

Original Research Article

Application of constructivist curricula in higher education in Iran

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Abstract

Constructivism is a learning theory describing the process of knowledge construction; Knowledge construction is an active, rather than a passive process. Given the importance of this approach in education, especially higher education, the purpose of the present study is to evaluate the degree of constructivist curriculum application at Shiraz University. The results indicated that from the standpoint of higher education students, their classes are 3.11 regarding content and it is above theoretical mean 3 and this difference is significant at 0.01 levels. Therefore, it is above the criterion mean. The factor of evaluation is 2.90 and lower than theoretical mean 3 and significant at 0.01 levels, so it is lower than criterion level; however, the factors of objective and learning strategies didn't show a significant difference with theoretical mean, therefore it is at criterion level.

Keywords: Constructivism, Content, Evaluation, Goal, Higher education, Strategies teaching and learning

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INTRODUCTION

Constructivist approach is a psychological approach based on genetic epistemologies that were developed by Jean Piaget in 1967. This approach has attracted wide attention among practitioners in the West, particularly in the fields of Mathematics and Science education (Steffe and Gale, 1995; Von Glasersfeld, 2008). In the last few decades, constructivism has emerged as a leading educational approach. More emphasis is needed to develop student skills necessary to becoming eager and effective lifelong learners and to concentrate on increasing student confidence in his/her own critical thinking skills. According to this philosophy, teachers are guides and facilitators and cannot do the learning for the student. Hence, the current traditional lecture-based style of education is ineffective and can increase the chance of misconceptions occurring in our students (Kang and et al, 2010). In other words the constructive process of learning is considered an inquiry process that is student-centered. The learner constantly is referencing new knowledge to

prior experiences to either build upon what he already knows or to modify existing knowledge. Actively processing information involves examining new information, organizing the information and comparing interpretations with others, all the while trusting that the new knowledge is worth the effort of integration. For students to be able to compare their interpretations to their peers, they must first be able to express their understanding of the information. This articulation process alone helps the student to organize and evaluate his understanding (Cramer ,2012). On the other hand Higher education is considered to be the apex in all educational endeavors. It is imparted by universities and other institutions of higher education and research. It embraces teaching and learning for the promotion of scholarship faculties and research attitude among students. "It mainly focuses on knowledge creation and its dissemination. Apparently, teaching, learning and research are considered to be the core activities in higher

education. Besides, there are some associated activities which seem to augment the outcomes and effectiveness of higher education. Such activities include instruction and instructional mechanism, learning activities, campus environment and infrastructure, innovations and interventions etc (Hussain and Reza, 2010). According to Hussain and Sultan (2010) university [higher] education aims at developing skills and competencies among students to live and work in 21st century. Therefore, a university teacher should involve students in learning process through activities aiming to inculcate academic and social skills among them. They would become capable of interpreting their knowledge according to situation(s) by making their own meaning of it. It would be broadening their vision and wisdom leading towards developing new knowledge” (Hussain, 2012, p. 179).

“The constructivist theory to teaching and learning has been broadly addressed in a number of researches in mathematics education (Katic, Hmelo-Silver and Weber, 2009; Steele, 1995). According to this theory, students do not just passively receive information but constantly create new knowledge based on prior knowledge in conjunction with new experiences” (Thenjiwe and Boitumelo, 2012, p.140). As opposed to the traditional approaches where students learn by copying “word for word” what teachers say, constructivism has shifted to a more radical conception of teaching and learning whereby learners’ fresh ideas are brought to class, acknowledged, and enhanced through a variety of teaching and learning techniques that actively engage them. Critical thinking, problem solving approach and analytical skills are assumed to be the essential constructs of higher education graduates, and a constructivist learning environment (CLE) is a technology-rich, open place where a learner can use a variety of tools and information resources in his pursuit of learning goals and problem-solving activities (Li, 2001). A number of studies have shown the effectiveness of the constructivist approach in teaching and learning in contrast to the traditional drilling and reciting approach. (O’Neill,2010; Vereijken and etal, 2013) to help students in acquiring knowledge through activities. Students’ involvement results in their effective learning. Johnson and Johnson (1999) stated that effective learning takes place through one’s personal involvement in learning experience and Can be constructive and promote more effective group learning(Roberts, 2004). “It requires them to work in groups and interact in social settings based on the principle of Vygotsky’s social constructivism. Vygotsky (1994) believed in social constructivism and asserted that social interaction among learners spurred the construction of new ideas and enhanced their intellectual development. Nonetheless to say that intellectual development and creation of ideas is associated with Bruners’ (1960) pedagogies. Bruners’ pedagogies included activity-based and hands-on instruction in which students were expected to use their

own direct experiences and observations to acquire information and to solve problems scientifically” (Hussain, 2012, p.180). Another study by (Ramnath and Sivakumar, 2011) performed that to investigate the role of constructivism in learning, and classroom teachers properties have been investigated in this context. It suggests learning is a search for meaning and have reached the conclusion that this approach, different aspects of training including learning, learner autonomy, teaching methods, learning activities and level thinking is influenced. A study was conducted by Santmire, Giraud, and Grosskopf (1999) and compared learning achievement of two groups of elementary school students. The researchers found that the students who learned through social-constructivist approach to education and took a standardized test secured higher grades than their counterparts who were instructed traditionally in the classroom. The students’ participation in such projects enhanced their academic performance as well. Constructivism involves students and they participate actively in teaching learning process through different activities. Therefore, active participation of students (constructivism) was affirmed to be an efficient instructional approach for creating and sustaining motivation and passion for knowledge construction (Hussain, 2012).

Constructivism and teaching

To consider the question “How should we teach?” in a manner consistent with constructivism means that we must find mechanisms to teach that explicitly address students’ active construction of their own knowledge. We must recognize that learners bring conceptions into the classroom and construct even more during their educational experience (Fosnot, 2005). Constructivist pedagogy began to be formulated and major reform began taking place. Classrooms soon became workshops, with teachers as facilitators, rather than transmitters of knowledge. The role of questioning, disequilibrium, learners paraphrasing each other and discussing ideas in learning communities, the importance of think time and pair talk, and the role of problem-solving and inquiry all began to be descriptive of the “new” classroom (Fosnot, 2005; B). This educational model is student-driven and requires the student to self-organize and generate his/her own hypotheses. Students should also be able to test, defend, and discuss the research question or the patient case at hand. In essence, the instructor must never do the learning for the student (Batchelor, 2007) Teachers should de center themselves so that they no longer function as the arbiter of right or wrong. Instead, there needs to be allowance for the students to critically and from actions and students’ reflections of them. Although the purpose here is not to give a tutorial in constructivism, as there are many good

texts that give a solid foundation to the interested reader (Fosnot, 2005; Steffe, 1999; von Glasersfeld, 1995) a brief overview of constructivism is appropriate. The fundamental tenet of constructivism is that learners try to make sense of their world by construction of cognitive schemata that can guide their actions in the world. These schemata are constructed using current understandings as building blocks. As such, students in our classrooms try to make sense of their experiences in the classroom, and they base their constructions on their previous understanding of the material. Knowledge does not exist outside a student's mind.

Constructivism and learning

Usually associated with Jean Piaget, a cognitive psychologist, the theory of *constructivism* is: "One that construes learning as an interpretive, recursive, nonlinear building process by active learners interacting with their surroundings- the physical and social world.

"Although educators now commonly talk about a "constructivist-based" practice as if there is such a thing, in reality constructivism is not a theory of teaching; it is a theory about learning. In fact, as we shift our teaching towards trying to support cognitive construction, the field of education has been left without well-articulated theories of teaching. Reformed practice has been attacked as fuzzy and relative. Major questions loom around what should be taught, how we should teach, and how best to educate teachers for this paradigmatic shift. The problem is that reform-based pedagogical strategies can be used without the desired learning necessarily resulting. This is because constructivism is a theory of learning, not a theory of teaching, and many educators who attempt to use such pedagogical strategies confuse discovery learning and "hands-on" approaches with constructivism "(Fosnot, 2005,B,p.5).

In other words, knowledge is actively constructed by the learner and not merely (passively) received from an outside source. Although there are still gaps in our understanding of this process, some form of constructivism is at the heart of successful learning theories and is well-supported by empirical evidence (Tobias, 2009) Piaget analogized knowledge to the biologist view of evolution; "knowledge is not more or less a representation of external things, situations, and events, but rather a mapping of action and concepts that have proven viable in a subject's experience." He continues to say that what we see, hear, and feel in our sensory world is the result of our own perceptual activities and therefore specific to our way of perceiving and conceiving. In general it must be said use of constructivist approach in education has direct effects on students learning. They are active stake holders in the process of knowledge construction and its dissemination.

They participate in teaching learning process and assume responsibility of their learning by giving it their own meaning in their respective contexts. Constructivism offers students opportunities of cooperative and collaborative learning.

Elements of Constructivist curriculum in higher education

Constructivist principles are being applied to a variety of efforts creating a range of models from single assignments to courses with practical to extended programs and institutes that are completely reorganized to facilitate learners constructing their own knowledge. Despite the range of structures of experiences, there are patterns that emerged providing specific elements that are common among constructivist efforts (Dangel, 2011). Elements examined in this study; goal, content, teaching-learning strategies and evaluation

These features are extracted based on interviews with experts and theoretical literature as follows:

Goal

The constructivist curriculum aimed at an ever more important that learning should be collaborative because then that deep learning takes place. As constructivist pedagogy emphasizes a learner-centered approach, it also emphasizes discourse and collaboration. This requires social interaction on the part of learners, assuming that active learning and discourse are more likely to produce connections between new concepts and prior knowledge, which in turn leads to a deeper understanding of the topic at hand (Jadallah, 1996). Collaborative learning groups provide contexts and processes for developing positive social skills such as being able to rationally justify an idea or solution to one's peers and to listen critically yet respectfully to the opinions and perspectives of others, and to develop networks of peers that allow connections to be made with other people in a shared experience.

Content

Significant in determining what content is on interaction teachers and students, many constructivist higher education programs promote learner-centered instruction because of their understanding that learning is maximized by educational settings that take student interest and ownership into account, sharing intellectual control with teacher-learners. Topics and pacing of teacher activities are made as part of a collaborative, democratic process in which the teacher educator becomes more of a facilitator or coach in the learning

process. A constructivist teacher educator finds ways to structure the classroom environment so that teacher-learner input and feedback about course logistics (scheduling, assignments), content, and their own evaluation is valued and has a real impact. Faculty also work hard to assess teacher-learners' prior knowledge and understandings throughout instruction in order to help them develop a deeper, richer conception of the topic. These ideas emerge from the many references to student autonomy in program descriptions.

Teaching and learning strategies

In this element, creative thinking and problem-solving ability is important. This element emerges from the way a constructivist teacher education program views the role of the teacher. In many constructivist programs, the teacher is viewed as a creator of problem-solving situations, a poser or solicitor of problems that students see as real and important to them. Teacher educators structure learning experiences around the big ideas of the curriculum, making sure those concepts are taught in a context relevant and significant to teacher-learners. These learning experiences are designed to promote cognitive dissonance, leading learners to examine and possibly restructure their understanding of the topic at hand. Effective problem-solving experiences offer open-ended questions that allow for multiple solutions, foster group collaboration, and require active student involvement in the development of solution strategies.

Evaluation

Evaluation of student learning is of two types: formative and summative. Formative evaluation occurs during learning and provides feedback to the student. It includes evaluations of ongoing portfolios, and demonstrations of work in progress. Student collaboration also provides a form of formative evaluation. For example, students report to each other periodically on their research. In knowledge-building classrooms, students can read and comment on each other's work. Formative evaluation rarely occurs in classrooms. Summative evaluation occurs through tests and essays at the end of a unit of study. Summative evaluation provides little specific feedback. From a constructivist perspective, formative evaluation is more valuable to the learner. On this basis, what is important in the evaluation of constructivist curriculum, the outgrowth of the constructivist viewpoint that learning is an active and reflective process is the notion that assessment strategies should be integral and ongoing parts of the professional growth plan, rather than just evaluative and at the end of the course of study. Benchmarks, capstones, and professional portfolios are evident in several constructivist teacher education

programs as techniques that provide opportunities for both formative and summative evaluation and which allow a large degree of student input and creativity. Teacher-learners work collaboratively and receive non-graded feedback from the instructor(s), making the feedback a part of the teaching and learning process. Teacher-learners are encouraged to take an active role in assessment, including negotiating assessment processes, self-assessing growth, participating in conferences, and learning from successes and struggles. To facilitate ongoing and continuous assessment, constructivist efforts often utilize flexible grading systems, for example using "in-progress" grades.

METHOD

The method of the present study: it is a combination of consecutive exploratory type. In order to conduct different parts of the study, two appropriate quantitative and qualitative approaches were applied; in the first part, while analyzing documents, the qualitative interview instrument was used to make the data consistent, in the quantitative part the questionnaire was also used. The statistical population of the current study was higher education students (MA and PhD) from four departments of Shiraz University (including departments of educational sciences and psychology, literature and humanistic sciences, law and political sciences as well as economy, management and social sciences) which are composed of 1362 individuals who are studying now. According to that, the sample under study is 302 individuals that 232 Questionnaires were returned. In the first part of current study through applying theoretical literature and interviewing with 8 experts in this area the questionnaire was made, and then it was distributed among higher education students.

This study was designed to answer the questions:

1. To what extents has the curriculum goal of higher education courses at Shiraz University been codified according to constructivist approach?
2. To what extents has the curriculum content of higher education courses at Shiraz University been codified according to constructivist approach?
3. To what extents has the curriculum teaching- learning strategy of higher education courses at Shiraz University been codified according to constructivist approach?
4. To what extents has the curriculum evaluation of higher education courses at Shiraz University been codified according to constructivist approach?

RESULTS

The first to fourth questions of the current research aimed to assess the degree of constructivist curriculum factors application at Shiraz University which is given in table 1 below.

Table 1. Degree of constructivist curriculum factors

Elements	Sample	Mean	SD	t	df	Sig
goal	232	3.08	0.91	1.35	231	0.17
content	232	3.11	0.72	2.44	231	0.01
teaching- learning strategy	232	3	0.75	0.10	231	0.91
evaluation	232	2.90	0.62	-	231	0.01
				2.43		
total	232	3.05	0.66	1.25	231	0.20

According to the table the factor of content with the mean of 3.11 is above theoretical mean 3 and there was a significant difference at 0.01. Therefore it is above criterion level. The evaluation factor with the mean of 2.90 is lower than theoretical mean 3 and it was achieved significant at 0.01 levels. So it is below the criterion level. However the factors of objective and learning strategies didn't show a significant difference with theoretical mean, therefore they are at criterion level.

CONCLUSION

Investigating the status of curriculum in higher education is considered one of the most important issues. In fact the curriculum is assumed as the heart of educational system which is the most important instrument and factor in reaching general goals and missions of educational system too. From the one hand the application of new approaches in educational system seems more necessary than before (Fathi Vajargah, 2007).Therefore, the study has established its objective on investigating the degree of constructivist curriculum factors application as a new approach in educational system at Shiraz University.

Considering the collected results from the questionnaires' data it can be stated that regarding the first question: to what extent have the objectives of curriculum in higher education courses been codified according to constructivist approach? From the viewpoint of higher education students at Shiraz University regarding to the factor of objective in constructivist curriculum which include issues such as creating deep learning, creating opportunity for thinking, attending to critical thinking development, their classes are constructivist. Regarding to the second research question: to what extent has the curriculum content of higher education courses been codified according to constructivist approach? The students believe that there are issues, such as utilizing original sources of each lesson, the number of sources, regarding this factor in their classes too, so their classes are ultimately constructivist. The third question of the study: to what extent have learning-teaching strategies of higher education courses been codified according to

constructivist approach? The results imply that from the viewpoint of higher education students, their lessons regarding factors are constructivist regarding issues such as utilizing creative methods, encouraging grouping activities, and active participation of the students. Regarding these factors of curriculum, the present study is apposite to the studies conducted in educational system. Mansoori et.al (2012), through doing a research in higher education, achieved the same results; and it is along with the studies by Owrangi (2003), Nik Neshan et.al (2010), Sha'bani Varaki and Gholi Zade (2006); in other words, they are opposite to the present study and they believe that the professors don't use modern approaches and creative teaching methods. Perhaps one of the reasons of such disagreement can be found in employing younger professors in faculties.

Further, holding various workshops for the professors can be another reason which emphasizes on opposite approaches of lecture teaching method which shows itself more today. Besides, the above mentioned studies drew their attention to higher education in all levels while the present study focused on higher education courses which can be one of the reasons of the difference in the results; since the professors of higher education are considered one of the most outstanding professors. Moreover, higher education courses, due to the shortage of students, more educational space, the importance of research and students' participation in learning and also being conversation-based in some areas are among other reasons which can explain the difference of the current study with others

Regarding to the forth question: to what extent have evaluation methods of higher education courses been codified according to constructivist approach? The results of data analysis imply that on the contrary to other factors stated before the factor of evaluation is not constructivist from the viewpoint of students and this belief is higher in PhD students than MA ones. The most important of not being constructivist on the part of evaluation factor is the professors who are results-oriented and don't attend to the process and administer their examinations solely on final forms. It is possible for most professors in higher education to not to administer their examination in multiple choice format. But other important issues, like formative evaluation and taking class research into

account don't attend to asking questions in teaching process and asking questions in the class is more for catching students red-handed and scoring rather than exploring teaching drawbacks and improving learning.

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