THE IMPROVEMENT OF LIFELONG LEARNING IN SAUDI ARABIAN UNIVERSITY FROM INDIVIDUAL LEARNING TO SOCIAL CONSTRUCTIVIST E-LEARNING ENVIRONMENT BASED NEW EDUCATIONAL TECHNOLOGIES

Chokri Barhoumi, PhD, Assistant professor

Talal bin Hasan Hamza kabli, PhD, Associate professor

Department of educational technology, Faculty of education, Taibah University, Al Medina Al Mounawara, Kingdom of Saudi Arabia

Abstract

The design of the instructions based social constructivist online course in Saudi Arabian universities is considered a new instructional technology to integrate in higher education compared to individual behavioural course design. The actual study aim is to improve lifelong learning in Saudi Arabian University through exploring the impact of using an online course design based social collaborative e-learning process on the achievement and attitudes of lifelong learning learners comapred to traditional individual learning. Researchers use the experimental approach to explore this impact. One sample contains an experimental group of 30 learners and an other sample of control group contains 30 learners from lifelong learning class in Taibah University. In order to achieve the object of this study, researchers develop an e-learning process based social constructivist e-learning environment for problems solving and observe its effects on the experimental group. Social electronic e-learning process experimeted in present research is based design of constructivist e-learning environment (Jonassen, 1991) and Vygotsky's social development theory (Vygotsky, 1978**)** for problem solving and facilitation of online learning and teaching. The t-test is used to find out difference between the experimental and control group. Results of the experimentation show that there is difference between the experimental group and the control group at 0.05 alpha level in the attitudes of learners toward using social construction of knowledge.

Keywords: Teaching, Collaborative e-learning, Design of the instruction, Social development, Social constructivist learning

Introduction

The World Wide Web service is considered as one of most important means of providing learning resources for learners to share and obtain information necessary for learning and teaching (Richard and Haya, 2009).

As part of new technologies, internet-based communication may provide learning resources in either synchronous or asynchronous way for learners in context of e-learning (Zengin, Arikan & Dogan, 2011).

E-learning is a concept covering a variety of applications, processes and learning methods. It is also referred to the use of information and communication technologies for teaching and learning in order to facilitate access to the online resources and to provide learners with collaborative tools, such us web 2.0 applications etc. Web 2.0 technology in e-learning environment offers a set of tools and utilities affecting communication and its social impact (Rossi, 2009). The online learning and teaching is based Open Educational Resources (OER), sharing and re-using learning resources created within a community of practice of teachers and learners in accordance with the aims of the open access movement (Banzato, 2012).

The online learning environments are not to be seen merely as tools to support learning. They are components of a wider approach that is more “theoretic” (Rossi, 2010). A well-structured learning environment has to facilitate user to make connection of different tools in order to build, to share and to change his/her level of knowledge in the e-learning environment (Rossi, 2006).

In this context, design of the e-learning processes chosen by the instructor of distance learning, characterizes any pedagogical act and determine the instructive relation between instructors and learners in context of e-learning. We believe, the e-learning process in context of collaborative learning is a fruit of social interactions between learners for knowledge construction. The e-learning process can also be influenced by cognitive and psychological state of learner, the instructor's professionalism, nature and complexity of the online module taught.

The choice of collaborative e-learning process by the instructor who favors learning for a specific online course has an added value on the effectiveness of learning and a positive impact on construction of knowledge by online learners and then on their achievements and

attitudes toward using constructivist course design (Jonassen, 1991). The experimentation of the e-learning process of a specific online course is very important as much as it assists instructors to manage their professional practices by choices of the effective e-learning process favoring acquisition and sharing of knowledge.

Collaborative learning is a mode of learning based social constructivism course design, which attaches importance to social construction of knowledge, where learners attain the processes of negotiation and collaborative design (Jonassen, 1991; Siemens, 2005).

In Saudi Arabian universities, especially in Taibah University, instructors uses frequently individual e-learning approaches and sometimes the assisted e-learning approaches but collaborative approaches for learning and teaching some online courses for lifelong learning learners is considered a new learning strategy based social constructivist online course design. Instructors believe that social collaborative e-learning process is effective for learning and teaching.

The objective of present experimental research is to improve lifelong learning in Saudi Arabian university through finding out the impact of social constructivist e-learning process on the achievements and attitudes of lifelong learning learners compared to individual behavioral online course and to adopt this strategy of e-learning processes in future, e-learning situation with lifelong learning learners in Saudi Arabia.

Theoretical Framework

Constructivist learning theory

The formalization of constructivist learning theory is related to the ideas of Jean Piaget (Piaget, 1967). He indicated in this theory that learners are responsible for knowledge construction. Knowledge is constructed by learners interacting with learning resources and they have an active role in knowledge acquisition.

Piaget suggests that by processes of accommodation and assimilation, knowledge is constructed by learners from their experiences. According to Jean Piaget, learners aren't only interacting with knowledge that they construct in the e-learning process, but they organize their knowledge with the adaptation process insisting on the adaptive structure of learner's intelligence. The adaptation capacity of learners is based on two processes of interaction with learning environment such us assimilation and accommodation (Piaget, 1967).

Assimilation: We talk about the existence of assimilation in learning situation, where learners are confronted with problems solving during their interactions with learning objects, they integrate new knowledge with knowledge that they already have. With assimilation,

understanding a problem for learners is based integration of new knowledge in the framework of current knowledge that learners already have to solve problems.

Accommodation: We talk about the existence of accommodation when there is a change in mental structure of learners through interactions with learning resources presented by instructor in the e-learning process. It is an action of the e-learning environment on mental structure of learners. He will have the effect of causing adjustments in the way of doing, seeing, thinking of the subject in order to construct new knowledge utile for learning.

Equilibration: The assimilation and the accommodation are complementary and antagonist processes that characterize the adaptation intelligence. This concept means finding the best possible equilibration between learner and his learning environment for problem solving. For this equilibration, Piaget speaks about self-regulation (Piaget, 1967).

Constructivist learning theory promotes the development of active learning strategy. Learners are placed in a situation of designing ideas and concepts for learning. Constructivism favors learning activities by placing learner in a central position in process of teaching - learning. In this context, instructors have an interest in providing learning tools for learners in order to help them to construct knowledge and designing new ideas and concepts of learning. Constructivist learning theory promotes problem solving situations. Indeed, the problem solving is viewed as a situation of basic constructivist learning. The primary aim of a problem solving situation is to put learner in a situation of a cognitive conflict in order to allow him to acquire new knowledge. The cognitive conflict triggered by the problem solving is able to generate conceptual changes that allow learners to progress in the acquisition of knowledge (Piaget, 1967).

The four stapes of problem solving are:

- Learner believes that s/he is unable to solve problems with knowledge that s/he possesses (the dominant process of assimilation);
- If learner is unable to solve learning problem inserted by the instructor in the e-learning process, he will be destabilized by this temporary setback, he becomes conscious of these shortcomings of the current information treatment method. Learner is currently in unstable situation and cognitive conflict;
- Learner can try to fill his/her gaps in knowledge (dominant process of accommodation) in order to adapt himself to the e-learning situation. If the efforts made by learner lead to solve problem, learner mobilizes knowledge to acquire tools to solve this learning problem;

- Cognitive conflict triggered by problem solving can lead to knowledge restructuring and better integration of new knowledge in the equilibration process;

Social constructivism learning theory

Social constructivism learning theory, strongly influenced by Vygotsky's research (Vygotsky, 1978), suggests that knowledge is first constructed in social context and is then appropriated by individuals. According to social constructivism, the process of sharing individual perspectives based collaborative elaboration results in learners constructing and understanding together that would not be possible alone.

Social constructivism is an active learning process where learners should learn to discover principles, concepts and facts for themselves, hence the importance of encouraging intuitive thinking in learners.

Vygotsky highlighted the convergence of social and practical elements in learning by saying that most significant moment in course of intellectual development occurs when speech and practical activity, two previously completely independent lines of development converge (Vygotsky, 1978). Through practical activity, a child constructs meaning on an intra-personal level, while speech connects this meaning with the interpersonal world shared by child and her/his culture.

Learners with different skills and backgrounds should collaborate in tasks and discussions to arrive at shared understanding of the truth in a specific field (Duffy & Jonassen, 1992).

Most social constructivist models, such as that proposed by Duffy and Jonassen (Duffy & Jonassen, 1992), also stress the need for collaboration between learners in direct contradiction to traditional competitive approaches.

One Vygotskian notion that has significant implications for peer collaboration between groups of learners in the e-learning environment is that of zone of proximal development, defined as distance between the actual developmental level as determined by independent problem-solving and level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers. Through a process of scaffolding, a learner can be extended beyond the limitations of physical maturation to the extent that the development process lags behind the e-learning process (Vygotsky, 1978). The major theme of Vygotsky's theoretical framework is that social interaction plays a fundamental role in development of cognition. Every function in the child's cultural development appears twice: First, on social level, and later, on the individual level; first, between people (inter-psychological) and then inside the child (intra-psychological). This applies equally to voluntary attention, to logical memory, and to formation of concepts. All

higher functions originate as actual relationships between individuals. A second aspect of Vygotsky's theory is the idea that the potential for cognitive development of learners depends upon the "zone of proximal development" (ZPD) (See Figure 1): A level of development attained when learners engage in social behavior. Full development of the ZPD depends upon full social interaction between learners in the e-learning environment. The range of skill that can be developed with adult guidance or peer collaboration exceeds what can be attained alone. Vygotsky's theory was an attempt to explain consciousness as the end product of socialization. For example, in learning of language, first utterances with peers or adults is for purpose of communication, but once mastered they become internalized and allow "inner speech". Vygotsky's focus was on cognitive development of learners in the learning environment.

Figure 1 explains Vygotsky's Social Development Theory (Source Vygotsky, 1978).

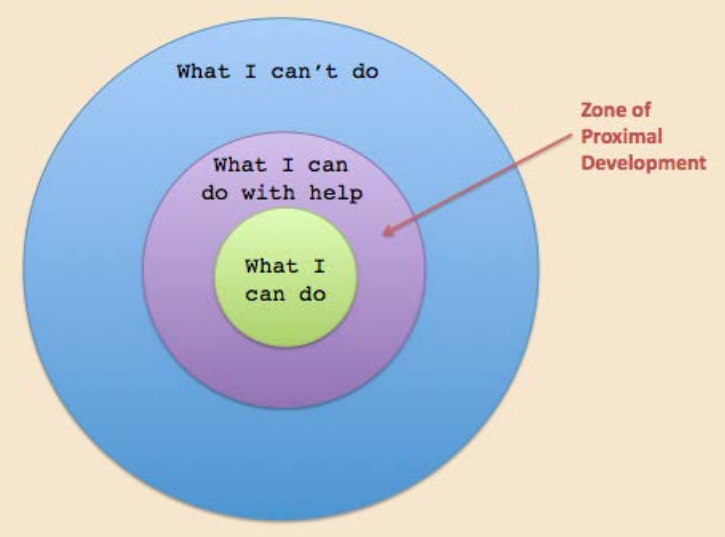

Fig. 1. Model of Vygotsky's Social Development Theory (Source Vygotsky, 1978)

Collaborative learning

Collaborative learning is a mode of learning supported by a set of activities realized by groups of learners for construction and sharing of knowledge through synchronous or asynchronous communication (chat, discussion forums, etc.) with presence of the online tutor. According to Henri and Lundgren CayrolIt, collaborative learning is an active initiative by which learners adopt for construction and sharing of their knowledge. Online tutor has a role of facilitator of learning while online groups of learners are an important source of knowledge, as agent of motivation, as means of mutual aid and mutual support of knowledge in a privileged environment of interaction for collective construction of knowledge. In

collaborative learning approach, learners collaborate in learning with group and group collaborates to those of learners (Henri and Cayrol, 2001).

In collaborative e-learning modality, tutor facilitates learning, supports groups of learners and intervenes to help learners in order to acquire knowledge, advises them, and contributes to the motivation of groups of learners. In the e-learning platform, online tutor has an important role to help learners in process of learning and adopting processes of communication with them according to the information and communication technologies used in the e-learning environment. The use of instructional technologies, in particular synchronous and asynchronous communication, promotes collaborative learning situation that supports the following points:

- Social interaction between learners privileges the contact between them and especially Feeling of membership of a group;
- Sharing knowledge helps in creating collaborative learning situations based communication in asynchronous mode (forums, etc.) or in synchronous mode (video conferencing, chat, etc.);

Social constructivist online course design

Objectivist conceptions of learning assume that knowledge can be transferred from instructors or transmitted by technologies and acquired by learners. Objectivist conceptions of instructional design include the analysis, representations of content and tasks in order to make them more predictably and reliably transmissible.

Social constructivist online course design, assume that knowledge is individually constructed and socially co-constructed by learners with their interpretations of experiences in the world (Jonassen, 1999). The model of designing constructivist e-learning environments engages learners in meaning making (knowledge construction).

In theory of design of the instruction, Jonassen, suggests that learning is guided by a problem (question, case study, project, etc.) in a constructivist learning environment for individual construction and social co-construction and sharing of knowledge (Duffy and Jonassen, 1992; Jonassen, 1991; Jonassen, 1995; Jonassen, 1996a; Jonassen, Campbell and Davidson, 1994; Jonassen, Peck and Wilson, 1998). David Jonassen (Jonassen, 1995, 1999) suggested a design of the e-learning environments which supports social interactions between learners in order to construct and share their knowledge with guiding learning by problem solving (question, case study, project, etc.) in social constructivist e-learning environment for acquisition and sharing of knowledge.

Design of the instruction which allows applying theory of Jonassen is described in following points:

- Choose a problem for learning (project, case study, etc.);
- Offer to learners some examples and similar case studies to project to guarantee cognitive flexibility (modeling);
- Offer to learners some information resources to select and to use for learning. The best information must be easily accessible;
- Offer cognitive tools for the representation of problems, modeling tools of knowledge;
- Offer learners tools of collaboration and conversation which support communication between communities of learning;
- Tools which support social context of communication between learners;

Jonassen's constructivist course design shows that knowledge is built individually and co-built socially by learners and based interpretations of their experiences.

Figure 2 shows clearly the model adopted for designing social constructivist online course design based Jonassen's constructivist design of the instruction. This design of the instruction is based essentially on problem solving and conversation between learners through synchronous and asynchronous online discussions to construct and share their knowledge for learning to affect communication and its social impact and also to make learning easy for learners and solve learning difficulties with a high cognitive legibility of learning resource and also help learners to find the information necessary for leaning through tools of online conversation.

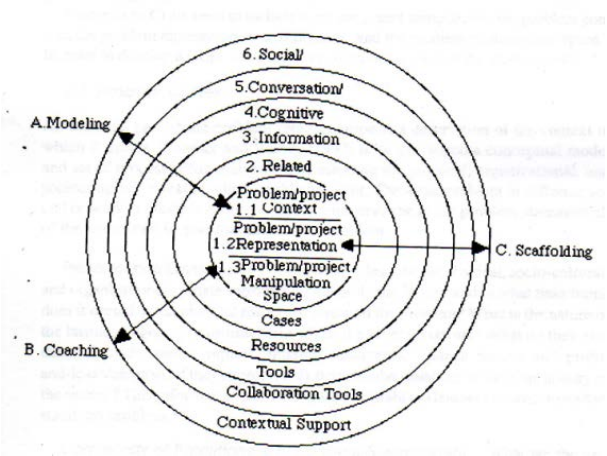

Fig. 2. Model of social constructivist learning design (Source Jonassen, 1999)

Model of the electronic learning process experimented in the e-learning platform

Figure 3 shows model adopted for designing social constructivist e-learning process. In this model, the e-learning process begin by a problem (Case study), similar information related to the problem, learning resource for presenting generalities of the online course, learning resource is based hypertext system (wiki) and online discussion through forum between learners for construction of knowledge in collaborative learning.

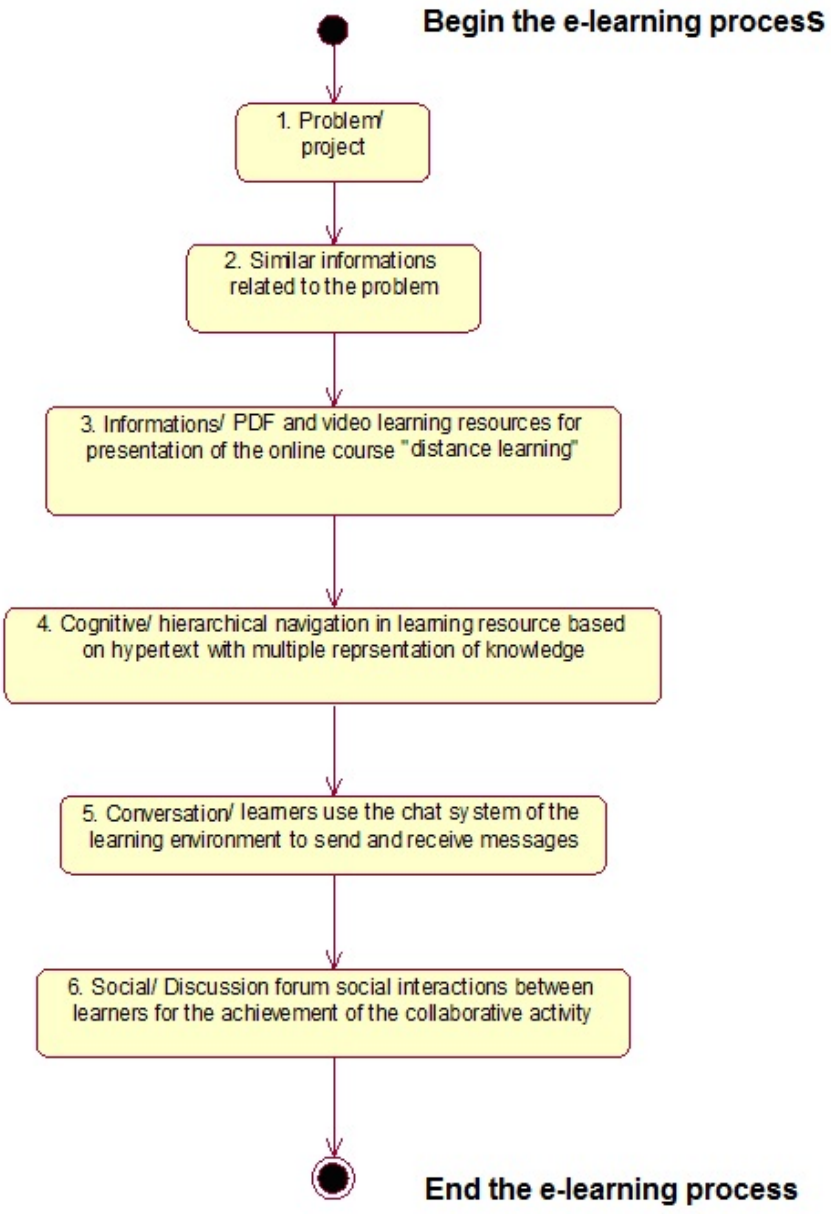

Fig.3. Model adopted for social constructivist online course design

Structure of the model of the e-learning process (design and theory)

Figure 4 shows that the model of the e-learning process is based integration between design of constructivist learning environment (Jonassen, 1991) and Vygotsky's social development theory (Vygotsky, 1978).

There is a distinction between learning theory and theory of design of the instruction. Indeed, learning theory is a manner of learning adopted by tutor, teacher or trainer for learners, but theory of design of the instruction is a manner which allows the instruction to have the best conception where learning will take place. Theory of design of the instruction is pulled from learning theory. Between learning theories we find, behaviorist, constructivist and socio-constructivist learning theories, etc.

In present study, we adopt a theoretical framework based design of constructivist learning environment for design of the instruction (Jonassen, 1999) and Vygotsky's social development theory (Vygotsky, 1978) for learning theory.

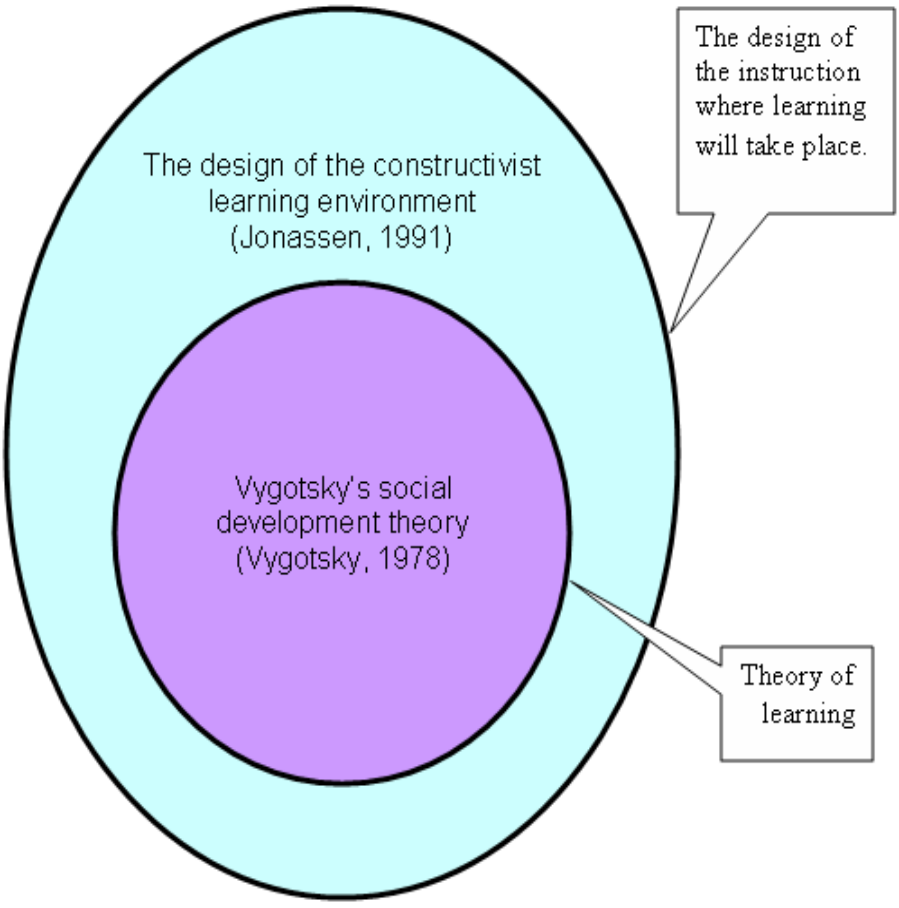

Fig.4. Model of social constructivist online course (design and theory*)*

Implementation of social constructivist online course design

The e-learning process is accessible at the web address (http://moodle.unimc.it). The web portal has been defined as an entry point to the Internet (Laudon and Traver 2008; Lewis 2002; Stair and Reynolds, 2008). The experimented e-learning process at Moodle e-learning platform is prepared by an instructor in order to teach the online course. Learners register automatically and access to the online course from the university or from any computer connected to the Internet.

Research Hypotheses

Hypothesis 1: There is no difference between the experimental group and control group at 0.05 alpha level in the achievement of learners after the experimental period.

Hypothesis 2: There is no difference between the experimental group and control group at 0.05 alpha level in the attitudes of learners toward using the experimented online courses.

Research method

Research methodology and objective of study

The choice of constructivist online course design favoring the effectiveness of learning of specific online course is a difficult task to realize by an instructor or an actor of distance learning, seen the variety of the e-learning processes, advantages and inconveniences of every e-learning process.

The objective of the present study is to explore the impact of the e-learning process based designing constructivist e-learning environment (Jonassen, 1991) and Vygotsky's social development theory (Vygotsky, 1978) on achievements and attitudes of lifelong learning learners in Taibah University.

In present research paper, researcher uses the experimental research based searching the impact of social constructivist e-learning process before and after its experimentation with lifelong learning learners in Saudi Arabian university taking into account that generally e-learning process used by instructor in Saudi Arabia are based individual behavioral learning.

Researchers completed the experimentation of socio-constructivist e-learning process based design of constructivist e-learning environment (Jonassen, 1999) and social development theory (Vygotsky, 1978) with a sample of learners containing an experimental group (30) learners and a control group (30) learners from the university lifelong learning class in Taibah University.

Results and discussions

Manner of choosing the experimental and control group

For the experimentation of the e-learning process based social constructivist e-learning environment, researchers divide sample of learners in two groups. The first group is an experimental group; second group is a control group. Approximately, the two groups are

similar in field of performance in using instructional technology. The achievement test is realized before the experimentation in order to divide sample in two similar groups from cognitive performance point of view.

Table number 1 shows results of the achievement test realized before the experimentation in order to divide sample in two groups taking into account performance of learners in achievement test. Number of learners in each scale "excellent", "very good", "good", "Average", "poor" is divided by 2 and one half of each scale is classified in the experimental group and the other half is classified in control group. The classification of each half in the experimental or control group is based random method.

Table 1 shows clearly each scale in the achievement test (Excellent, very good, good, Average, Poor).

Table 1 Results of the achievement test 1 realized before the experimentation

Scale	value	Frequency	Percent	Cumulative Percent
Excellent	1	14	23.3	23.3
Very good	2	12	20.0	43.3
Good	3	8	13.3	56.7
Average	4	16	26.7	83.3
poor	5	10	16.7	100.0
Total		60	100.0	

Result of the achievement test of the experimental group (group 1)

The figure number 8 present the histogram of the achievement test of the experimental group realized with new social constructivist learning course design.

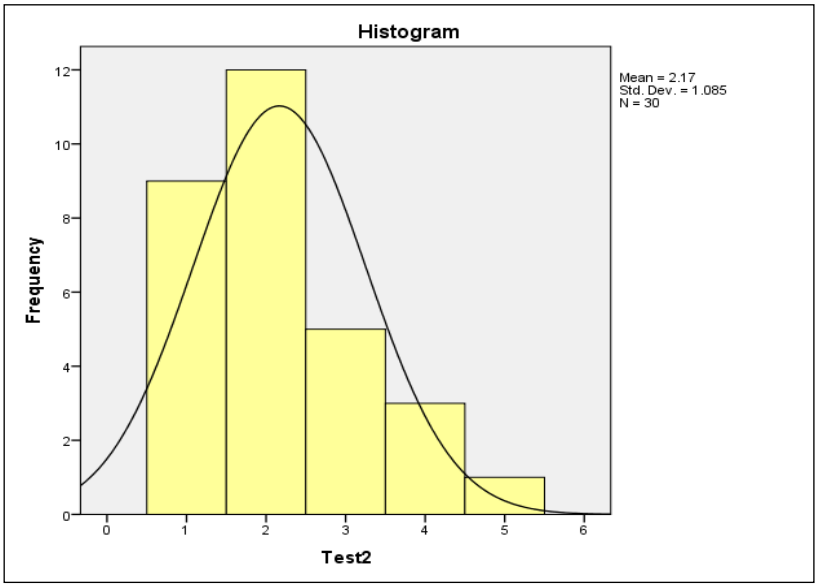

Fig. 7 Result of achievement test of the experimental group (group 1)

Result of the achievement test of control group (group 2)

Figure number 7 present the histogram of the achievement test of the control group realized with habitual e-learning process based on individual behaviorist learning course design.

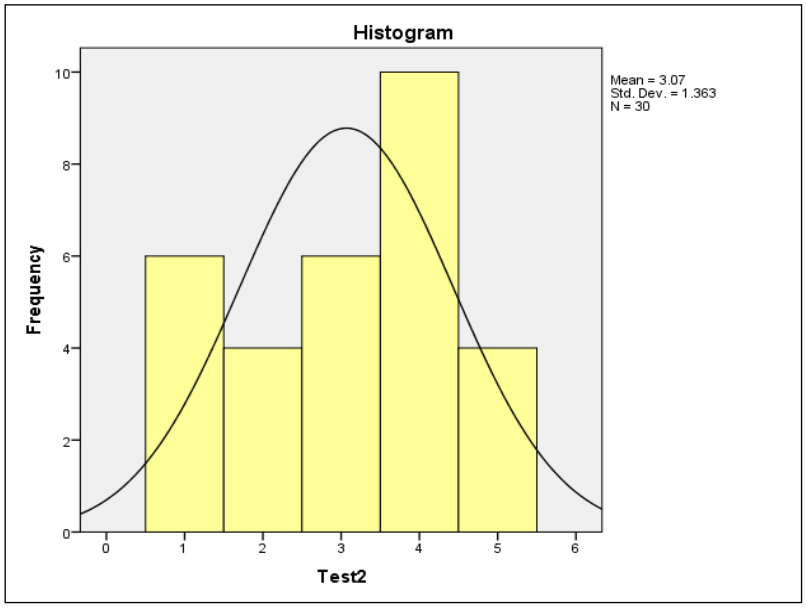

Fig. 8 Result of the achievement test of the control group (group 2)

Results of t-test for the equality of means in the achievement test

Table number 2 presents means of the experimental group and control group in the achievement test. Table 2 shows also standards deviations of two groups.

Table 2 Means of the experimental group and control group in the achievement test

	group	N	Mean	Std. Deviation	Std. Error Mean
Test 2 (Test realized after the experimental period).	Experimental group	30	2.17	1.085	.198
	Control group	30	3.07	1.363	.249

Table 2 shows means of the experimental group and control group in the achievement test. The interpretation of difference between two groups needs to calculate value of t-test for equality of means and to compare it to value of t-test of table.

Table 3 present value of t test for equality of means. The interpretation of t-test is presented also in Table 3.

Table 3 t-test for the equality of mean in the achievement test

	t-test for Equality of Means				
	Value of t- test	df	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
Equal variances assumed	***2.829***	58	.900	1.537	.263
Equal variances not assumed		55.234	.900	1.537	.263
Interpretation of t-test	**The hypotheses number 1 is rejected**				

Results of the attitudes of learners

Figure number 9 and figure number 10 show positive attitudes of learners of the experimental group compared to learners of control group. The difference between the two groups is for the interest of the experimental group toward using model of instruction based social constructivist online course design.

Table 4 present variables adopted for the evaluation of attitudes of learners toward using social constructivist online course design. Table 4 shows also items adopted for each variable. Table 4 present also value attributed for each items in each variable in the attitudes of learners toward using the experimented online courses , this value for each item (I agree strongly, I agree, Neutral, I disagree, I disagree strongly) is respectively (1, 2, 3, 4, 5). The sum of all values of items chosen for each variable is inserted in table of attitudes of learners toward using each experimented online course.

The same questionnaire of attitude of learners based Likert scale (Likert, 1932) is distributed to control group and the experimental group after the experimental period.

Table 4*:* Structure of questionnaire of the attitudes of learners

Variables	**N= 60**	
	Items	**Attributed value**
This e-learning process makes learning easy.	I agree strongly	1
	I agree	2
	Neutral	3
	I disagree	4
	I disagree strongly	5
This e-learning process solve learning difficulties	I agree strongly	1
	I agree	2
	Neutral	3
	I disagree	4
	I disagree strongly	5
This e-learning process provide a visual legibility of learning resources.	I agree strongly	1
	I agree	2
	Neutral	3
	I disagree	4
	I disagree strongly	5
This e-learning process provides a cognitive legibility of learning resources .	I agree strongly	1
	I agree	2
	Neutral	3
	I disagree	4
	I disagree strongly	5
The time of achievement of activity is sufficient.	I agree strongly	1
	I agree	2
	Neutral	3
	I disagree	4
	I disagree strongly	5
Research of the information is easy.	I agree strongly	1
	I agree	2

	Sort of	3
	I disagree	4
	I disagree strongly	5

Result of attitude of learners of control group (group 2)

Figure number 9 present results of the attitudes of learners of control group toward using the online course design based habitual behavioral learning theory. Graph 9 shows different values of attitudes of learners of control group. These values are sum of the different values attributed to the items (I agree strongly, I agree, Neutral, I disagree, I disagree strongly) chosen by learners for each variable in the attitude.

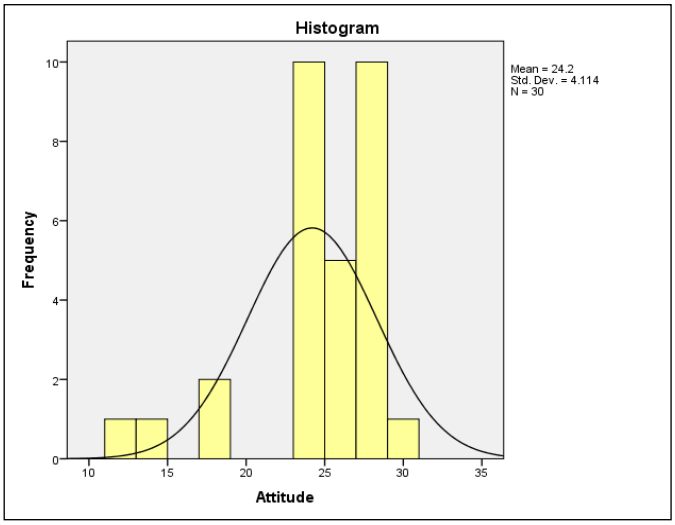

Fig. 9 Result of the attitude of learners of control group (group 2)

Result of the attitude of learners of the experimental group (group 1)

Figure number 10 present results of the attitudes of learners of the experimental group taught with an online course based social constructivist online course design. Graph 10 shows different values of attitudes of learners of experimental group. These values are the sum of different values attributed to the items (I agree strongly, I agree, Neutral, I disagree, I disagree strongly) chosen by learner for each variable in the attitudes.

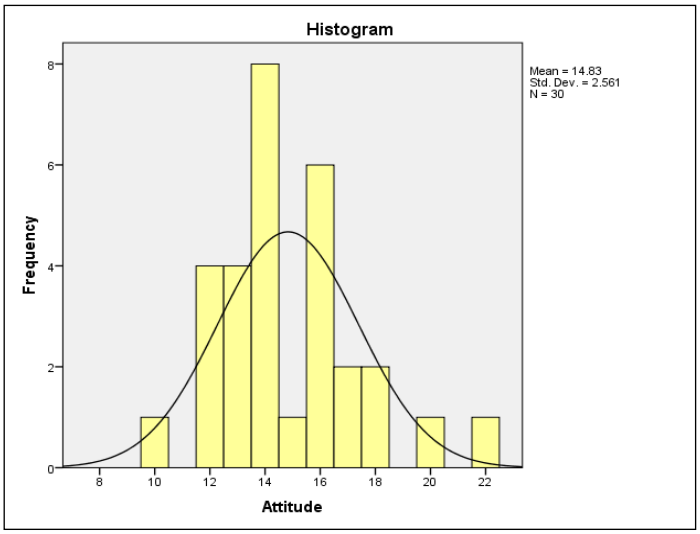

Fig. 10 Result of the attitude of the experimental group (group 1)

Means of the experimental group and control group in the attitudes of earners

Table number 5 presents means of the experimental group and control group in the attitudes of learners toward each online course design and also standard deviation of each group.

Table 5 mean of group statistics

	group	N	Mean	Std. Deviation	Std. Error Mean
Attitude	Experimental group	30	14.83	2.561	.468
	Control group	30	24.20	4.114	.751

T-test for the equality of mean in the attitude of learners toward online courses design

Table number 6 presents t-test value of equality of means in the attitudes of learners of the experimental group and control group. The interpretation of the equality of means in the attitudes of learners is presented also in table 6.

Table 6 t-test for the equality of mean in the attitudes of learners

	t-test for Equality of Means				
	t-test value	df	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
Equal variances assumed		58	9.367	7.596	11.138
Equal variances not assumed	***10.587***	48.539	9.367	7.588	11.145
Interpretation of t-test	**The hypotheses number 2 is rejected**				

Discussions

Results of achievement test realized after the experimented e-learning processes show that mean of the experimental group is 2.17 and mean of control group is 3.07 (see table 2). The difference between mean of the experimental group and control group is clear from table 2 and shows that mean of control group is superior than mean of the experimental group. This difference will be explained in the next paragraph by the value of t-test.

The value of t-test calculated for the equality of mean in the achievement test is 2.829 and superior than value of t-test of table (2.00) (see table 3). This result means that the hypotheses number 1 is rejected and then exist a difference between the experimental group and control group at 0.05 alpha level in the achievement test of learners after the experimental period.

Figure 7 shows performance of learners of the experimental group in the achievement test compared to learners of control group. The difference between the two groups is for the interest of the experimental group learnt with an online course based social constructivist online course design.

Results of attitudes of learners of the experimental and control group realized before the experimental process showed that mean of control group is 14.83 and mean of the experimental group is 24.20 (see table 5). To interpret the difference between mean of the experimental group and control group, we use value of t-test. The value of t-test calculated for the equality of mean in attitudes of learners is 10.587 and higher than value of t-test of table (2.00) (see table 6). This result shows that the hypothesis number 2 is rejected and then exist difference between the experimental group and control group at 0.05 alpha level in the attitudes of learners after the experimental period to positive orientation to use design of social constructivist learning environment in online teaching and learning. .

Results of present experimental research show that the e-learning process based designing social constructivist e-learning environment is effective for lifelong learning learners. Results of the achievement test and attitudes of learners of the experimental group are characterized by a high cognitive performance compared to results of control group. The design of social constructivist learning environment has an impact on the achievement test and the attitudes of learners to the use of designing social constructivist e-learning environment. Collaborative e-learning modality based constructivist e-learning environment and Vygotsky's social development theory facilitates learning for a majority of learners of the experimental group compared to control group taught with individual behavioral e-learning process without any interaction between online learners and without problem solving.

These results show clearly that collaborative learning based design of constructivist learning environment and Vygotsky's social development theory favors the achievement test and the attitudes of learners. This is an advantage of collaborative learning based design of constructivist learning environment (Jonassen, 1995), and Vygotsky's social development theory (Vygotsky, 1978). We believe that this advantage is triggered by the important role of the online tutor and also triggered by the important role of social interactions between learners through discussion forum in order to make learning easy for online learners.

The concept of collaborative learning, grouping and pairing of learners for purpose of achieving an academic goal has been widely researched and advocated throughout professional literature. The term "collaborative learning" refers to an instructional method in which learners at various performance levels work together in groups toward a common goal. Learners are responsible for one another's learning as well as their own. Thus, success of one student helps other learners to be successful. Collaborative learning approach promotes problem solving (problems linked to use of features of the e-learning platform, problems linked navigation in the learning process and the learning resources, solving information and communication difficulties, etc.). Results show that learners need social collaboration to answer their questions for problem solving.

These results show also that the advances in technology and changes in the organizational infrastructure put an increased emphasis on teamwork within workforce. Learners need to be able to think creatively, solve problems, and make decisions as a team. These results support research of Janassen in designing constructivist learning environment (Jonassen, 1995, 1999) and Vygotsky's social development theory (Vygotsky, 1978). Therefore, development and enhancement of critical-thinking skills through collaborative learning and social interactions between learners is one of the primary goals of educational technology.

Present research paper was designed to study the effectiveness of collaborative learning as it relates to learning outcomes at the faculty level, for lifelong learning learners in e-learning course and result shows that learning difficulties are solved for majority of learners with the social interactions between them.

Socio-constructivism learning theory is based important role of social interactions for the effectiveness of learning and also sharing of knowledge between learners for collaborative construction of knowledge. These results are in accordance with the ideas of Vygotski in social development theory (Vygotsky, 1978) and design of the instruction suggested by jonassen in designing constructivist learning environment (Jonassen, 1995, 1999) which allows making more understandable learning resources from cognitive point of view and triggered by social interactions between learners.

Results show that the experimented learning process based on the interactions between learners (Vygotski, 1978) and designing constructivist learning environment (Jonassen, 1995, 1999) help online learners to find easily researched information utile for learning.

Proponents of collaborative learning claim that the active exchange of ideas within groups not only increases interest among participants, but also promotes critical thinking. According to (Johnson and Johnson, 1986), there is persuasive evidence that cooperative teams retain

information longer than learners who work quietly as individuals. The shared learning gives learners an opportunity to engage in discussion, take responsibility for their own learning, and thus become critical thinkers and to find easily researched information (Totten, Sills, Digby, & Russ, 1991).

Results show that the electronic learning process based designing social constructivist learning environment (Jonassen, 1991) and Vygotsky's social development theory (Vygotsky, 1978) has an impact of cognitive performance on learning and teaching the online course. The lifelong learning learners of experimental group showed that they are cognitively successful in e-learning process based designing social constructivism learning environment.

Conclusion and implications

In present research, it can be concluded that collaborative learning based design of instruction suggested by Jonassen (Jonassen, 1991) and theory suggested by Vygotsky (Vygostky, 1978) fosters the improvement of knowledge construction by learners through discussion, social interaction, clarification of ideas, and evaluation of other learners' ideas. However, collaborative method of instruction was found to be effective in gaining factual knowledge. Therefore, if the purpose of instruction is to enhance problem- solving skills, then collaborative learning is more beneficial.

For collaborative learning to be effective, the instructor must view teaching as a process of developing and enhancing learners' ability to learn. The instructor's role is not to transmit information, but to serve as a facilitator for learning. This involves creating and managing meaningful learning experiences and stimulating learners' thinking through real world problems. The advent of e-learning changed the e-learning process with the interactive tools offered by the e-learning environment such us discussion forums, chat, etc. The interactive learning process encouraged active participation of learners in construction of knowledge and helped in better understanding of the e-learning content. Further, the exchange of ideas and views during social electronic learning process and social interactions is effective for learning and co-construction of knowledge. Online discussions have the potential for being effective seminars and forums for collaborative learning; however, they are not always designed that way. Online courses offer the opportunity for a much deeper and richer engagement with materials, but social aspects of group dynamics need to be taken into account for greater effectiveness.

We should not forget the added value of the online tutor in the e-learning process. We think that tutor function is strongly bound to devices in which it is implanted. We noticed that

the quality of the mediation made by online tutor in context of e-learning has an added value on the e-learning effectiveness and favors the ease of learning allowing tutor to have the role of a facilitator of learning. Tutoring function required from online tutor some attitudes towards online learner, and the implementation of a directory of new skills. Tutor plays an active role in development of the e-learning device, as well as in the e-learning process of learners through constructivist learning approach.

Future research studies need to investigate the effect of different variables in collaborative e-learning process. Group composition: Heterogeneous versus homogeneous, group selection and size, structure of collaborative learning, amount of instructor intervention in group learning process, differences in preference for collaborative learning associated with gender and ethnicity, and differences in preference and possibly effectiveness due to different learning styles, all merit investigation. Also, a psycho- analysis of group discussions will reveal useful information.

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