

The effectiveness of the model of 'social constructivist learning environment' design through research

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Abstract

This presentation is to examine whether a model of 'Social Constructivist Learning Environment' (SCLE) design developed by Fer by utilizing six different research studies is effective for the learning process, ethnocentrism and intercultural approaches, as well as for the academic achievement of students in different grades. The theoretical framework of SCLE comes from both Dewey's famous expression of 'learning by doing' and Vygotsky's 'zone of proximal development' ideas. SCLE consists of four main stages that include learner analysis, context determination, meaning construction, and learning evaluation. The role of the teacher in SCLE design is to serve as both a facilitator and moderator to the students. In general, SCLE design is effective for students of different grades, based on the results of six different research studies. It has been shown to be effective in the learning processes, ethnocentrism and intercultural approaches, as well as in academic achievement.

Keywords: Social constructivism, instructional design

1. Background

Social constructivism is related to Vygotsky's (1929, 1930) ideas and is based on the idea that all knowledge is constructed socially, and is acquired through social groups. Social constructivist learning (SCL) sheds light on the questions of 'what knowing' is and 'how an individual knows' by explaining knowledge as being socially and culturally constructed (Fosnot, 1996). The construction of meaning is a result of mutual communication between individuals (Jonassen & Rohrer-Murphy, 1999). The SCL process occurs in a learner by using existing basic cognitive processes, such as experiences, beliefs, knowledge, skills and mental models, in order to organize the learning process in a social and cultural environment. Contrary to popular belief, SCL does not deny that reality exists outside the person; however, it denies that there is a single way to reach to the reality or world (Fer & Cirik, 2007).

Dewey, who expressed his ideas before Vygotsky, also influences SCL. Dewey's famous expression: "*learning by doing*" constitutes an active learning method that is used in social constructivist learning. According to Dewey (1915), learning is reflection upon what the learner has experienced. This understanding of the learner changes her view of, and action in, the world and new understanding of the learner changes the world. It is also necessary for learners to interact with one another in real social situations in order to understand life and the world itself.

One of the important ideas of Vygotsky relates to thought and language. It is important to note that, according to Vygotsky (1962), language does not only have a role in thought development but also in the development of consciousness as a whole. Vygotsky (1930) explains his idea: "*The acquisition of language can provide a paradigm for the entire problem of the relation between learning and development.*" According to Vygotsky (1929), while a child grows up, she does not only add cultural phenomena and events to her experiences, but also understands habits and forms of cultural behavior and forms as a cultural method. Individuals acquire the way of learning by using language and thought in their culture and society. In addition, the major theme of Vygotsky's theoretical framework is that of the zone of proximal development. Vygotsky (1930) explains the zone of proximal development as follows: "*the distance between the actual developmental levels as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.*" In this frame, Vygotsky provides practical suggestions to educators indirectly through the zone of proximal development explanations. To put it simply, through interactive communication in collaborative learning environments, learners develop their thinking through language. At the same time, learners also develop their language through thinking. Thus, an essential feature of SCL is that it incorporates the zone for proximal development process.

In a SCL design, learners and teachers participate in the design process. Moreover, the design process has a non-linear structure (Wilson, 1997; Wilson, Teslow, & Osman, 1995; cited in Fer, & Cirik, 2007) that sometimes can lead to big ideas with multiple-goals (Gagnon & Collay, 2001). In learning, learner-teacher and learner-learner interactions are the basic mechanisms. The teacher works with learners: she explains, informs, inquires, asks questions, corrects and directs the learners to make explanations. When the learner later solves a problem alone, he uses the cooperative learning principles independently that he learned before (Vygotsky 1934/1978/1987; cited in Green & Gredler 2002).

Previous studies concerned with constructivist design have presented positive results in regard to effects on the learning process, as well as learners views and perceptions (e.g., Abd-El-Khalick, 2001; Akar & Yildirim, 2004; Banet & Ayuso, 2003; Clark & James, 2004; Maypole & Davies, 2001; Tsai, 2000); yet, a model of the social constructivist learning environment (SCLE) design might be one of the alternatives in organizing learning environments for today's diversity classes where issues like gender, methodological problems, linguistic and cultural diversities, and intercultural misunderstandings of learners must be taken into greater consideration. In keeping with the findings of the above-mentioned research, the idea that the learning-centered structure of SCLE design with the

convenience and flexibility provided for the learning and instructional process might be taken into account as a variable, it might be reasonable to expect that SCLE positively serves learning in socio-cultural environments. Having this idea in mind, this study was to examine if a model of SCLE design developed by Fer by utilizing six different research studies, applied SCLE design, is effective for the learning process, ethnocentrism and intercultural approaches, as well as for the academic achievement of students in different grades (see, Akyol, 2011; Akyol & Fer, 2010; Cimen, 2010; Fer, 2011; Ergul, 2010; Kaya-Korkmaz, 2014).

2. Methods and procedures

The research methods and procedures reported here, utilized from six different research studies, and applied SCLE design, as explained below.

2.1. Research design

Fer (2011) used the one group pretest-posttest design. Moreover, Kaya-Korkmaz (2014), Cimen (2010) and Akyol (2011) carried out a pretest-posttest–delayed posttest control group experimental design. Additionally, Akyol and Fer (2010) carried out a qualitative study, a focus group method with a phenomenological approach. Finally, Ergul (2010) used a qualitative study with an instrumental case study design.

Participants: In Fer's (2010) study, the participants were 52 student teachers who took the Curriculum Development and Instruction course at Yildiz Technical University in Istanbul. Moreover, in Kaya-Korkmaz's (2014) research, the participants of an experiment (n=39) and control group (n=40) from an English as a Foreign Language course were at the 7th grade of Siteler Junior High School in Esenyurt. Also, in Cimen's (2010) research, the participants of an experimental group (n=30) and control group (n=33) were from the Information Technologies course at the 7th grade of Ismet Pasa Elementary School in Duzce. Additionally, in Akyol's (2011) study, the participants of an experimental group (n=37) and control group (n=37) were from the Science and Technology course at the 5th grade of Kemal Kaya Elementary School in Istanbul. In addition, in Akyol and Fer's (2010) research, seven members for the focus group were from the Science and Technology course of experimental group at the 5th grade of Kemal Kaya Elementary School. Finally, in Ergul's (2010) study, 46 participants were from the Mathematics course at the 6th grade of Haluk Undeger Elementary School in Istanbul.

2.1. Materials and procedures

All research studies applied a model of SCLE design as shown in Figure 1 and explained below. *Preparation process of SCLE:* The model was created based on class observations and a book (Fer & Cirik, 2007). The first model of SCLE developed in 2007 had one stage that focused on construct meaning; instead of the whole design approach as in Figure 1. Then the model applied to student teachers who took a Curriculum and Instruction course at Yildiz Technical University in Istanbul. However, the students did not like the application of the model, expressing their opinion that they were not happy in collaborative group where not much learning occurred. The researcher's opinion and observation also showed that students in the collaborative group did not study or learn well. According to learner opinions, it was understood that learner needs were different from those of the course through the SCLE model; therefore, in light of both the students' and researcher's opinions and observations, some changes have been made on the model by adding learner analysis stage as presented in Figure 1.

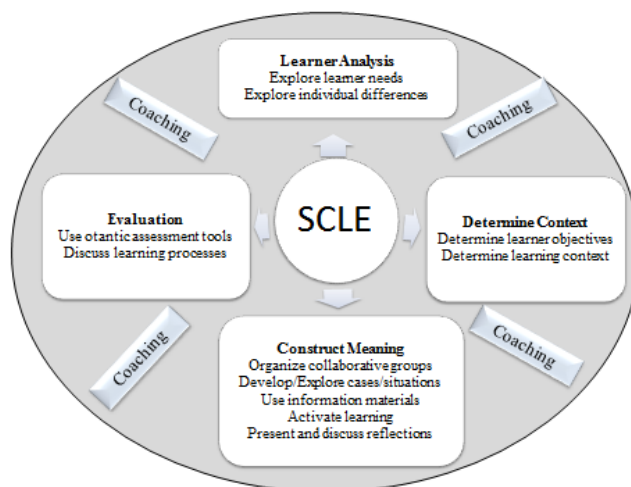


Fig.1. SCLE design models

SCLE design: The theoretical framework of SCLE design developed by Fer (2009) comes from both Dewey’s (1915) famous expression of ‘learning by doing’ and Vygotsky’s (1930) ‘the zone of proximal development’ ideas as explained under the background heading. SCLE is comprised of four main stages as depicted below. However, it is important to remember that SCLE presents a conceptual and procedural framework by giving general insights to anybody who wants to apply it instead of a strict process to apply. Thus, it is possible to modify or adapt it according to students’ needs and based on the experience of teacher who applies it. In addition, any stage of SCLE is applied simultaneously and/or independently if it is appropriate to student’s needs and experiments.

Learner analysis: The main aim of this stage is determine individual differences such as gender, learning styles, needs, cultural diversities, likes-dislikes of learners in order to consider in the classroom. How and what kind of information gotten through the learner analysis depends on teachers and learners. For instance, use a learner analysis form or instrument that contains some questions regarding individual differences of students might be used or any other way such as organizing focus groups might. Based on the information from the learner analysis, a course would be designed according to needs of learners; also, collaborative working groups might be set up.

Context determination: Learning context that is comprised of topics, cases, situations, or themes is determined at this stage. How and what kind of information might be collected through context analysis depends on teachers and learners. For instance, a context analysis form or instrument that contains topics, cases, situations, or themes regarding what to learn in the course might be used or any other way such as organizing focus group might be used. Based on the information gathered from context analysis, learner objectives for the course would be made; also, collaborative working groups might be set up.

Meaning construction: First, teachers or students *organize collaborative groups*. *Second*, cases, situations, and/or topics are to be explored and developed by the students through collaborative groups that also help to activate learning. In addition, interaction among different learners might be facilitated through changes made in group members and group size. Third, the groups use information sources in different activities or products such as stories, posters, video films, weblogs, 3D models, power point presentations, etc. Fourth, to activate learning, group knowledge and/or skills are examined in detail through collaborative group activities and communication by using information materials. Fifth, the groups share their reflection of knowledge and/or skills inside or outside the groups by presenting and discussing them with their

teacher and peers.

Learning evaluation: Authentic assessment tools such as rubrics, portfolios, observations and self-assessment tools, etc., are to be used with earners in order to discuss and evaluate the learning process with them at this stage. Using a wide range of 'authentic assessment' tools it is also possible to observe how and at which level the learners construct knowledge. Additionally, learners evaluate their own level of knowledge construction and learning process, and they discuss their evaluation with peers.

Coaching: The teacher serves as a guide; a facilitator and a moderator in the learning process of the students (see Fer, & Cirik, 2007 chapter 5-7 for details).

Other materials: In three quantitative research studies (Akyol, 2011; Cimen, 2010; Fer, 2011), an academic achievement test as pretest, posttest and delayed-posttest was used after reliability and validity process. In one quantitative research study (Kaya-Korkmaz, 2014), a questionnaire on ethnocentrism and intercultural approaches as pretest, posttest was used after reliability and validity process. On the other hand, in two qualitative (Akyol & Fer, 2010; Ergul, 2010) research, observer notes, videos recordings, and interview transcripts were used.

3. Results

Fer (2011) found a statistically significant difference between pretests and posttest academic achievement scores of learners in favor of the posttest [$t_{(49)}=-12.63$, $p=.00<.01$].

Moreover, in Cimen's (2010) study, as expected, the posttest scores of the experimental group of students who participated in SCLE were higher than those from control group who participated in MEB constructivist design when pretest scores were controlled for [$F_{(1-57)}=9.14$, $p=.00<.01$]. Moreover, the delayed-posttest scores as learning retention of the experimental group of students were higher than those from control group were ($U=151.50$, $p=.00<.01$).

Contrary to the expectations, Akyol (2011) found no statistically significant difference in terms of posttest scores of the groups when pretest scores were controlled [$F_{(1-67)}=.63$; $p=.42$, $p >.05$]. However, as expected, a significant difference was found in terms of the delayed-posttest scores of learners in the experimental group on which SCLE design was applied when posttest scores were controlled for [$F_{(1-67)}=4.69$; $p=.03$, $p <.05$].

Similarly, in Kaya-Korkmaz's (2014) study, contrary to the expectations, no statistically significant difference was found in terms of ethnocentrism [$F_{(1-76)} = 1.43$, $p= 0.23>.05$.], as well as intercultural sensitivity [$F_{(1-76)} = 2.39$, $p= 0.12>.05$.] posttest scores of the groups when pretest scores were controlled. However, as expected, a significant difference was found in terms of the delayed-posttest scores of learners about the ethnocentrism [$F_{(1-76)} = 7.23$, $p= .00<.05$.], as well as on the intercultural sensitivity [$F_{(1-76)} = 15.42$, $p= .00<.05$.] in favor of the experimental group on which SCLE was applied when posttest scores were controlled for.

Ergul (2010) found from the analysis of observer notes, videos recordings, and interview transcripts regarding SCLE that, in the learner analysis stage, most of the students stated that they had needed peer learning to share their thoughts. In the context determination stage, most of the students associated mathematics with their daily lives and they realized that they would be using mathematics in their future education. In the meaning construction stage, some of the students expressed their feelings by saying that at first they had trouble in the distribution of duties within the cooperative groups; however, they learned by cooperating and by practicing and enjoyed learning with peers.

According to findings of Akyol and Fer (2010), from the analysis of interview transcripts regarding SCLE, in the learner analysis stage, some of the students expressed their feelings by saying that individual differences affected student's learning. However, they could not express which individual differences affected their learning or how they were affected. Additionally, although they chose the

topic of 'Planets' to study on it, some of the students found this topic difficult. On the other hand, most of the students stated that SCLE helped them to achieve their learning objectives through collaborative learning environment.

In both Ergul's (2010) and Akyol and Fer's (2010) research, students expressed their opinions by saying that learners can establish a connection between Daily subjects and knowledge in construct meaning process. More importantly, SCLE design was found to be enjoyable and interesting by the students. Additionally, both a task sharing in a group and using multimedia aids such as preparing poster, making a model were found to have positive effects in the construction of knowledge through collaborative learning environment by most of the students. In the evaluation stage, almost all students indicated that they liked the evaluation process that they performed. Moreover, teacher coaching was found by the students to be more efficient with respect to other courses.

4. Discussion, conclusion and implications

In general, it is possible to express based on the six research results presented here that SCLE design is effective for learning process, ethnocentrism and intercultural approaches, as well as for academic achievement of students at different educational levels. However, it is important to discuss results by differentiating research according to qualitative and quantitative results.

The two quantitative research studies (Cimen, 2010; Fer, 2011) presented here indicated that the SCLE design is effective for academic achievement of learners at different educational levels. On the other hand, one quantitative research study (Akyol, 2011) indicated that the SCLE design is effective for delayed-posttest scores of the students instead of posttest scores of the students.

Academic achievement tests are not exactly suitable for constructivist design. Gagnon and Collay (2001) indicated that standardized tests redirected more towards what the learner does not know than what he/she knows. Still, the conclusion of the qualitative research is that the SCLE design caused an increase on the academic achievement scores of students. The result supports the findings of research (e.g., Banet & Ayuso, 2003; Cirik, 2005; Clark & James, 2004), which have stated that the SCL environment is effective in terms of academic achievement scores of students. On the other hand, only a limited number of studies have found SCLE as not having a positive effect on the academic achievement (e.g., Gurol, 2003; Serin, Serin, & Saygili, 2008b; cited in Akyol, 2011).

The other quantitative research study (Kaya-Korkmaz, 2014) presented here indicated that according to pretest, posttest and delayed-posttest scores, ethnocentrism scores decreased; however, intercultural sensitivity scores increased in a long term after being in SCLE environments.

On the other hand, the two qualitative research studies (Akyol, & Fer, 2010; Ergul, 2010) presented here indicated that SCLE design was effective on learning process of learners as well as gathering new information through collaborative works and multimedia. This result supports the findings of some research (e.g., Marinopoulos & Stavridou, 2008; Pilatou & Stavridou, 2008; Solomonidou & Kalantzi, 2008; Solomonidou & Kolokotronis, 2008; Syh-Jong, 2007; cited in Akyol, 2011) that shows that construction of knowledge in social environments is effective in learning concepts and phenomena for learners.

One possible explanation for these positive results might be that SCLE with heterogeneously formed groups of students provides a learning environment by giving an opportunity for students to learn from each other. Moreover, the use of SCLE with flexible and democratic environment by taking into consideration individual differences of learners might increase the students' motivation towards learning.

It is important to note that the starting point of the design of the model was a consideration that SCLE would be effective on the learning process and on views of students. Therefore, it is not surprising to reach positive results obtained by applying SCLE on class. This findings reached might be

suggested to prove the truth of this thought.

However, it should be noted that there was three limitations to quantitative studies both in general and presented research here. Firstly, since the quantitative research used experimental design, generalization of the findings is limited. Secondly, the small size of the study group of the quantitative research is believed to lessen the reliability of the studies. Finally, although the academic achievement tests were used in experimental studies since there is the necessity to use of a quantitative assessment tool, the test is not very convenient for a SCLE design since this kind of test ranks students. Thus, it is worthwhile to remember that a SCLE design might produce results that are more effective by using qualitative research and authentic evaluation tools.

On the other hand, qualitative studies both in general and presented research here is not transferable in the usual quantitative sense. However, experiences of students may have transferability or suitability to other settings (Lincoln & Guba, 1985, as cited in Callahan, Maldonado, & Efinger, 2003). In general, there are some limitations inherent in the data from focus groups. One is the limited scope of generalization of these results, due to a higher interdependency of participants' responses, as well as the higher possibility of bias through the focus group participants. Limitations of this analysis technique also include a possibility for subjectivity and bias that may be introduced by a sole analyst (Cohen, Manion, & Morrison, 2000; Fraenkel & Wallen, 2000; Kiger, 2002).

However, these limitations overall contribute to the limited transferability of the results of this study. On the positive side, the somewhat heterogeneous nature of the participants in terms of their age and the subjects may be considered strength of this study, as well as the willingness and openness of participant students to express their experiences. Moreover, none of the participants dominated the discussions, thereby minimizing a possible bias of the opinions of other group members.

Nevertheless, considering the above-mentioned limitations, the results of the research studies might be of interest to researchers and teachers or practitioners. That is, SCLE provides an enjoyable and interesting learning environment for the students. Moreover, this model might be used as an effective model to use with students by opening a perspective by considering students' needs in learning, as much as in assessment processes. Additionally, SCLE would be effectively used in multi-cultural classrooms. Educators might also be encouraged to develop SCLE designs for their courses, which would provide their students a social and collaborative learning opportunity environment. In this way, learners construct their meaning not just individually but together with peers and their groups.

Because the SCLE design has not yet been evaluated in a full perspective, further research is needed at different grade levels and in different cultures, to facilitate a better understanding of the effects of SCLE on students. Additionally, it is especially important to carry out cross-cultural comparisons regarding the effects of SCLE on students within a socio-cultural and multi-cultural framework.

Author's note

This article is an extended version of a paper, by adding a few new research, presented by the name of testing a model of 'the social constructivist learning environment' design at the first international congress on curriculum and instruction in Eskişehir, Turkey,

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