The Regression Level of Constructivist Learning Environment Characteristics on Classroom Environment Characteristics Supporting Critical Thinking

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Abstract

Problem Statement: One of the main aims of constructivism is to improve critical thinking skills/tendencies via experiences. In this sense, it is believed that the more the constructivist-learning environment is improved, the more the appropriateness of supporting critical thinking is improved. However, no study has yet statistically tested this belief.

Purpose of the Study: The aim of this study is to determine the regression level of constructivist learning environment characteristics on classroom environment characteristics supporting critical thinking according to the teachers participating in the study.

Method: The study is a regression study at relational screening model. The sample of the study consists of 351 teachers working at primary and secondary schools in Kutahya city center and surrounding villages. The Constructivist Learning Environments Questionnaire and Critical Thinking Supportive Teachers' Behaviors Inventory were used as data collection tools. During the data analysis, the Pearson correlation test was conducted to determine the relation between the two variables. To determine the regression level of constructivist learning environment characteristics on classroom environment characteristics supporting critical thinking, multiple regression analysis was conducted.

Findings and Results: The results of the regression analysis revealed that constructivist learning environment characteristics explain the 44% of the total variance of classroom environment characteristics supporting Open Mindedness; 50% of the total variance of classroom environment characteristics supporting High-Level Questioning; 40% of the total

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variance of classroom environment characteristics supporting Questioning of the Accuracy and Reliability of Information; 47% of the total variance of classroom environment characteristics supporting Seeking Causes and Evidence; 48% of the total variance of classroom environment characteristics supporting Openness.

Conclusion and Recommendations: In general, a medium-level, positive and significant relation was found between the sub-dimensions of the Constructivist Learning Environments Questionnaire and the sub-dimensions of the Critical Thinking Supportive Teachers' Behaviors Inventory. Furthermore, it was found that the constructivist learning environment characteristics could explain nearly half of the total variance in classroom environment characteristics supporting critical thinking. These results show that the belief expressed in the existing literature that aligning the classroom environment with constructivist learning environment characteristics is also effective in supporting critical thinking is true to a great extent.

Keywords: Constructivism, critical thinking, learning environment, constructivist learning environments, classroom environment supporting critical thinking.

Introduction

Constructivism, which is defined as the philosophical belief of individuals related to making sense of reality (Fosnot, 1996, p. 19), comprises epistemological and pedagogical tenets (doctrine) (Boghossian, 2012). In other words, it is a philosophical approach and learning theory (Wilson, 1996; Duffy & Cunningham, 1996, p. 184). According to the constructivist learning theory, learning is defined as an active process in which the individual constructs knowledge on her/his own by relating the obtained knowledge as a result of interacting with the environment and new knowledge (Driscoll, 2005). Literature that considers the constructivist viewpoint on learning emphasizes that actualizing constructivism in a real sense depends on the created learning environment. Fraser (1998) defines learning environment as a social, psychological and pedagogical context that affects the attitude and success of students and where learning occurs. On the other hand, a constructivist learning environment (CLE) is defined as an environment where learners generally support each other's learning and construct knowledge by using information resources and various tools to solve a problem or to reach their learning goals (Wilson, 1996; Tynjala, 1999). CLE is a student-centered environment (Brooks & Brooks, 1999). When the definitions related to CLE is taken into consideration, it can be stated that CLE is purposeful, contextual, interactive, cooperative, complex, inductive, reflective and active. Cunningham, Duffy and Knuth (1993) determined seven principles which should be adhered to create a constructive learning environment (cited in Honebein, 1998, p. 13). The first principle is that teachers provide experience with the knowledge constructing process, which means making the learners gain experiences on how to construct knowledge. The second is for teachers to appreciate students'

presentations of different points of view and their respect for different points of view. The third principle is to provide real and context-related learning, which means that students use the acquired knowledge in daily life in appropriate contexts. The fourth is to include students' active participation in the learning process. The fifth involves providing learning with social experiences. The sixth principle is to allow students to express themselves in various ways. The seventh principle is for teachers to increase students' own awareness of the learning strategies they use to construct knowledge and of problem-solving strategies. The CLE characteristics referred to by the measurement tool used in the present study are Discussions and Interviews, Conceptual Contradictions, Sharing Opinions with Others, Materials and Sources Aiming to Lead to a Conclusion, Reflection and Motivation for the Discovery of Concepts, Meeting the Needs of the Learners and Creating a Meaning and Correlating with the Real Life Situations (Fer & Cirik, 2006). According to Brooks and Brooks (1999), the role of the constructivist teacher is to encourage students to take initiative in subjects, such as by determining their own learning goals, to create an environment promoting critical thinking skills by asking high-level questions and by asking students to construct conflicting hypotheses. Within this line of reasoning, it can be said that CLE develops students' high level thinking skills such as critical thinking (Terhart, 2003).

Critical thinking is defined as directing beliefs and actions and as a process of conceptualizing, applying, analyzing and evaluating knowledge that is formed as a result of observation, experience, reflection and reasoning (Paul & Scriven, 1987). Today, one of the main aims of education systems is to foster individuals' critical thinking. Hence, literature on improving individuals' critical thinking recommends creating classroom environments where this skill is directly thought of or where critical thinking is supported. Also, studies in literature on aiming developing the critical thinking of students stated that teacher attitudes/classroom environment supporting critical thinking is more effective than directly teaching it (Innabi, 2003). Additionally, in the literature it is stated that the environmental context in which students' thinking skills development is important, and Vygotsky's theory supports this. Vygotsky stated that all high-level thinking skills occur in a social environment via social activities (Schunk, 2008). Thus, a learning environment which makes it easy to develop critical thinking skills through social interactions is important. Mathews (2003) determined four characteristics related to classroom environment that support critical thinking (cited in Crawford, Saul, Mathews & Makinster, 2009). The first characteristic is that both the teacher and the student share responsibilities in the classroom environment. According to this principle, for example, an environment where the class rules are agreed upon by the class supports critical thinking. The second feature is that the teacher serves a sa role model for the students in terms of thinking skills, for example by presenting behavior showing importance different ideas. The third principle includes encouraging students to observe their own learning processes. The fourth is organizing a classroom that makes working together easy for students. The teacher behavior/classroom environment in support of critical thinking that the measurement instrument refers to in this study was examined in five groups supporting Open Mindedness, Questioning of the Accuracy

and Reliability of Information, High-Level Questioning, Seeking Causes and Evidence and Openness (Alkin, 2012).

When the CLE and the classroom environment supporting critical thinking are examined, it can be seen that there are some shared characteristics such as supporting different ideas in the classroom environment, giving students learning responsibilities, caring social experiences, observing students' thinking processes, supporting students' cooperatively working, encouraging high level questions to be asked and giving importance to conflicting topics. Moreover, when it is considered that one of the main aims of constructivism is developing critical thinking via experiences (Kwan & Wong, 2014), it can be stated that organizing a classroom environment aligned with CLE characteristics can be effective in supporting critical thinking. When the literature on CLE is examined, it is noticed that studies are more focused on evaluating the environment (Allodi, 2007; Aybek & Aglagul, 2011; Bal & Doganay, 2009; Bas, 2013; Busbea, 2006; Nix, Fraser & Ledbetter, 2005; Ocak, 2012; Petegem, Donche & Vanhoof, 2005). It can be seen that there are studies investigating the relationship between CLE and thinking friendly classroom environments (Doganay & Sarı, 2012), self-efficacy perceptions (Koc, 2013), epistemological beliefs (Dindar, Kirbulut & Boz, 2014; Marra, 2005), their attitudes on the constructivism approach (Uredi, 2013) and metacognitive strategies (Kirbulut & Gokalp, 2014). When it comes to practical, non-theoretical studies of classroom environment/ teacher behaviors supporting critical thinking, there is Alkin (2012)'s doctoral thesis, which is on evaluating teacher behaviors supporting critical thinking. Notably, most of the literature on critical thinking and CLE was investigated, it attracts attention that most of the studies are experimental studies on teaching methods and the effectiveness of the program (Ernst & Monroe, 2006; Kaya, 2010). Apart from experimental studies, only one study was found on determining the effect of CLEs on critical thinking tendencies according to students' views (Kwan & Wong, 2014). No study has tested the presently studied hypothesis statistically. In other words, there is no statistical study of the relationship between CLE characteristics and critical thinking. In line with the reasons mentioned, the aim of this study is to determine the regression level of CLE characteristics on classroom environment characteristics supporting critical thinking. In recent years both in the world and in Turkey, greater emphasis has been put on critical thinking skills to educate reasonable, wise and inquisitive people. Theoretical research conducted to develop critical thinking in literature has reported that constructivism has positive effects on the promotion of critical thinking. In this regard, the present study is believed to contribute to the confirmation of the assumption that constructivism has some positive impacts on the development of critical thinking.

Method

Research Design

By use of the correlational survey model, this quantitative research study aims to identify the predictive level of constructivist learning environments on classroom

environments supporting critical thinking. The relational screening model aims at determining the relationship among more than two variables (Fraenkel & Wallen, 2005).

Research Sample

The population of the study consists of a total of 4116 teachers working at primary and secondary schools in Kutahya city center and villages in Kutahya during the 2014–2015 school year. In the study, since 2005 when Primary Education Programs were developed, both class teachers and branch teachers working at primary schools were responsible for creating constructive learning environment and classroom environments supporting critical thinking, and this influenced setting the branch and class teachers into work. In addition to this, another reason why the related branches were included was to examine the psychometric characteristics of measurement instruments on the related branches included in the study. In determining the teachers included in the sample, a disproportional cluster sampling technique was used. This sampling technique is more economical and practical, especially for large-scale survey research studies (Balci, 2010). The target population of the study was the province of Kutahya, and each school in the province was considered a cluster. From these clusters, a random selection of schools was identified until the minimum desired number in the sample was reached. By means of the disproportional cluster sampling approach, scales were administered to classroom teachers and teachers of the subjects of math, science, Turkish and social studies in all schools included in the sample. The size of the sample was calculated as 351 at a 95% confidence level. It was decided to obtain the opinions of 400 teachers by means of scales by taking into consideration that scales may not be filled in correctly, completely or with care. Analysis was carried out on 351 scales, which were used as the data collection tool. Of the teachers who participated in the study, 42% were male (n=148) and 57% were female (n=202), 38% (n=132) were class teachers, 13% were science teachers (n=47), 14% were Turkish teachers and 13% were social science teachers (n=45). Of those included in the study, 53% of the teachers (n=185) had a seniority level of 1 to 10 years, 34% (n=121) had 10 to 20 years, 4% (n=13) had 20 to 30 years and 5% (n=18) had 30 to 40 years seniority. Among the teachers, 8% (n=29) had an education level of associate degree, 80% (n=282) had bachelor degrees and 8% (n=27) had postgraduate degrees. Fifty-five percent of the teachers had attended in-service teacher training courses in critical thinking, while 44% had not. Fifty-one percent of the sample had attended in-service training courses in constructivism, and 44% stated that they had not.

Research Instrument and Procedure

The study used the Constructivist Learning Environments Questionnaire (CLEQ) and the Critical Thinking Supportive Teachers' Behaviors Inventory (CTSTBI) as data collection instruments.

CLEQ, developed by Tenenbaum, Naidu, Jegde and Austin (2001), was adapted to Turkish by Fer and Cirik (2006). The scale, prepared to evaluate CLE consists of 30 items and seven dimensions: "Discussions and Interviews (DI)", "Conceptual

Contradictions (CC)", "Sharing the Opinions with the Others (SOO)", "Material and Sources Aiming to Lead to a Conclusion (MSALC)", "Reflection and Motivation for the Discovery of Concepts (RMDC)", "Meeting the Needs of the Learners (MNL)" and "Creating a Meaning and Correlating with the Real Life Situations (CMCRLS)". The items in the scale are graded as "1-never and 5-completely". The points taken from the scale range from 30 to 150. The higher the points, the higher the level of the constructivist learning environment. The Cronbach's alpha internal consistency of the scale was found between 0.72 and 0.86 by Tenenbaum et al. (2001) and between 0.86 and 0.93 by Fer and Cirik (2006). In the present study, the Cronbach's alpha internal consistency coefficient was calculated between 0.71 and 0.79 at the sub-dimensions, and for the whole scale it was found as .93. Some examples of the items of the CLEQ are as follows: "Students had the opportunity to express themselves", "The lessons were helpful for students to follow their own individual goals", "In the lesson, students learned to access and use the resources they required", "The lessons were conducted with exchange of information within the classroom" and "Students were encouraged to share their individual ideas during the lesson".

CTSTBI was developed by Alkin (2012). The scale which measures the behaviors of the teachers supporting critical thinking consists of 80 items and five dimensions as "Open Mindedness (OM)", "High-Level Questioning (HLQ)", Questioning of the Accuracy and Reliability of Information (QARI)", "Seeking Causes and Evidence (SCE)", "Openness (O)". The items in the inventory are graded as "1-Does not reflect me at all" and "5- Reflects me a lot". For the construct validity of the inventory, factor analysis was conducted for each dimension. As a result of the exploratory factor analysis, variance explaining the "OM" dimension formed by 18 items was 33.34%; variance explaining the "HLQ" dimension formed by 13 items was 34.49%; variance explaining the "QARI" dimension formed by 18 items was 35.65%; variance explaining the "SCE" dimension formed by 17 items was 35.70%; variance explaining the "O" dimension formed by 14 items was 35.63%. The Cronbach's alpha coefficient of the scale fell between 0.83 and 0.89. In this study, the reliability of the inventory was re-tested. According to this, Cronbach's alpha coefficient for the sub-dimensions were found as 0.86−.90. Some examples of items of the CTSTBI are as follows: "I prefer to use topics, themes or problems that allow for a different point of view in the classroom environment", "I start the discussion about a text after I am sure that all the students understand the text", "I provide feedback to students about whether the words or phrases used by students are clear and comprehensive", "I guide students to ask questions which fit the purpose", "I caution my students to check whether the information they access has a bibliography" and "I assess whether the students can support their opinions with evidence or justifications".

Data Analysis

In the study, Pearson Correlation analysis was conducted to find out the relationship between teachers' CLE and classroom environments supporting critical thinking. The absolute value of correlation coefficient between 0.70 and 1.00 was interpreted as high, 0.69−0.30 as medium, 0.29−0.00 as low (Buyukozturk, 2005). In the study, the points from the sub-dimension of CTSTBI formed the predicted

variables, and the points from the sub-dimensions of CLEQ formed the predictor variables. Multiple regression analysis was conducted to determine to what extent the CLE characteristics predicted the classroom environment characteristics supporting critical thinking. While interpreting whether the findings were significant or not, .05 significance level was taken as a criterion.

Results

In this section, the results of the multiple regression analysis related to predicted and predicting variables are presented. The results of the multiple regression analysis take place in Tables 1,2,3,4 and 5.

Table 1.

The results of The Regression Analysis Predicting Classroom Environment Supporting Open Mindedness

Predictor Variables	B	Standard Error	β	t	p	Binary r	Partial r
Invariant	31.057	2.72		11.40	0.00		
DI	.429	0.22	.152	1.93	0.05	0.59	0.10
CC	.211	0.14	.064	1.51	0.13	0.13	0.08
SOO	.225	0.23	.069	0.98	0.33	0.56	0.05
MSALC	1.118	0.31	.248	3.62	0.00	0.59	0.19
RMDC	.089	0.20	.035	0.45	0.65	0.57	0.02
MNL	.374	0.20	.137	1.91	0.06	0.58	0.10
CMCRLS	.385	0.24	.106	1.61	0.11	0.55	0.09

R=0.67   R^2=0.44

F$_{(5-159)}$=38.86,   p= 0.00

As seen in Table 1, while there is a positive and medium level of relationship between classroom environment characteristics supporting the OM and DI dimension (r=0.59), SOO dimension (r=0.56), MSALC dimension (r=0.59), RMDC dimension (r=0.57), MNL dimension (r=0.58) and CMCRLS dimension (r=0.55), no relationship was found between classroom environment characteristics supporting the OM and CC dimensions. When the other variables were examined, a positive and low-level relationship was found between classroom environment characteristics supporting OM and only the MSALC dimension (r=0.19). All the characteristics of CLE showed medium-level and significant relationships with the points of classroom environment characteristics supporting OM (R=0.67, p<0.01). CLE characteristics explain 44% of the total variance of classroom environment characteristics supporting OM. According to the standardized regression coefficient, the order of importance of (*β*) CLE characteristics on classroom environment characteristics supporting OM is "MSALC", "DI", "MNL", "CMCRLS", "SOO", "CC" and "RMDC". When the t-test results related to regression coefficient significance were examined, it was seen that only the "MSALC" dimension was the predictor of

classroom environment supporting OM. According to the findings obtained, the regression equality of classroom environment supporting OM is as follows:

Classroom environment supporting Open Mindedness=31.057+ .429 (DI), +.211 (CC) + .225 (SOO) + 1.118 (MSALC) + .089 (RMDC) + .374 (MNL) + .385 (CMCRLS)

Table 2 .

Regression Analysis Results Related to Prediction of Classroom Environment Supporting High-Level Questioning

Predictor Variables	B	Standard Error	β	t	p	Binary r	Partial r
Invariant	21.541	1.89		11.39	0.00		
DI	.127	0.15	.062	0.82	0.41	0.61	0.04
CC	-.047	0.10	-.020	-0.48	0.63	0.06	-0.03
SOO	.321	0.16	.134	2.00	0.05	0.61	0.11
MSALC	.770	0.21	.234	3.60	0.00	0.63	0.19
RMDC	.322	0.14	.172	2.34	0.02	0.62	0.13
MNL	.151	0.14	.076	1.11	0.27	0.59	0.06
CMCRLS	.345	0.17	.130	2.08	0.04	0.60	0.11

R=0.70 R^2 =0.50

$F_{(5-159)}$ =48.22,   p= 0.00

As seen in Table 2, while there is a positive and medium-level relationship between classroom environment characteristics supporting HLQ and DI dimension (r= 0.61), SOO dimension (r= 0.61), MSALC dimension (r= 0.63), RMDC dimension (r= 0.62), MNL dimension (r=0.59), CMCRLS dimension (r=0.60), no relationship was found between classroom environment characteristics supporting HLQ and CC. When the other variables were examined, a positive and low-level relationship between classroom environment characteristics supporting HLQ and only the MSALC dimension (r=0.19) were found. With all the characteristics of constructivist learning environments, the points of classroom environment characteristics supporting HLQ displayed a high-level and significant relationship (R=0.70, p<0.01). CLE characteristics explain 50% of the total variance of classroom environment characteristics supporting HLQ. According to the standardized regression coefficient, the order of importance of (*β*) CLE characteristics on the related dimension is: "MSALC", "RMDC", "SOO", "CMCRLS", "MNL", "DI", "CC". When the t-test results related to regression coefficient significance were examined, it was seen that "MSALC", "RMDC" and "CMCRLS" dimensions were the predictors of classroom environment supporting HLQ. According to the findings obtained, the regression equality of classroom environment supporting HLQ is as follows:

Classroom environment supporting High-Level Questioning = 21.541+ .127 (DI) - .047 (CC) + .321 (SOO) + .770 (MSALC) + .322 (RMDC) + .151 (MNL) + .345 (CMCRLS)

Table 3.

Regression analysis results related to prediction of classroom environment supporting Questioning of the Accuracy and Reliability of Information

Predictor Variables	B	Standard Error	β	t	p	Binary r	Partial r
Invariant	28.302	3.04		9.30	0.00		
DI	.282	0.25	.093	1.14	0.26	0.54	0.06
CC	.313	0.16	.089	2.01	0.04	0.19	0.11
SOO	-.131	0.26	-.037	-0.51	0.61	0.47	-0.03
MSALC	.656	0.34	.135	1.90	0.06	0.51	0.10
RMDC	.226	0.22	.082	1.02	0.31	0.55	0.05
MNL	1.009	0.22	.342	4.61	0.00	0.60	0.24
CMCRLS	.263	0.27	.067	0.99	0.32	0.49	0.05

R=0.63 R^2 =0.40

$F_{(7-344)}$ =33.11, p= 0.00

As Table 3 displays, while there is a positive and medium-level relationship between classroom environment characteristics supporting the QARI and DI dimension (r= 0.54), SOO dimension (r= 0.47), MSALC dimension (r= 0.51), RMDC dimension (r= 0.55), MNL dimension (r=0.60) and CMCRLS dimension (r=0.49), a positive and medium-level relationship was found between classroom environment characteristics supporting the QARI and CC dimension (r=0.19). When the other variables were examined, a positive and low-level relationship was found between classroom environment characteristics supporting QARI and only with the "MNL" dimension (r=0.24). With all the characteristics of constructivist learning environments, the points of classroom environment characteristics supporting QARI displayed a medium-level and significant relationship (R=0.63, p<0.01). CLE characteristics explain 40% of the total variance of classroom environment characteristics supporting QARI. According to the standardized regression coefficient, the order of importance of (*β*) CLE characteristics on the related dimension is: "MNL", "MSALC", "DI", "CC", "RMDC", "CMCRLS", "SOO". When the t-test results related to regression coefficient significance were examined, it was seen that "MNL"and "CC" dimensions were the predictors of classroom environments supporting QARI. According to the findings obtained, the regression equality of classroom environments supporting QARI is as follows:

Classroom environment supporting Questioning of the Accuracy and Reliability of Information= 28.302 + .282 (DI) + .313 (CC) - .131 (SOO) + .656 (MSALC) + .226 (RMDC) + 1.009 (MNL) + .263 (CMCRLS)

Table 4.

Regression Analysis Results Related to Prediction of Classroom Environment Supporting

Seeking Causes and Evidence

Predictor Variables	B	Standard Error	β	t	p	Binary r	Partial r
Invariant	22.772	2.74		8.31	0.00		
DI	.408	0.22	.140	1.82	0.07	0.61	0.10
CC	.208	0.14	.061	1.49	0.14	0.17	0.08
SOO	.057	0.23	.017	0.24	0.81	0.55	0.01
MSALC	.567	0.31	.121	1.83	0.07	0.57	0.10
RMDC	.362	0.20	.137	1.82	0.07	0.62	0.10
MNL	.804	0.20	.284	4.08	0.00	0.64	0.21
CMCRLS	.225	0.24	.060	0.94	0.35	0.54	0.05
R=0.69 R²=0.47							
F$_{(7-344)}$=43.93, p= 0.00							

As exhibited in Table 4, while there is a positive and medium-level relationship between classroom environment characteristics supporting SCE and the DI dimension (r= 0.61), SOO dimension (r= 0.55), MSALC dimension (r= 0.57), RMDC dimension (r= 0.62), MNL dimension (r=0.64) and CMCRLS dimension (r=0.54), a positive and low-level relationship was found between classroom environment characteristics supporting SCE and the CC dimension. When the other variables were examined, a positive and low-level relationship was determined between classroom environment characteristics supporting SCE and only the 'MNL' dimension (r=0.21). With all the CLE characteristics, the points of classroom environment characteristics supporting SCE show a medium-level and significant relationship (R=0.69, p<0.01). CLE characteristics explain 47% of the total variance of classroom environment characteristics supporting SCE. According to the standardized regression coefficient, the order of importance of (*β*) CLE characteristics on the related dimension is: 'MNL', 'DI', 'RMDC', 'MSALC', 'CC', 'CMCRLS', 'SOO'. When the t-test results related to regression coefficient significance were examined, it was seen that only the 'MNL' dimension was a predictor of classroom environments supporting SCE. According to the findings obtained, the regression equality of classroom environments supporting SCE is as follows:

Classroom environment supporting Seeking Causes and Evidence= 22.772+ .408 (DI) + .208 (CC) + .057 (SOO) + .567 (MSALC) + .362 (RMDC) + .804 (MNL) + .225 (CMCRLS)

Table 5.

Regression Analysis Results Related To Prediction Of Classroom Environment Supporting

Openness

Predictor Variables	B	Standard Error	β	t	p	Binary r	Partial r
Invariant	27.238	2.01		13.58	0.00		
DI	-.009	0.16	-.004	-0.05	0.96	0.56	0.00
CC	-.139	0.10	-.056	-1.36	0.18	-0.01	-0.07
SOO	.399	0.17	.159	2.35	0.02	0.60	0.13
MSALC	1.286	0.23	.372	5.66	0.00	0.66	0.29
RMDC	.141	0.15	.072	0.96	0.34	0.56	0.05
MNL	.114	0.14	.055	0.79	0.43	0.55	0.04
CMCRLS	.360	0.18	.130	2.05	0.04	0.57	0.11

R=0.70 R^2 =0.48

$F_{(7-344)}$ =45.84,   p= 0.00

As seen in Table 5, while there is a positive and medium-level relationship between classroom environment characteristics supporting O and the DI dimension (r= 0.56), SOO dimension (r= 0.60), MSALC dimension (r= 0.66), RMDC dimension (r= 0.56), MNL dimension (r=0.55) and CMCRLS dimension (r=0.57), no relationship was found between classroom environment characteristics supporting O and the CC dimension. When the other variables were examined, a positive and low-level relationship was determined between classroom environment characteristics supporting O and only the 'MSALC' dimension (r=0.29). With all the CLE characteristics, the points of classroom environment characteristics supporting O show a high-level and significant relationship (R=0.70, p<0.01). CLE characteristics explain 48% of the total variance of classroom environment characteristics supporting O. According to the standardized regression coefficient, the order of importance of (*β*) CLE characteristics on the related dimension is: 'MSALC', 'SOO', 'CMCRLS', 'RMDC', 'CC', 'MNL', 'DI'. When the t-test results related to regression coefficient significance were examined, it was seen that 'SOO', 'MSALC', 'CMCRLS' dimensions were the predictors of classroom environments supporting O. According to the findings obtained, the regression equality of classroom environments supporting O is as follows:

Classroom Environment supporting Openness= 27.238 - .009 (DI) - .139 (CC) + .399 (SOO) + 1.286 (MSALC) + .141 (RMDC) + .114 (MNL) + .360 (CMCRLS)

Discussion and Conclusion

This study aimed to determine the regression level of CLE characteristics on classroom environment characteristics supporting critical thinking according to the teachers who participated in the study.

In the study, in general, it was found that there was a medium-level, positive and significant relationship between the sub-dimensions of CLEQ (except for the CC dimension) and the sub-dimensions of CTSTBI. In this respect, it may be stated that the more the CLE characteristics of the class of teachers in Kutahya increase, the more supportive they are of critical thinking. In the literature, it may be stated that the study results showing significant relationships between CLE characteristics, thinking-friendly classroom characteristics (Doganay & Sarı, 2012) and metacognitive learning tendencies (Kirbulut & Gokalp, 2014), even indirectly, may support the results of the present study. A low relationship was found for the 'CC' dimension and some of the sub-dimensions of CTSTBI; for some sub-dimensions no relationship was found at all (OM, HLQ and O). However, in classroom environments, the creation of imbalanced situations, such as students experiencing conflicts and confusion of their thoughts, was one of the necessary characteristics of a classroom environment supporting critical thinking. One of the reasons for this unexpected finding may be the teacher's perception of "students experiencing conflicts in lessons", which was emphasized by the items as a negative situation. It was found that being parallel with the medium level, in general, the positive and the significant relationships between both variables, CLE characteristics explained half of the total variance in classroom environment characteristics supporting critical thinking (OM= 44%, HLQ= 50%, QARI= 40%, SCE= 47%, O=48%). These results show that the belief expressed in the literature that organizing the classroom environment according to CLE characteristics is an effective means of supporting critical thinking is true to a great extent. The findings of Doganay and Sarı's study (2012) on the relevant topic are consistent with the results of the present study.

Another finding obtained from the study is that the 'MSALC' dimension from the predictor variables predicted the classroom environment supporting OM, HLQ and O significantly. Students' seeing the events, ideas or thoughts from different points of view, questioning the ideas being accepted by most of the society, using oral, written or visual materials that help them to form high-level questions related to the subject taught, and aiding them to understand clearly the subjects or concepts they did not understand all influence classroom environments supporting OM, HLQ and O (Alkin, 2012). Considering this, it may be stated that when the use of materials aiming taking the classroom environment to solutions increases, the classroom environment characteristics supporting OM, HLQ and O will increase too.

In the study, it was seen that the 'CC' dimension predicted classroom environment supporting QARI significantly. According to Tenenbaum et al. (2001), the 'CC' dimension points to characteristics in classrooms, such as creating unbalanced situations, discussing conflicts and solving conflicts. One of the behaviors students would show in the process of solving conflicts would be questioning the truth and reliability of the knowledge. As a result, creating unbalanced situations in the classroom environment will create an environment where the learners question the truth and reliability of the knowledge, which causes conflict. In this sense, it may be expressed that the findings reached in the present study were as expected.

In the study, it was also found that the 'SOO' and 'CMCRLS' dimensions from the predictor variables predicted classroom environment supporting O in a significant way. Classroom environment characteristics supporting O include creating a classroom environment where students would want the concepts they did not understand to be explained, where the students are encouraged to share the concepts they did not understand in class, where students are encouraged to pose questions to each other about the views they did not understand and where supplying concrete, clarifying examples of the views or concepts not understood takes place. To actualize such a classroom environment, there is a need for a learning environment where knowledge is constructed on basic concepts of the 'CMCRLS' dimension characteristic, where concrete examples from students' real lives are presented to them, and where the teacher and the students interact, which is the characteristic of the 'SOO' dimension (Fer & Cirik, 2006). In this sense, it can be stated that a classroom environment created where ideas are shared and meanings are connected to real life has a classroom environment characteristic supporting O.

An important finding reached in the present study is that the 'DI' dimension from the predictor variables predicted none of the predicted variables significantly. Some of the items representing 'DI' dimension are: (1) The subjects were taught by discussing and negotiating in class. (2) Students were encouraged to put forward genuine ideas in class. (3) Students learned to develop mental point of views, such as critical thinking. As seen, it is extremely surprising that although there was an item directly developing critical thinking in the related dimension, it predicted none of the dependent variables. Considering this finding, descriptive statistics were carried out related to the items representing the relevant dimension. According to the analyses, it was observed that the highest average belonged to the item "Students were encouraged to put forward genuine ideas in class" ($\overline{X}$=3.93, s=.87) and that the lowest average belonged to the item "Students learned to develop mental point of views, such as critical thinking" ($\overline{X}$= 3.70, s= .88). The items receiving the highest average of this sample group may have featured the judgment/ perception on evaluating the classroom environment supporting critical thinking rather than the classroom environment supporting critical thinking, which is one of the high-level thinking skills. This situation can be one of the reasons for the unexpected and surprising result.

Depending on the strong regression relationships obtained from the study, it can be stated that to create a classroom environment supporting critical thinking in the courses of the teachers in Kutahya included in the study, the classes of those teachers need to be in constructivist learning environments. Thus, it will contribute to educate individuals who question existing knowledge and make new knowledge more meaningful by combining it with their previous learning. The 'MSALC' dimension is an extremely strong and significant predictor in creating a classroom environment supporting critical thinking. In this sense, the teachers in Kutahya receiving in-service training provided on the present topic should be made aware of the 'MSALC' dimension characteristics. In the study, in general no relationship was found between the 'CC' dimension and the predicted variables. However, students experiencing

conflict is one of the necessary characteristics for the relevant classroom environment. Considering this, the teachers in Kutahya who receive in-service training on the present topic should be made aware of the 'CC' dimension characteristics. Since there is a limited number of studies on this topic, it was difficult to discuss the results of the present study with outside findings and to make generalizations. In this sense, to conduct similar studies whose findings can be discussed with the outside findings and can be generalized, additional studies can be conducted by making use of the measurement scales used in this study and by including different samples. In addition, the reason why the 'DI' dimension did not predict nearly any of the predicted variables in the study is related rather to the items in the dimension to have created the perception of evaluating the environment supporting critical thinking at teachers. In future studies, the hypothesis put forth in this study can be tested.

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Yapılandırmacı Öğrenme Ortamı Özelliklerinin Eleştirel Düşünmeyi Destekleyen Sınıf Ortamı Özelliklerini Yordama Düzeyi

Özet

Problem Durumu: Yapılandırmacı öğrenme ortamının ve eleştirel düşünmeyi destekleyen sınıf ortamının özellikleri incelendiğinde "sınıf ortamında farklı bakış açılarını destekleme, öğrenciye öğrenme sorumluluğunu verme, sosyal deneyimleri önemseme, öğrencilerin düşünme süreçlerini izleme, öğrencilerin birlikte çalışmasını destekleme, üst düzey soru sorulmasını teşvik etme, çatışmalı konulara önem verme vb. özelliklerin ortak olduğu görülmektedir. Bunun yanında yapılandırmacılığın ana amaçlarından birinin deneyimler aracılığıyla eleştirel düşünmeyi geliştirmek olduğu dikkate alındığında sınıf ortamının yapılandırmacı öğrenme ortamı özelliklerine uygun olarak düzenlenmesinin, eleştirel düşünmeyi destekleyen sınıf ortamının düzenlenmesinde etkili olacağı söylenebilir. Başka bir değişle, sınıfların, yapılandırmacı öğrenme ortamı olma özelliği geliştirildikçe, eleştirel düşünmeyi desteklemeye uygunluğunun da geliştirileceği düşünülmektedir. Yapılandırmacı öğrenme ortamına ilişkin alanyazın incelendiğinde daha çok ortamın değerlendirilmesine yönelik çalışmaların yapıldığı dikkat çekmektedir. Bunun yanında yapılandırmacı öğrenme ortamı ile düşünme dostu sınıf ortamı, yapılandırmacı öğrenme ortamı becerileri ile özyeterlik algıları, epistemolojik

inançları, yapılandırmacı yaklaşıma ilişkin tutumları, üst biliş stratejileri, öğrenme yaklaşımları ve düşünme stilleri arasındaki ilişkiyi belirlemeye yönelik çalışmaların da olduğu görülmektedir. Eleştirel düşünmeyi destekleyen sınıf ortamına / öğretmen davranışlarına ilişkin alanyazın incelendiğinde ise kuramsal çalışmaların dışında eleştirel düşünmeyi destekleyen öğretmen davranışlarının değerlendirilmesine yönelik yapılan bir çalışmaya ulaşılmıştır. Öğretmenlerin eleştirel düşünmeyi destekleyen öğretmen davranışları ile öğrenen özerkliği arasındaki ilişkiyi belirlemeye yönelik de yalnızca bir çalışmaya ulaşılmıştır. Eleştirel düşünmeye ve yapılandırmacı öğrenme ortamına ilişkin alan yazın incelendiğinde ise yapılan çalışmaların çoğunun öğretim metodunun ve programın etkililiğine yönelik deneysel çalışmalar olduğu dikkat çekmektedir. Görüldüğü gibi alanyazında, araştırmanın ileri sürdüğü hipotezi istatistiksel olarak test eden, başka bir deyişle yapılandırmacı öğrenme ortamı özellikleri ile düşünmenin alt becerisi olan eleştirel düşünmeyi destekleyen sınıf ortamı özellikleri arasındaki ilişkiyi inceleyen araştırmalara rastlanmamıştır.

Araştırmanın Amacı: Öğretmenlerin görüşlerine göre, yapılandırmacı öğrenme ortamının özelliklerinin eleştirel düşünmeyi destekleyen sınıf ortamı özelliklerini yordama düzeyinin belirlenmesidir.

Araştırmanın Yöntemi: Araştırma, ilişkisel tarama modelinde nicel bir araştırmadır. Araştırmanın evrenini 2014-2015 eğitim öğretim yılında, Kütahya il merkezi ve merkeze bağlı köylerde bulanan ilkokul ve ortaokullarda görev yapan toplam 4116 öğretmen oluşturmaktadır. Örnekleme girecek öğretmenlerin belirlenmesinde oransız küme örnekleme tekniği kullanılmış; örneklem büyüklüğü ise 351 olarak hesaplanmıştır. Araştırmada veri toplama aracı olarak Yapılandırmacı Öğrenme Ortamı Ölçeği ve Eleştirel Düşünmeyi Destekleyen Öğretmen Davranışları Envanteri kullanılmıştır. Araştırmada, yapılandırmacı öğrenme ortamı ile eleştirel düşünmeyi destekleyen sınıf ortamı arasındaki ilişkinin belirlenmesi amacıyla ise Pearson korelasyon analizi kullanılmıştır. Yapılandırmacı öğrenme ortamı özelliklerinin eleştirel düşünmeyi destekleyen sınıf ortamı özelliklerini ne ölçüde yordadığını belirlemek için ise Çoklu Regresyon analizi kullanılmıştır

Araştırmanın Bulguları: Araştırmada yapılan regresyon analizi sonuçlarına göre, yapılandırmacı öğrenme ortamı özellikleri, açık fikirliliği destekleyen sınıf ortamı özelliklerindeki toplam varyansın % 44'ünü; üst düzey soru sormayı destekleyen sınıf ortamı özelliklerindeki toplam varyansın % 50'sini; bilginin doğruluğunu ve güvenirliğini sorgulamayı destekleyen sınıf ortamı özelliklerindeki toplam varyansın % 40'ını; neden kanıt aramayı destekleyen sınıf ortamı özelliklerindeki toplam varyansın % 47'sini; açıklığı destekleyen sınıf ortamı özelliklerindeki toplam varyansın % 48'ini açıklamaktadır. Araştırmada, regresyon katsayılarının anlamlılığına ilişkin t testi sonuçları, "materyal ve kaynakların çözüme götürmeyi amaçlaması" boyutunun, açık fikirliliği; "materyal ve kaynakların çözüme götürmeyi amaçlaması", "yansıtma ve kavram keşfi için motive etme" ve "anlam oluşturma ve gerçek yaşam olaylarıyla bağlantı" boyutlarının, üst düzey soru sormayı; "öğrenen ihtiyaçlarını karşılama" ve "kavramsal çelişkiler" boyutlarının, bilginin doğruluğunu

ve güvenirliğini sorgulamayı; "öğrenen ihtiyaçlarını karşılama" boyutunun, neden kanıt aramayı; "düşünceleri diğerleriyle paylaşma", "materyal ve kaynakların çözüme götürmeyi amaçlaması" ve "anlam oluşturma ve gerçek yaşam olaylarıyla bağlantı" boyutlarının, açıklığı destekleyen sınıf ortamının yordayıcısı olduğunu göstermektedir.

Araştırmanın Sonuçları ve Önerileri: Araştırmada, yapılandırmacı öğrenme ortamı özelliklerinin, eleştirel düşünmeyi destekleyen sınıf ortamı özelliklerindeki toplam varyansın yaklaşık yarısını açıkladığı (açık fikirlilik= %44, üst düzey soru sorma= %50, bilginin doğruluğunu ve güvenirliğini sorgulama= %40, neden kanıt arama= %47, açıklık=%48) sonucuna ulaşılmıştır. Bütün bu sonuçlar, alanyazında belirtilen sınıf ortamının yapılandırmacı öğrenme ortamı özelliklerine uygun olarak düzenlenmesinin, eleştirel düşünmeyi destekleyen sınıf ortamının düzenlenmesinde etkili olacağına ilişkin görüşün büyük ölçüde doğrulandığını göstermektedir. Araştırmada elde edilen diğer bir sonuç, yordayıcı değişkenlerden "materyal ve kaynakların çözüme götürmeyi amaçlaması" boyutunun, açık fikirliliği; üst düzey soru sormayı ve açıklığı; "kavramsal çelişkiler" boyutunun, bilginin doğruluğunu ve güvenirliğini sorgulamayı; "düşünceleri diğerleriyle paylaşma" ile "anlam oluşturma ve gerçek yaşam olaylarıyla bağlantı" boyutunun, açıklığı destekleyen sınıf ortamını anlamlı bir biçimde yordadığı sonucuna ulaşılmıştır. Araştırmada ulaşılan önemli bir sonuç da, yordayıcı değişkenlerden "DI" boyutunun, yordanan değişkenlerden hemen hiçbirini anlamlı bir biçimde yordamamasıdır. Araştırmadan elde edilen güçlü yordamsal ilişkilere bağlı olarak, eleştirel düşünmenin desteklendiği sınıf ortamının oluşturulması için sınıfların yapılandırmacı öğrenme ortamı özelliklerine sahip olması gerektiği söylenebilir. Böylece var olan bilgiyi sorgulayan, sorguladıkları yeni bilgiyi ön öğrenmeleriyle bütünleştirerek anlamlı hale getiren bireylerin yetiştirilmesine katkı sağlanacaktır. "MSALC" boyutu, eleştirel düşünmeyi destekleyen sınıf ortamın oluşturulmasında oldukça güçlü ve anlamlı bir yordayıcıdır. Bu bağlamda öğretmen adaylarına öğretmen eğitimi programlarında, öğretmenlere ise ilgili konuda verilen hizmet içi eğitimlerde, "MSALC" boyutunun özelliklerine ilişkin farkındalık kazandırılmalıdır. Araştırmada, genel olarak "CC" boyutu ile yordanan değişkenler arasında ilişki çıkmamıştır. Oysaki öğrencilerin çelişki yaşaması, ilgili sınıf ortamlarının olmazsa olmaz özelliklerinden biridir. Bu bağlamda öğretmenlere ilgili konuda verilecek hizmet içi eğitimlerde, özellikle "CC" boyutu özelliklerine ilişkin farkındalık yaratılmalıdır. Alanyazında ilgili konuda sınırlı sayıda çalışmanın olması, araştırma elde edilen sonuçların dış bulgularla tartışılmasını ve genellemelere varılmasını güçleştirmiştir. Bu bağlamda gelecekte daha genellenebilir ve dış bulgularla desteklenebilir çalışmaların yapılabilmesi için, araştırmada kullanılan ölçme araçlarından yararlanılarak farklı örneklemler üzerinde benzer çalışmalar yapılabilir. Ayrıca araştırmada, "DI" boyutunun, yordanan değişkenlerden hemen hiçbirini anlamlı bir biçimde yordamamasının nedeni boyuttaki maddelerin, öğretmenlerde daha çok yaratıcı düşünmeyi destekleyen ortamın değerlendirilmesine yönelik algıyı oluşturması ile ilişkilendirilmiştir. Gelecek çalışmalarda ileri sürülen bu hipotezi test edecek çalışmalar yapılabilir. Ayrıca araştırmada, ilgili sınıf ortamları öğretmen görüşlerine göre incelenmiştir.

Gelecek araştırmalarda, ilgili sınıf ortamları, öğrenci görüşleri ya da sınıf içi gözlemler yoluyla da incelebilir.

Anahtar sözcükler: Yapılandırmacılık, eleştirel düşünme, öğrenme ortamı, yapılandırmacı öğrenme ortamı, eleştirel düşünmeyi destekleyen sınıf ortamı.