total	208	100.0	1830	100.0

Research Instruments

Constructivist Learning Environments Questionnaire (CLEQ): Constructivist Learning Environments Questionnaire developed by Tenenbaum, Naidu, Jegede, and Austin (2001), and adapted to Turkish culture by Fer and Cırık (2006) was used to measure teachers' and students' views of constructivist learning environments. The questionnaire consists of seven factors and a total of 30 items. "Arguments, discussions, debates" factor covers items related with problem solving, higher order thinking and encouraging deep learning; "conceptual conflicts and dilemmas" includes items about creating dilemmas by presenting conflicting situations to learners' hypotheses; "sharing ideas with others" has items to measure the teacher-student and

student-student interaction; "materials and resources targeted toward solutions" factor is related with using raw data to organize the complexity of real world settings; "motivation towards reflections and concept investigation" covers items about discovering students' points of view and respecting them; "meeting students' needs" is about presenting problems that students can relate with themselves; and finally "making meaning, real life examples" factor has items about supporting learning with a rich learning environment which consists of real life situations. The questionnaire has a five point Likert scale, namely, never (1), seldom (2), sometimes (3), often (4), always (5). The Cronbach alpha internal consistency coefficients of the factors in the original scale vary between .72 and .87. The Cronbach alpha coefficient for the total survey is .86. The Cronbach alpha coefficients of the factors in Turkish form are between .89 and .94 in teachers group, and are between .86 and .93 in students group. For the total Turkish scale the Cronbach alpha coefficient is .91 for teachers and .89 for students. For the present study the total scale's Cronbach alpha coefficient is found to be .92 for teachers and students. In factors, the coefficients are between .66 and .86 for the teachers, and between .69 and .83 for the students. These findings show that the scale has a reliable structure to be used for the present research.

Learning Process Questionnaire (LPQ): Learning Process Questionnaire was used to measure students' learning approaches. LPQ is developed originally by Kember, Bigss, and Leung (2004) for secondary school students and adopted to Turkish culture by Çolak and Fer (2007). The scale includes a total of 22 items within deep learning and surface learning factors. Eleven items belong to deep learning and 11 items belong to surface learning factor. The questionnaire has five point Likert scale, namely, never true (1), rarely true (2), sometimes true (3), often true (4), always true (5). The original scale has Cronbach alpha coefficients of .82 for deep learning approach and .71 for surface learning approach. For the Turkish form, the coefficients are .79 and .72 respectively. For the present study the Cronbach alpha coefficient is calculated as .76 for deep learning and .57 for surface learning. These findings show that the scale has an acceptable reliability level to be used for the present research.

Procedure

Permission was taken from Secondary School Department of Ministry of National Education to implement instruments for teachers and students. Instruments were posted to 42 schools, which were included in the sampling. Teachers and students participated to the study on voluntary basis. A written document covering purpose and importance of research and characteristics of the instruments were sent to school managers. Teachers and students filled the surveys and the surveys were re-posted to researchers by school managers.
The suitability of data with normal distribution was examined through Q-Q plots. For determining the equality of variations of dependent variables in each group Levene test was used. For the three research questions of the study (i) independent samples t-test; (ii) Welch test for analyzing data for deep learning variable and Tamhane test for multiple comparisons, one way Anova for analyzing data for surface learning variable; (iii) one way Anova for teaching experience variable and independent samples t-test for educational level variable, were used. SPSS 17.0 was used for analyzing data.

FINDINGS

Findings for the First Research Question

Independent sample t-test was conducted to find answers for the first research question: Is there a significant difference in teachers' and students' views on constructivist learning environments? Because the purpose of the study is to examine the constructivist learning principles in classroom implementations within a broader perspective the total CLEQ scores of teachers and students were analyzed. Although the data from the factors of CLEQ were not analyzed the descriptive statistics were presented in order to provide more details to discuss the findings thoroughly. Descriptive statistics for CLEQ total and factor scores were presented in Table 2 and findings from independent sample t-test can be found in Table 3.

Table 2: Descriptive Statistics for Teachers' and Students' CLEQ Scores

	Teacher (n = 208)		Student (n = 1830)	
Factor	X	SD	X	SD
Arguments, discussions, debates	3.41	.70	3.37	.88
Conceptual conflicts and dilemmas	2.28	.83	2.53	.99
Sharing ideas with others	3.61	.65	3.29	.96
Materials and resources targeted toward solutions	3.89	.63	3.81	.87
Motivation towards reflections and concept investigation	3.42	.68	3.40	.87
Meeting students' needs	3.26	.65	3.31	.88
Making meaning, real life examples	3.66	.63	3.57	.86
Total	3.38	.50	3.34	.67

According to the data in Table 2 the lowest mean score of teachers and students is in "conceptual conflicts and dilemmas" factor. The highest mean score, on the other hand is in "materials and resources targeted toward solutions". Teachers have higher total score (3.38) than students (3.34).

Table 3: T-test Results for Teachers' and Students' CLEQ Scores

Group	N	X	SD	df	t	p
Teacher	208	3.38	.50	298.66	-1.02	.30
Student	1830	3.34	.67			

$p < .05$.

Teachers' mean score is 3.38 (.50) higher than students' mean score 3.34 (.67) , as can be seen in Table 3. T-test results, on the other hand, reveals that this mean difference is not statistically significant $t(298.66) = -1.02$, $p = .30$, $p > .05$.

Findings for the Second Research Question

Descriptive statistics were examined firstly, to find answers for second research question: Is there a difference in students' views of constructivist learning environments according to deep and surface learning approach level? Students' deep and surface learning mean scores were analyzed and categorized as low, medium and high according to standard deviation score. The assumptions of Anova test were investigated after that. Q-Q plots by these investigations indicated that the data were distributed normally. However, Levene test results for deep learning variable revealed that the variances between groups were not equal $F(2, 1827) = 11.90$, $p = .00$, $p < .05$. Therefore, Welch test, which is an alternative of Anova, and Tamhane test for multiple comparisons were used. Levene test results for the surface approach showed that the group variances were equal $F(2, 1827) = 1.07$, $p = .34$, $p > .05$. Ensuring equality of variance, Anova test was used for analysis of data from surface learning approach variable. Table 4 presents descriptive statistics for deep and surface learning levels. Table 5 and 6 shows Welch test results for deep learning variable and Anova test results can be found in Table 7 and 8.

Table 4: Descriptive Statistics for Students' Deep and Surface Approach Scores

Learning Approach	N	X	SD
Deep Learning	1830	3.26	.65
Surface Learning	1830	3.12	.55

Table 4 shows that the mean for deep learning scores is 3.26 (.65); whereas the mean for surface approach is 3.12 (.55).

Table 5: Descriptive Statistics for Students' CLEQ Scores According to Deep Learning Levels

Deep Learning	N	X	SD
Low	137	2.90	.80
Medium	1118	3.27	.62
High	575	3.58	.65

Table 6: Welch Test Results for Students' CLEQ Scores According to Deep Learning Levels

Dependent Variable	df1	df2	F	Significant Difference
Constructivist Learning Environment	2	350.27	66.66	C-B, C-A, B-A

$p < .05$, *Note.* A = Low, B = Medium, C = High

Welch test results presented in Table 6 reveals a significant difference in student views of constructivist learning environments according to deep learning levels in 95 percent, $p <. 05$, confidence interval $F(2, 350.27) = 66.66$, $p = .00$, $p < .05$. To specify the groups between which this difference exist Tamhane test was conducted. According to results, there is a significant difference in favor of high level deep learners between high 3.58 (.65), medium 3.27 (.62) and low 2.90 (.80) deep approach levels $p = .00$, $p < .05$. Moreover, the difference is also significant in favor of medium level learners between medium and low deep learning approach levels $p = .00$, $p < .05$.

Table 7: Descriptive Statistics for Students' CLEQ Scores According to Surface Learning Levels

Surface Learning	N	X	SD
Low	159	3.32	.70
Medium	1447	3.33	.66
High	224	3.43	.70

Table 8: Anova Test Results for Students' CLEQ Scores According to Surface Learning Levels

Source of Variance	Sum of Squares	df	Mean Square	F	p
Between group	1.89	2	.94	2.06	.12
Within group	835.15	1827	.45		
Total	837.04	1829			

According to results in Table 8 there is no significant difference in student views of constructivist learning environments according to surface learning levels in 95 percent, $p <. 05$, confidence interval $F(2, 1827) = 2.06$, $p = .12$, $p > .05$.

Findings for the Third Research Question

Descriptive statistics were examined firstly, to find answers for third research question: Is there a difference in teachers' views of constructivist learning environments according to teaching experience and educational level? After that, Anova test for teaching experience and independent samples t-test for educational level variable was conducted. Before the Anova test, assumptions were examined. Q-Q plots indicated that data was distributed normally and according to Levene test results the variances between groups were equal $F(2, 205) = 1.70$, $p = .18$, $p > .05$. Results were presented in Table 9, Table 10 and Table 11 respectively.

Table 9: Descriptive Statistics for Teachers' CLEQ Scores According to Teaching Experience

Teaching Experience (yrs)	N	X	SD
1-10	64	3.31	.52
11-20	110	3.38	.47
21+	34	3.51	.54
Total	208	3.38	.50

Table 10: Anova Results for Teachers' CLEQ Scores According to Teaching Experience

Source of Variance	Sum of Squares	df	Mean Square	F	p
Between group	.88	2	.44	1.74	.17
Within group	51.89	205	.25		
Total	52.78	207			

$p <. 05$

Anova test results in Table 10 show that there is no significant difference in teachers' views of constructivist learning environments according to teaching experience in 95 percent, $p <. 05$, confidence interval $F(2, 205) = 1.74$, $p = .17$, $p > .05$.

Table 11: T-Test Results for Teachers' CLEQ Scores According to Educational Level

Educational Level	N	X	SD	df	t	p
Bachelor	159	3.36	.49	206	-1.04	.29
Master/PhD	49	3.45	.53			

$p <. 05$

According to results in Table 11 the mean scores of teachers completed graduate programs 3.45 (.53) are higher than teachers with bachelor's degree 3.36 (.49). However, t-test results reveal this mean difference is not statistically significant $t(206) = -1.04$, $p = .29$, $p > .05$.

DISCUSSION AND CONCLUSION

For the first research question teachers' and students' CLEQ scores were examined to understand if there is a significant difference between their views. According to the results, teachers evaluate the learning environments as showing more constructivist features than students. However this finding did not point out a statistical difference. There are studies on constructivist learning environment perceptions of teachers and students, which reported significant differences in favor of teachers (Ocak, 2012; Johnson & McClure, 2004). Yore, Anderson, and Shymansky (2005) compared supervisors' and teachers' perceptions of constructivist learning environments. In their study, although supervisors evaluated teachers as implementing constructivist learning strategies in classroom settings, students of those teachers did not agree with that. There is no significant difference for the present study, but still it is important to elaborate on why teachers have higher CLEQ scores than students. In literature, this difference is explained with the influence of past learning experiences on students' perceptions (Segers & Dochy, 2001, as cited in Gijbels, Watering, Dochy, & Bossche, 2006) and with the different perceptions of teachers' and students' on the features of constructivist learning stated in the instruments (Otting & Zwaal, 2007). Unal and Akpınar (2006) noted that although teachers have relatively positive perceptions on constructivist learning on theoretical level, in classroom settings they do not implement constructivist learning principles properly. Findings of studies in the literature signify the importance of conducting qualitative studies to explore the difference in teachers' and students' views on constructivist learning in detail. To find out reasons for this difference will also help for improving the quality of classroom implementations of constructivist learning approach.

To understand the nature of difference in teachers' and students' views the present study also examined mean scores of both groups in the sub-dimensions of the CLEQ. According to this examination, both teachers and students have highest scores in the sub-dimensions of "materials and resources targeted toward solutions" and "making meaning, real life examples". The lowest mean scores, on the other hand, are in "conceptual conflicts and dilemmas" sub-dimension. On a study comparing constructivist learning perceptions in problem based and traditional learning environments, it was also found that the highest scores in traditional learning environment are "materials and resources targeted toward solutions" and "making meaning, real life examples" dimensions (Gijbels et al., 2006). Doğanay and Sarı (2012) noted in their study that, "materials and resources targeted toward solutions" dimension coincide strongly with traditional learning. These findings point out the fact that change from traditional environments towards constructivist ones will not happen so fast, and therefore,

although there are changes in programs we are in a transition phase for the classroom implementations of constructivist learning approach. This perspective is also supported by the lowest scores' being in "conceptual conflicts and dilemmas" dimension. Otting and Zwall (2007) reported lowest mean scores also in "conceptual conflicts and dilemmas" dimension for both teachers and students in the problem based learning environment. In Gijbels et al. (2006) study, a significant difference between problem-based and traditional learning environments was found in "conceptual conflicts and dilemmas" dimension. Researchers explain that "conceptual conflicts and dilemmas" dimension represents constructivist learning approach more than the other dimensions of CLEQ. Ocak (2012), found also that lowest mean scores for both teachers and teacher candidates are in "conceptual conflicts and dilemmas" dimension and similarly indicated that this dimension covers most important features for constructivist learning. From this point of view, it is not wrong to tell that "conceptual conflicts and dilemmas" dimension is one of the hardest aspects of constructivist learning to be implemented in classroom settings.

Examining total CLEQ mean scores, the past studies reveal that teachers' and students' scores are between 3 and 4 out of a five point scale (Gijbels et al., 2006; Ocak, 2012; Otting & Zwall, 2007). Otting and Zwall (2007) pointed out that scores above 3 are satisfying for improvement. The results of the present study also refer to a change towards constructivist approach in both programs and classroom environments. However, the study also underlines the fact that especially teachers, who have a major role in implementation, are in a transition stage. Parallel to this view, Evin (2013), in her study found that teachers in Turkey mostly prefer facilitative/personal model/expert teaching style, which is associated with humanistic approach. But the second style teachers prefer is authoritarian/expert style. Researcher explained this finding with Turkey's being on a transition phase for educational reforms. In conclusion, it is not wrong to tell the reforms in our educational system triggers a change in classroom implementations.

Within the second research question of the study the results indicated that students differ in their CLEQ scores significantly according to their deep learning levels. More precisely, students with a high level deep approach evaluated their learning environment more constructivist than middle and low levels. Also the middle level has significantly higher CLEQ scores than low-level deep learners. The level of surface approach, on the other hand, did not establish a significant difference on students' CLEQ scores. These findings underline an association between learning environments and students learning approaches, especially in favor of deep learning approaches. Fok and Watkins (2007), in their experimental study found that constructivist learning environments triggered a shift towards deeper and more meaning oriented motivation and strategy. They also noted that the change occurred in groups with students who have the strongest awareness of the shift in the learning environment. Campbell et al. (2001) reached similar findings in their study, where they pointed out that students with deep approach to learning can grasp the active teaching strategies teachers employ easily and use these strategies for their learning more effectively. Moreover they also found that students with surface approach to learning tended to change their learning strategies towards deeper and more meaningful approach. In Dart et al. (1999) study students with deep approach to learning perceived the elements of constructivist learning environments more strongly. The students in Yuen-Yee and Watkins's (1994) study similarly preferred learning environments with a friendlier atmosphere where students and teachers collaborated to provide interesting but challenging activities. Students associate this kind of environment with deep learning approach. Different from the results of studies, which support the findings of the present study, Unal and Akpınar (2006) and Çalışkan (2004) found no significant difference in students' learning approaches according to constructivist teaching strategies. They associate this result with the short duration of the study and concluded that to expect significant changes in students learning approach, long-term interventions are needed. The results of the studies reveal a reciprocal relationship between deep learning approach and constructivist learning environment. In other words, constructivist learning environments encourage deep learning and deep learners are the ones who can comprehend and benefit from the elements of constructivist learning environments. The present study put the latter relationship forward, that is deep learners are more aware of the constructivist learning environments and use materials and strategies provided for them more effectively to reach meaningful understandings.

The views of students with varying levels of surface approach are not significantly different for the present study. Literature also reveals no significant difference in students' views of constructivist learning according to surface learning approach (Unal & Akpınar, 2006; Çalışkan, 2004; Çolak, 2006). The main reason for this is the fact that although there are signs for the change, students cannot quit their surface learning habits easily in an outcomes-based environment where multiple choice tests are still a major evaluation tool. Because changing the instructional method is in itself not enough to discourage a surface approach and promote a deep approach to learning (Herrmann, 2013, as cited in Laguador, 2014) in an outcomes-based environment.

Students' learning approaches are accepted as one of the indicators for constructivist learning environments (Alt, 2014). Therefore, it is important to discuss students mean scores regarding their preferred learning approach. The mean score for deep learning is 3.26, whereas it is 3.12 for surface learning. Both means can be evaluated as moderate levels within a five point scale. In Çolak and Kaya's (2013) study students attending a vocational high school have a 3.07 mean for deep and 3.22 for surface learning. Öner (2008) reported that students attending Anatolian high schools in İstanbul, have a mean score of 3.16 for deep learning and 3.05 for surface learning. The results of these studies from Turkey coincide with the present study. In Alt's (2014) study deep learning scores were examined in seminar, distance learning environment and lecture based environment. The mean score for deep learning in these classes were 3.98; 3.35 and 2.20 respectively. Although, deep learning scores found in the present study are higher than the scores in traditional learning environments, they are lower than scores reported in constructivist learning environments. Within the current research question, it is important to note that besides teachers' efforts to create constructivist learning environments, students' participation to those environments is also a factor. In other words, the implementation of constructivist approach is not only related with teachers' actions, but the preferences of students to participate in these processes should also be taken into account. As Perkins (2006) stated, it takes two to tango. Within this context, it is not wrong to tell, students are also in an adaptation phase regarding constructivist learning approach.

Results within the third research question of the study indicated that there were no significant differences among teachers' CLEQ scores with respect to teaching experience and educational level. This finding is consistent with similar research. For instance, Ağlagül (2009), in her study found that teaching experience had no significant effect on teachers' activities when creating a constructivist learning environment. Parallel to the present study, Ağlagül (2009) reported that the less experienced teacher group has the lowest mean score from CLEQ. Tatlı (2007) also did not find any difference with respect to teaching experience in implementing constructivist teachers' roles. Isıkoglu, Basturk and Karaca (2009), on the other hand, pointed out that student-centered beliefs of teachers differ significantly according to teaching experience. However, in regard to the direction of the difference they reached the similar results, that is, teachers' with more experience have more student-centered beliefs. Authors explained this finding as teachers developed better views of students and instruction over the years. Because having student-centered beliefs for instruction is a preliminary sign of constructivist approach the findings of this research supports the present study's findings about creating constructivist learning environments and teaching experience. Snider and Roehl (2007), conducted a more general survey regarding teachers' beliefs about pedagogy and related issues. They also reported no significant difference between experience groups about their pedagogical orientations. Cheung and Wong (2002), in their study examined teachers' beliefs about alternative curriculum designs and found that teachers with more professional experience mostly prefer an academic oriented curriculum to cognitive, social re-constructionist, humanistic and technological ones. In other words on the contrary of other presented studies this study indicates that teachers with more professional experience have a more academic orientation towards curriculum, which is mostly not among the top priorities of a constructivist curriculum. Akpınar and Aydın (2007) found significant differences in teachers' perceptions of change in Turkish educational system. According to the results of their study teachers new to the profession perceive the change towards a constructivist curriculum more positive and have more positive understanding about student-centered instruction.

Examining the results of studies on years of experience and beliefs/perceptions about learning one can conclude that teaching experience is not among the most effective variables for designing and implementing a

constructivist learning environment. Most of the studies reported no significant differences in regard to constructivist perceptions, parallel to the present study. The higher scores in favor of more experienced teachers can be explained with the lack of necessary classroom management skills of novice teachers to create fruitful learning environments. Experienced teachers, on the other hand, are more likely to have skills for facilitating students' self-regulation and critical thinking, linking new learning to students' existent knowledge and guiding students' social interaction (Chen & Rovegno, 2000).

Within the third research question of the study it is found that there is no significant difference in teachers' constructivist learning environment survey scores according to level education. The mean scores, on the other hand, show that higher educated teachers evaluated their learning environments as more constructivist. There are studies both supporting and contradicting with this finding. For instance Eskici (2013) found that teachers with master's degree have more positive attitudes towards constructivist learning than teachers with bachelor's degree. However, this difference is not statistically significant. Inan (2006), similarly, in his study on teachers views on ninth grade mathematics curriculum, which is revised according to constructivist learning principles, found that teachers with PhD degree have more positive views, followed by Teachers with Master's and Bachelor's degree respectively. However, these differences in views of teachers are not statistically significant. Beck, Czerniak, and Lumpe (2000), on the other hand, found that teachers with higher educational degrees have weaker beliefs regarding implementation of constructivism in their classrooms. Another study reporting lower attitudes towards constructivism is Özbay's (2009) study.

For further research, experimental studies are recommended to understand the nature of the relationship between constructivist learning environments and deep learning approach. Such studies will widen the knowledge about the implementation of constructivist learning strategies effectively to achieve expected changes in the nature of students learning. This study also draws attention to an important aspect of the implementation of constructivism in classroom settings, which is, although teachers think they implement constructivist strategies effectively, the strategies they use cannot reach students effectively and remain inadequate for encouraging a change in their learning. To sum up, the change towards constructivist learning environments is still on a transition phase. To conclude this phase positively, it is important to evaluate the quality of learning environments through students' learning. Further studies on different samples and employing qualitative methods will help to develop recommendations for teachers and educational managers by applying constructivist learning in classroom settings effectively.

BIODATA AND CONTACT ADDRESSES OF AUTHORS

Dr. İlker CIRIK has been working as an Assist. Prof. at Mimar Sinan Fine Arts University, Faculty of Science and Letters, Department of Educational Sciences, Division of Curriculum and Instruction since 2010. He has a PhD and bachelor's degree in division of primary education. He has master's degree in division of curriculum and instruction. He lectures about curriculum and instruction, instruction methods, introduction to multicultural education, introduction to educational science. His current research interests are curriculum development and evaluation, instructional design, instruction methods, constructivism, multicultural education, perceived social support and motivation in learning process. He is in the science committee of several congress and periodicals in educational science.

Assist. Prof. Dr. İlker CIRIK
Mimar Sinan Fine Arts University
Faculty of Science and Letters
Istanbul- TURKEY
E. Mail: ilker.cirik@msgsu.edu.tr

Dr. Esma ÇOLAK is currently working at Mimar Sinan Fine Arts University, Faculty of Science and Literature, Educational Sciences Department. She received her M.A degree on Technology Education at Marmara University and PhD on Curriculum and Instruction at Yıldız Technical University. After she received her PhD, she worked as a curriculum development specialist in schools for two years. She had seminars about constructivist teaching and instructional planning for preschool, primary school and high school teachers at different schools. Her research performance is summarized as writing book chapters in the "Learning and Instructional Theory and Applications", adapting different scales in Turkish society, authoring international and national journals about learning and instructional design for at different grades and attending the educational conferences as a researcher. Her main interests are learning variables, instructional design and teacher training. Her current research is mapping features of constructivist activities in different grade education settings.

Assist. Prof. Dr. Esma ÇOLAK
Mimar Sinan Fine Arts University
Faculty of Science and Letters
Istanbul- TURKEY
E. Mail: esma.colak@msgsu.edu.tr

Defne KAYA has been working as a research assistant at Mimar Sinan Fine Arts University, Faculty of Science and Letters, Department of Educational Sciences, Division of Curriculum and Instruction since 2012. She has her bachelor's degree from primary math education department. She received her master's degree from curriculum and instruction department and still doing her PhD in the same area. Her current research interests are curriculum development and evaluation, instructional design, instruction methods, constructivism, alternative education and mathematical discourse in classroom settings.

Defne KAYA
Mimar Sinan Fine Arts University
Faculty of Science and Letters
Istanbul- TURKEY
E. Mail: defne.kaya@msgsu.edu.tr

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