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Constructivist vs. objectivist learning environments

Yapılandırmacı ve nesnelci öğrenme ortamları

Ali Rahimi[1]

Nabi.A Ebrahimi[2]

Abstract
This study aims to compare objectivism and constructivism based on the learning environments they create, especially to present the deficiencies caused by adhering to objectivism and the benefits brought about by constructivism. Objectivist learning environments bring about, among other things, teacher-centeredness, emphasis on textbooks, lack of students thinking, and lack of attention to students' interest and preferences. However, constructivist learning environments emphasize deep understanding, learner-centeredness, and students' responsibility and initiative.

Keywords: objectivism, constructivism, learning environment

Özet
Bu çalışmada nesnelci ve yapılandırmacı öğrenim ortamları incelenmekte ve bunu yaparken de özellikle ikisi arasındaki farklar nesnelciliğin eksiklikleri üzerinde durularak ortaya konulmaktadır. Nesnelci öğrenme ortamları öğretmen merkezli, ders kitaplarına dayalı, öğrencinin düşünmesine odaklanmayan, öğrencilerin ilgi ve tercihlerine dikkat etmeyen bir görüşün sonucudur. Buna karşın, yapılandırmacı öğrenme ortamları derinlemesine anlamayı, öğrenci merkezliliği ve öğrencilerin sorumluluk ve inisiyatif almasını vurgulamaktadır.

Anahtar sözcükler: Nesnelcilik, yapılandırmacılık, öğrenme ortamı

Introduction

Fraser (1994, 1998) defines learning environments as both social and psychological in nature, and believes that they are 'determinants' of learning. Such a definition embraces a vast array of hidden and unhidden aspects of a learning process as well as the most important ones or 'determinants' of learning. Such a definition leads not only to the significance of learning environments researches but also to the comprehensiveness of such studies. In other words, the picture such studies present of any educational setting is hardly obtainable through other approaches with such a thoroughness and quickness.

[1] Email: rahimijah@yahoo.com, address: Iran, Isfahan Province, Kashan, Ravand, University of Kashan
[2] Email: nabi.ebrahimi@yahoo.com, address: Iran, Fars Province, Arsanjan, Islamic Azad University (Arsanjan Branch)

On the other hand, the way learning is defined affects all aspects of the learning process including learning environment. Constructivist epistemology in practice will lead to constructivist learning environments while objectivist views will lead to the creation of objectivist learning environments. Comparing objectivism and constructivism according to the learning environments they create gives us a more holistic picture of merits or demerits of these approaches. In addition, such a comparison shows how important the epistemology a teacher or an educator adopts or believes to is and how a simple assumption affects a range of factors which form 'determinants' of learning.

The paper is presented as following. First, the major philosophical assumptions of the two paradigms (i.e., objectivism and constructivism) are discussed. Then the major characteristics of (the most) objectivist and (the most) constructivist learning environments are put forward. Some guiding principles of constructivism form the last part of this paper.

Objectivism

For several years, the field of education has been dominated by objectivism. A large number of the traditional approaches to learning and teaching that are based on behavioristic and cognitive theories, share philosophical assumptions that are fundamental in objectivism (Vrasidas, 2000). Lakoff (1987, p.158) argues that objectivism is "one version of basic realism according to which reality exists independent of human mind". According to Jonassen (1991) and Lakoff (1987), the major assumptions of objectivism include: (I) There is a real world composing of entities structured based on their properties and relations. Categorization of these entities is based on their properties. (II) The real world is fully and correctly structured so that it can be modeled. (III) Symbols are representations of reality and can only be meaningful to the degree that they match reality. (IV) Human thought is symbol-manipulation and it is independent of the human organism. (V) The meaning of the world exists objectively, independent of the human mind and it is external to the knower. (VI) The human mind processes abstract symbols in a computer-like fashion so that it reflects nature.

An objectivist educator believes that there is one *true* and *correct* reality, which can be known to humans by using the objective methods of science. By studying the world we can identify its structure and entities as well as their properties and relations. We can then represent the world by using theoretical models and abstract symbols. These models and abstract symbols can then be mapped on the learners' minds. The learner's thought processes will manipulate those abstract symbols and they will come to know the world only when their minds mirror reality. As Lakoff (1987, p.163) puts it "knowledge consists in correctly conceptualizing and categorizing things in the world and grasping the objective connections among those things and those categories".

Knowledge and learning are achieved when the abstract symbols that the learner came to know match the one and only real world. Any topic has only one correct way of understanding. Learning is plainly defined as change in behavior and/or change in the learner's cognitive structures. Therefore, objectivist educators believe that instruction should be planned to effectively transfer the objective knowledge in the learner.

Constructivism

From this perspective, everyone constructs his own understanding of the world in which he lives. The basic and the most fundamental assumption of constructivism is that knowledge is not independent of the learner, it is constructed. Among the most prominent philosophers and educators associated with constructivism are Piaget (1970), Blumer (1969), Kuhn (1996), von Glasersfeld (1989), and Vygotsky (1978). Putting together Cobb (1994), Jonassen (1991) and Philips (1995), one can summarize the major philosophical and epistemological assumptions of constructivism as following. (I) There is a real world that puts boundaries to what we can experience. However, reality is local and there are multiple realities. (II) The mind creates symbols by perceiving and interpreting the world. (III) The structure of the world is created in the mind through interaction with the world and is based on interpretation. (IV) Meaning is a result of an interpretive process and it depends on the knowers' experiences and understanding. Symbols are products of culture and they are used to construct reality. (V) Human

thought is imaginative and grows out of perception, sensory experiences, and social interaction.

There are several schools of thought within the constructivist paradigm (Cobb, 1994; Prawat & Floden, 1994). The two most prominent ones are radical constructivism and social constructivism. Their major difference is connected to the locus of knowledge construction. For the radical constructivists, knowledge is constructed in the head of the learner while they are re-organizing their experiences and cognitive structures (Piaget, 1970; Von Glasersfeld, 1989). But social constructivists believe that knowledge is constructed in communities of practice through social interaction (Brown, Collins, Duguid, 1989; Kuhn, 1996; Lave & Wenger, 1991; Vygotsky, 1978).

The most objectivist classroom environments

Much has been written about objectivism and the learning environments it creates (e.g. McDermott, 1993; Hanley, 1994; Williams and Burden, 1998; Winters, 2004). In objectivist classroom environments learning is thought to be a "mimetic" activity, a process including students repeating, or miming, newly presented information in reports or tests (Jackson, 1986). Objectivist instruction is regularly referred to as transmissive instruction, where knowledge is transmitted from teachers to learners. Objectivist educators believe that improving learning is a matter of more effectively communicating ideas to learners by improving the clarity of the message (Jonassen & Land, 2000). For objectivists, effective teaching means effective communication because teaching is viewed as a process of conveying ideas to students. The assumption underlying objectivist learning environments is that because teachers have studied ideas longer, they understand them better and are therefore better able to communicate or transmit them (Jonassen & Land, 2000). Students are viewed as passive learners who want to know the world as the teacher does. Students existing in objectivist environments have to submit themselves to deliberate instructional situations. Although most students in such environments have no desire, need, and interest to learn what teachers transmit to them, they are required to submit themselves to "acquiring" what teachers tell them, because it is assumed that teachers know better (Jonassen & Land, 2000). Objectivist teachers break

wholes into parts and then focus separately on each part. But many students are not able to build concepts and skills from parts to wholes. "These students often stop trying to see the wholes before all the parts are presented to them and focus on the small, memorizable aspects of broad units without ever creating the big picture" (Brooks & Brooks, 1999, p.46).

In a nutshell, the main features of objectivist classroom environments can be summarized as follows:

- The direction of communication flow is mainly from teacher to learners
- Teachers heavily rely on textbooks and just try to transmit the information included in them to learners
- Cooperative activities are hindered because of the structures prevalent in the classroom
- Teachers tend to value correct answers and ignore students' thinking
- The assumption underlying the whole learning process is that there is a static objective world that students should try to know.

The most constructivist classroom environments

Constructivist learning environments provide learners with authentic or complex problems or projects that are supported by cases similar to the problem being posed, information resources, cognitive tools, and learning-support strategies such as modeling, coaching, and scaffolding (Jonassen, Marra & Palmer, 2003). Constructivist learning environments are student-centered and learner-controlled, emphasizing student responsibility and initiative in specifying learning goals and regulating their performance toward those goals, not just determining the path through a prescribed set of learning activities (Marra, 2004).

While objectivist environments, at best, increase learners' context-reduced and inert knowledge which is useful just on test occasions, social constructivist environments enhance learners' abilities of problem-solving, critical reflection, and thoughtful

application of and contribution to knowledge based on a deep understanding of what is happening in the social context (Abednia, unpublished article).

Teachers in constructivist learning environments seek to ask big questions, to give the students enough time to think about them, and to direct students to the resources to find the answers. They know that the predefined sequence and timeline mostly interfere with their ability to help students understand complex concepts.

In general, the nature of questions presented to students greatly influences the depth to which the students search for answers. Posing problems of emerging relevance and searching for windows into students' thinking is one of the most important roles of the constructivist teacher and also a particular aspect of the teaching process occurring in constructivist environments.

Constructivist teachers believe that the part-to-whole approach is not necessarily predictive of student success. When designing curriculum, they organize information around conceptual clusters of problems, questions, and discrepant situations because students are most attracted when problems and ideas are given in a holistic manner rather than in separate, isolated parts.

Structuring curriculum around "big ideas" and broad concepts provides students a lot of opportunities: some become engaged through practical responses to problems, some analyze tasks based on models and principles, and others interpret ideas through metaphors and analogies from their unique perspectives. Using broad concepts, constructivist environments provide each student to participate irrespective of individual styles, temperaments, and dispositions.

In constructivist environments, students are at the center of instruction and their points of view are highly valued. As Brooks and Brooks (1999, p. 60) put it insightfully and interestingly:

The more we study the learning process, the more we understand how fundamental students' points of view are. Students' points of view are windows into their reasoning. Awareness of students' points of view helps teachers challenge students, making school experiences both contextual and meaningful. Each student's point of view is an instructional entry point that sits at the gateway of personalized education. Teachers who operate without awareness of their students' points of view often doom students to dull, irrelevant experiences, and even failure.

Since students' points of view are valued in constructivist environments, these students are provided the opportunities to express their ideas. Constructivist teachers are also good listeners. It does not mean that constructivist teachers hinder the process of teaching in search and listening to their students' points of view. Teachers' ability to uncover students' conceptions is, to a large degree, a function of the questions and problems posed to students. Instead of seeking for "right" answers, the teacher can pose questions bringing about students' different points of view. Being "right" often limits the generation of new views.

Constructivist learning environments are also categorized as learner-centered ones in which students' interests and preferences affect all aspects of education. In constructivist learning environments, content, instructional materials, instructional media, and pace of learning are germane with the abilities and interests of each individual learner. These learning environments are elaborated with the premises that each learner is unique and "is an individual who must be helped to find his or her way to become autonomous" (Williams & L.Burden, 1998, p.194) and "learners have diverse learning styles, learn at different rates, have varying socioeconomic backgrounds, and have diverse intellectual strengths" (Dileo, 2007). Here the traits of the individual learner are given more consideration and learning is improved by varying the pace of instruction, the instructional method, and the content. In such settings, learner achievements are independent of each other, everyone has an equal opportunity of gaining a reward of

some kind, and success or failure is more likely to be attributed to effort (Williams & L. Burden, 1998). Constructivist learning environments allow a student who is above or below "average" to move forward at their own pace for optimal learning. It is not necessary for students to repeat parts of a course that they have already mastered. Students learn the self-discipline and goal-orientation required to motivate them and to keep their progress on target. Furthermore, students can check their own results on classwork and ask for help when needed. Such environments "can be viewed as providing a form of self-competition, but differ from competitive structures in that they are essentially goal oriented and involve the development of self-awareness" (Williams & L.Burden, 1998, p.194).

In the learning and assessment processes, constructivist teachers come to view themselves as cognitively linked with the students they teach. Rather than using assessment results as indices indicating individual student knowledge, such information might shed light on the relationship between the student and the teacher. In constructivist classroom environments, "the student is not assessed in isolation, but in conjunction with the teacher, and both learn as a result of assessment" (Brooks & Brooks, 1999, p.87). As Newman, Griffin & Cole (1989, p.77) put it:

> Instead of giving the children a task and measuring how well they do or how badly they fail, one can give the children the task and observe how much and what kind of help they need in order to complete the task successfully. In this approach the child is not assessed alone. Rather, the social system of the teacher and child is dynamically assessed to determine how far along it has progressed.

Using such an approach, the teacher is able to simultaneously keep track of the cognitive functioning of the student, the disposition of the student, and the status of the teacher/student relationship. "Student conceptions, rather than indicating "rightness" or "wrongness," become entry points for the teacher, places to begin the sorts of intervention that lead to the learner's construction of new understandings and the acquisition of new skills" (Brooks & Brooks, 1999, p.88).

Some guiding principles of social constructivism

a. posing problems of emerging relevance to students

Brooks and Brooks (1999, p.44) state that the notion of emerging relevance is one of the first generated universals or guiding principles of constructivist teaching. It should be noted that relevance does not mean that everything presented in the classroom pre-exists for students. It is clear that all students are not interested in learning about verb constructs, teaching methods or testing approaches, but most students can be helped to construct understandings of the significance of these topics. Relevance can emerge through teacher mediation (Brooks and Brooks, 1999, p.35).

How can a teacher help his or her students consider a topic relevant? First, the teacher should begin with a good problem (Brooks and Brooks, 1999). Here is the definition of a good problem-solving situation offered by Joel Greenberg (1990, p.147).

1. It demands that students make a testable prediction

2. It makes use of relatively inexpensive equipment. Fancier equipment might be used (to obtain higher precision), but the problem should work well at the low-tech end of the spectrum.

3. It is complex enough to elicit multiple problem-solving approaches from the students.

4. It benefits from (as opposed to being hindered by) group effort.

These criteria are consistent with constructivist pedagogy and speak to both social and cognitive needs in the classroom. But as Brooks and Brooks (1999) emphasize:

> When posing problems for students to consider and study, it's crucial to avoid isolating the variables *for* the students, to avoid giving them more information than they need or want, and to avoid simplifying the complexity of the problem too early. Complexity often serves to generate relevance and, therefore, interest. It is oversimplification that students find confusing.

Constructivist teachers seek to ask big questions, to give the students enough time to think about them, and to direct students to the resources to find the answers. They know

that the predefined sequence and timeline mostly interfere with their ability to help students understand complex concepts.

In general, the nature of questions presented to students greatly influences the depth to which the students search for answers. Posing problems of emerging relevance and searching for windows into students' thinking is one of the most important roles of the constructivist teacher and also a particular aspect of the teaching process occurring in constructivist environments.

b. structuring learning around primary concepts

Structuring curriculum around primary concepts is a critical dimension of constructivist pedagogy (Brooks and Brooks, 1999, p.46). Constructivist teachers believe that the part-to-whole approach is not necessarily predictive of student success. When designing curriculum, they organize information around conceptual clusters of problems, questions, and discrepant situations because students are most attracted when problems and ideas are given in a holistic manner rather than in separate, isolated parts. As Brooks and Brooks (1999, p.47) state:

> When concepts are presented as wholes, students try to make meaning
> by breaking the wholes into parts that they can see and understand.
> Students initiate this process to make sense of the information; they
> construct the process and the understanding rather than having it done
> for them. With curricular activities clustered around broad concepts,
> students can select their own unique problem-solving approaches and
> use them as springboards for the construction of new understandings.

Learners of all ages are more engaged by concepts introduced by the teacher from whole-to-part, rather than part-to-whole. It's more effective, for example, to permit beginning writers to invent their own spelling and publish their material for others to read than to teach the rules of grammar and conventional spelling and then ask students to put the skills together in an original piece of writing. Problems structured around "big ideas"

provide a context in which students learn component skills, gather information, and build knowledge. Attempts to linearize concept formation quickly restrict the learning process. Structuring curriculum around "big ideas" and broad concepts provides students a lot of opportunities: some become engaged through practical responses to problems, some analyze tasks based on models and principles, and others interpret ideas through metaphors and analogies from their unique perspectives. Using broad concepts, constructivist environments provide each student to participate irrespective of individual styles, temperaments, and dispositions.

c. seeking and valuing students' points of view

Trying to discover students' points of view is fundamental to constructivist education. In constructivist environments, students are at the center of instruction and their points of view are highly valued. As Brooks and Brooks (1999, p. 60) put it insightfully and interestingly:

> The more we study the learning process, the more we understand how fundamental students' points of view are. Students' points of view are windows into their reasoning. Awareness of students' points of view helps teachers challenge students, making school experiences both contextual and meaningful. Each student's point of view is an instructional entry point that sits at the gateway of personalized education. Teachers who operate without awareness of their students' points of view often doom students to dull, irrelevant experiences, and even failure.

Since students' points of view are valued in constructivist environments, these students are provided the opportunities to express their ideas. Constructivist teachers are also good listeners. It does not mean that constructivist teachers hinder the process of teaching in search and listening to their students' points of view. Teachers' ability to uncover students' conceptions is, to a large degree, a function of the questions and problems posed to students. Instead of seeking for "right" answers, the teacher can pose questions

bringing about students' different points of view. Being "right" often limits the generation of new views.

d. adopting curriculum to address students' suppositions and interests

Constructivist learning environments are also categorized as learner-centered ones in which students' interests and preferences affect all aspects of education. In Constructivist learning environments, content, instructional materials, instructional media, and pace of learning are germane with the abilities and interests of each individual learner. It has been elaborated with the premises that each learner is unique and "is an individual who must be helped to find his or her way to become autonomous" (Williams & L.Burden, 1998, p.194) and "learners have diverse learning styles, learn at different rates, have varying socioeconomic backgrounds, and have diverse intellectual strengths" (Dileo, 2007). Here the traits of the individual learner are given more consideration and learning is improved by varying the pace of instruction, the instructional method, and the content. In such settings, learner achievements are independent of each other, everyone has an equal opportunity of gaining a reward of some kind, and success or failure is more likely to be attributed to effort (Williams & L.Burden, 1998, p.193). Constructivist pedagogy allows a student who is above or below "average" to proceed at his/her own pace for optimal learning. Students do not have to repeat parts of a course that they have already mastered. Students learn the self-discipline and goal-orientation needed to motivate them and to keep their progress on target. In addition, students can check their own results on classwork and seek help when needed. Such environments can be viewed as providing a form of self-competition, but differ from competitive structures in that they are essentially goal oriented and involve the development of self-awareness (Williams & L.Burden, 1998, p.194).

e. assessing students learning in the context of teaching

In the learning and assessment processes, constructivist teachers come to view themselves as cognitively linked with the students they teach. Rather than using assessment results as indices only of individual student knowledge, such information might shed light on the relationship between the student and the teacher. In this paradigm,

the student is not assessed in isolation, but in conjunction with the teacher, and both learn as a result of assessment (Brooks and Brooks, 1999, p.87). As Newman et.al (1989, p.77) put it:

> Instead of giving the children a task and measuring how well they do or how badly they fail, one can give the children the task and observe how much and what kind of help they need in order to complete the task successfully. In this approach the child is not assessed alone. Rather, the social system of the teacher and child is dynamically assessed to determine how far along it has progressed.

In this approach, the teacher is able to monitor simultaneously the cognitive functioning of the student, the disposition of the student, and the status of the teacher/student relationship. Student conceptions, rather than indicating "rightness" or "wrongness," become entry points for the teacher, places to begin the sorts of intervention that lead to the learner's construction of new understandings and the acquisition of new skills (Brooks and Brooks, 1999, p.88).

Conclusion

Comparing objectivism and constructivism according to the learning environments they create gives us a more holistic picture of merits or demerits of these approaches. Such an approach was adopted in this study to show how important the epistemology a teacher or an educator adopts or believes to is and how a simple assumption affects a range of factors which form 'determinants' of learning. Constructivist ideas and practices are effective ones for those teachers aspiring to train autonomous, self-directed, critical and motivated students being used to exploration, finding their learning as a meaningful process, and being able to face the challenges of the new world. At the same time, constructivism can be an efficient framework for those students seeking to evaluate their educational system, their learning and teaching process and their teacher. The students aspiring to have a voice will find constructivism a good approach against which they can scientifically and rationally examine the process in which they are located at the center.

Finally, it should be emphasized that objectivism and constructivism are the two opposing points of a continuum, rather than two mutually exclusive approaches. Objectivist and constructivist learning environments should also be viewed as the two ends of one continuum. A learning environment can be the one affected at the same time by both objectivist and constructivist ideas. There are two reasons for such a synthesis. First, the nature of the class requires the eclectic and experienced teacher to switch between objectivist and constructivist ideas, hence to create a blended environment. Second, the pragmatic constraints of learning and teaching pose clear restrictions on the use of pure constructivism (Nunes & McPherson, 2003). In fact, synthesizing constructivist and objectivist approaches may provide teachers, designers and educationalists with more applicable approaches which in turn lead to the creation of objectivist-constructivist blended learning environments.

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