

Constructivism and the Constructivist Classroom

Lionel Callender

Long Island University – C.W. Post Campus

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Abstract

Constructivism and constructivist classrooms, current issues in the educational arena, are the focal point of this paper. The study was undertaken with a view to shedding light on some of the issues and misunderstandings that exist. Constructivism is defined and discussed in its historical context. In addition, the connection between developmental psychology and constructivism is highlighted, with reference to the theories of Jean Piaget and Lev Vygotsky. The effort is made to address the connections between constructivism and brain based learning. With a basis for constructivism established the paper takes a look some concrete suggestions for the structuring of constructivist classrooms. The paper closes with a look at some of challenges and objections to constructivist philosophy.

Introduction

If there is one thing that is certain in educational circles it is that there is a significant measure of uncertainty with respect to what constructivism means. As with other theories and strategies in the educational arenas, it is not uncommon for different people in the same organization to define the same concept differently. A good place to start then would be to attempt to define constructivism. This effort will draw from various sources and try to capitalize a concise definition.

One of the things that will be a part of the focus will be a look at some of the several view points that have gained some currency with respect to this concept. Good, Wandersee, and St. Julien (1993) suggest as many as fifteen different adjectives that may be paired with constructivism in the effort to define what it really is. These will be looked at later. Continuing with the study, the paper will seek to make the connection between constructivism and

developmental psychology. In particular it will look at the theories of Jean Piaget and Lev Vygotsky. Looking at these two theorists will focus the discussion around cognitive construction and social construction. The next step would be to take a look at the linkage between constructivism and brain based learning. Recent work in the area of brain based learning process suggests a strong support for constructivist theories. Time will be taken to discuss some of this work. In addition to others, the work of Brian Cambourne will be discussed.

The final two phases of the paper will look at vastly different areas. The first will be a discussion of what the constructivist classroom should look like, and some of the ideas that are offered for teachers who would embrace constructivist theories. The next focal point would be to look at some of the challenges and objections to constructivism. By this stage, a sufficient foundation would have been laid to suggest a guiding principle with reference to constructivism and constructivist practice. It should also then be possible to discuss a probable approach to constructivism as an instructional strategy.

Narrative

What is constructivism? Constructivism is a theory that seeks to explain how children learn and gain knowledge. Ishii, 2003 states thus, “The main tenet of constructivist learning is that people construct their own understanding of the world, and in turn, their own knowledge.” Ozer, 2004, suggests that, according to constructivist theories, “learning is a social advancement that involves language, real world situations, and interaction and collaboration among learners.” While it will not be discussed fully here, it is worth noting that his description hints very strongly at what the constructivist classroom should be like.

One of the struggles with the application of constructivist theories to teaching practice derives from the fact that there are several different forms of constructivism. (Ishii, 2003) There is the suggestion that there are at least fifteen different adjectives that are placed in front of constructivism in the effort to explain what it really is. (Good, Wandersee, and St. Julien, 1993) These fifteen adjectives are as follows: - contextual, dialectical, empirical, humanistic, information-processing, methodological, moderate, Piagetian, post-epistemological, pragmatic, radical, rational, realist, social, and socio-historical (p74). The one common feature of all of these probable different forms is that they all “incorporate the notion of individually constructed knowledge.” (Ishii, 2003)

Two things become clear almost immediately; first, constructivism refers to the idea of individually constructed knowledge. In this system of thinking, learners learn by constructing their own knowledge and understanding. This being so, the “what” of constructivism is clear. The second thing that emerges though is that the “how” of constructivism can be a point of variance. It should be vary easy to agree on what would be the goal of constructivism, but how to reach that goal may present some difficulty. Given that there are so many different possible approaches, there would be the need to come to the point of clarity with respect to how a given institution would pursue its constructivism goals.

Paul Ernest, (1996) offers additional perspectives on constructivism. He introduces the concepts of weak, radical, and social constructivism. The explanations given by Ernest of these perspectives are summarized in Table 1.

Table 1

Perspective	Details
Weak Constructivism	Individuals construct their own knowledge, while accepting the existence of objective knowledge
Radical Constructivism	Individual knowledge is in a state of flux, or constant reevaluation by adapting and evolving
Social Constructivism	Individual knowledge and social knowledge are one and the same

Mordechai Gordon, in a 2008 essay, which looked at a Parker Palmer article that appeared in the *Journal of Teacher Education*, makes some statements with respect to what constructivism is. He observes that constructivism is a model for explaining how knowledge is produced and how students learn. (Gordon, 2008) He continues to suggest that the knowledge constructed must certainly be influenced by particular perspectives and ideological stances. (p324) Referring to Piaget, Vygotsky and others, he concludes that “a constructivist approach to education is one in which learners actively create, interpret, and recognize knowledge in individual ways.” (p324) In addition Gordon notes four principals, formulated by Marlow and Page, which are typically agreed upon in constructivist teacher education programs. (Gordon, 2005 p325) The Marlowe and Page (2005, pp7-9) principles are:

1. Constructivist learning is about constructing knowledge, not receiving it.
2. Constructivist learning is about understanding and applying, not recall.
3. Constructivist learning is about thinking and analyzing, not accumulating and memorizing.

4. Constructivist learning is about being active, not passive.

These four principles seem adequately to sum up what the literature reviewed says about constructivism and do offer a reasonably sound basis upon which to proceed.

Two views of constructivism that are linked to developmental psychology may be seen through the lenses of Piaget's and Vygotsky's Theories. Piaget's cognitive constructivist theory is rooted in his belief that children develop through a series of different cognitive stages. These steps are: - sensorimotor (birth – 2yrs); preoperational (2 – 6yrs); concrete operational (6 – 12yrs); formal operational (12 – 19yrs). In Piagetian thought, these developmental stages are universal, they apply to all children. Piaget identified the basic unit of cognitive functioning as the schema. As children grow and develop, and interact with their environments, the schemas change. Piaget defined the change process as adaptation, and notes that adaptation could further be defined as assimilation and accommodation. Assimilation involves adopting new experiences into existing schemas to accommodate new experiences. (Lightfoot, Cole and Cole, 2009)

Piaget specifically says that children “construct knowledge out of their actions with the environment.” (Harlow, Cummings and Aberasturi, 2006) He continues that these interactions may be physical or mental. He explains that children learn by encountering and exploring objects and ideas. When new ideas are encountered the child tries either to assimilate or to accommodate them. Accommodation of new experiences creates new schemas and returns the child to the state that Piaget calls equilibrium. This process defines knowledge construction in Piaget's theory. From Piaget's perspective, children learn as they develop through the stages, as he defines them, by constructing knowledge. The implications for constructivism and for constructivist teaching are clear --- children should be allowed the opportunity to learn by exploring and experiencing

their environments in a variety of different ways. The constructivist practitioner has the opportunity to structure and manipulate that environment as needed. In a sense the teacher must take steps to ensure that children will construct the knowledge that he/she needs them to discover.

Lev Vygotsky, the Russian psychologist, is the other theorist whose work will be receiving specific mention. Most consider Vygotsky to be a proponent of what is called social constructivism. Paul Adams, in a 2006 article, credits Vygotsky with the following description of constructivism; “learner construction of knowledge is the product of social interaction, interpretation, and understanding.” (Adams, 2006 p245) A key construct in Vygotsky’s theory is the concept that he calls the Zone of Proximal Development, or ZPD. As explained in Ozer, 2004 this concept refers to “the distance between the critical development of a child as determined by the independent problem solving, and the level of potential development as determined through problem solving under adult guidance, or in collaboration with peers.” Adams, 2006 offers a more succinct explanation. He defines ZPD as “the difference between that which a child can do independently and that which can be achieved with the support of a more significant other.” (p252)

This concept, ZPD, as found in Vygotsky’s theory provides the foundation for social constructivism. Adams, 2006 suggests that ZPD allows for the rich learner – teacher interactions that social constructivism would require. He also suggests that it creates a context for assessment, “whereby pupil communities of practice provide opportunities for and requirements to share thought process.” (p253) Cooperative learning groups are a feature of the constructivist classroom. Gordon, 2009 makes the argument that such cooperative learning practice is a direct development from Vygotsky’s ZPD theory. Gordon, in the same article, also notes Vygotsky’s

insistence “that teaching should be tied more closely to the level of potential development than to the level of actual development.” (p52)

It should be clear from what has so far been discussed that constructivism has a definite connection to developmental psychology, and that it might find justification in several of the developmental theories. Another area that merits consideration in the discussion of the psychological basis of constructivism is the matter of brain based learning. Brain based learning is a relatively new focus area in educational research. In its essence, brain based learning seeks to know how the brain functions, and what is the connection between brain function and learning. It also wants to find ways to maximize the learning that takes place. (Kahveci and Ay, 2008)

The Kahveci and Ay 2008 study compared the principles of brain based learning and of constructivist learning. Their purpose was to discover the areas of commonality, if any, between the two concepts. The conclusion that was indicated, was that there were in fact areas of commonality that potentially link the two constructs together. Kahveci and Ay formulated what they described as five common principles in constructivism and brain-based learning. These principles are: (i) meaningful learning, (ii) individual differences in learning, (iii) multiple representations in learning, (iv) personal and environmental factors in learning, and (v) affective components in learning. (Kahveci and Ay, 2006 p126)

The close relationship between brain based learning and constructivist learning that Kahveci and Ay were able to establish by their study is supported by the work of some others. J.T. Bruer’s opinion is that “brain based learning does not offer anything different than constructivist learning.” (p127) Responding to Bruer’s statement, Kahveci and Ay suggest that

the brain research that supports brain based learning helps to explain constructivist learning principles. (p127)

Further support for this connectedness between brain based learning and constructivist learning is found in Rushton, Eitelgeorge, and Zickatoose, 2003. This article makes connections between Brian Cambourne's Conditions of Learning, constructivism, and brain based learning principles. The product of this study is a tabulation of the linkages between condition of learning, brain research, and constructivist classrooms. The conditions of learning – immersion, demonstration, engagement, expectations, responsibility, employment, approximation, and response – are the guides for the formatting of the table. (pp14, 15)

To this point the discussion has focused on theoretical aspects of constructivism. The concept has been defined and discussed, from a variety of different perspectives. The connections to developmental psychology and brain based learning have been explored. Attention now turns to what the constructivist classroom would look like. It is certain that a classroom that embraces constructivist philosophy will be quite different from a traditional classroom. Exactly what the classroom looks like would depend on the type of constructivism that is embraced. For example, a Piagetian classroom would feature a variety of activities that would promote (i) acceptance of individual differences, (ii) increased readiness to learn, (iii) discovery of new ideas, and (iv) construction of new knowledge. (Ozer, 2004) The Piagetian classroom would also provide opportunities for students to explore using the senses, and for them to engage in concrete learning experiences.

The Vygotskian classroom would present a different set of features. Support and guidance, based on the needs of the learner, without any undue force, would be in evidence.

Students would be seen to be involved in discussion, research collaboration, and problem solving project work. (Ozer, 2004) Support materials in a variety of media would also be present in this type of classroom like drawing and building materials. (Ozer, 2004) The Vygotskian classroom would also feature teacher-student interaction and student-student interaction. Students would be observed using cognitive strategies like questioning, predicting, summarizing, and clarifying. (Ozer, 2004)

Some of the literature that was reviewed offered a variety of principles, tips, and lists of implications. A sampling of these is offered below. Brooks and Brooks, 1999 offered a list of five principles of the constructivist classroom. These principles are: (i) teachers seek and value students' points of view, (ii) classroom activities challenge students' suppositions, (iii) teachers pose problems of emerging relevance, (iv) teachers build lessons around primary concepts and "big" ideas, (v) teachers assist student learning in context of daily teaching. (pp 9, 10) In chapter nine of the same book, Brooks and Brooks suggest a list of twelve strategies for becoming a constructivist teacher. Included in these strategies are the following:

1. When framing tasks, constructivist teachers use cognitive terminology such as classify, analyze, predict, and create.
2. Constructivist teachers inquire about students' understanding of concepts before sharing their own.
3. Construct teachers encourage inquiry by asking thoughtful, open ended questions, and encouraging students to ask questions of each other.
4. Constructivist teachers allow wait time after posing questions.

This sampling of the recommended strategies does indicate that the list in total would be a useful resource.

Clearly there is a strong case to be made for a move towards incorporating constructivist philosophy into teaching practice. However, there are notes of warning that need to be sounded. To begin with, the focus that is placed on students constructing knowledge and understanding should not be taken to mean that teachers are cancelled out of the process. The teacher is by no means reduced to being the creators of learning context. Gordon, 2008 argues that constructivist teaching, in its correct usage, is neither teacher centered nor student centered, but learner centered. He continues to note this view point leads to classrooms that feature a good “balance between teacher and student directed learning, and requires teachers to take an active role in the learning process, including formal teaching.” (p325)

This leads to the tension that exists between constructivism and direct instruction. Strong arguments are made for both of these models, and it would represent a significant failing not to mention this here. One should not make the case for constructivist teaching without, at the very least, acknowledging that there are some challenges and objections. The claim that discovery learning, a constructivist concept, as opposed to direct instruction has come under scrutiny and has received negative reviews. (Klahr and Nigam, 2004) In a 2003 study Klahr and Nigam focused attention on this issue. This study tested a set of hypothesis in the effort to adequately evaluate the relative merits of discovery learning and direct instruction. The conclusion of the study, briefly summarized, was that direct instruction yielded better outcomes for the students.

Two reactions to the work of Klahr and Nigam illustrate this claim. One article hailed their new evidence that “direct instruction” most effectively helps elementary students. The

writer spoke in glowing terms about the work that had been done, noting its great value.(Adelson, 2004) The article, while reflecting very positively on the claims of the Klahr and Nigam study, made several negative claims with respect to discovery learning. A second study took a very different view. Dean and Kuhn, 2006 reported the findings of a study that had been under taken to examine the findings of the Klahr and Nigam study. Dean and Kuhn reported to have found that, while their initial results replicated those for the Klahr and Nigam study, long term study, in the context, suggested that “direct instruction is neither necessary nor sufficient.” (p394) The point of this section of this study was to show that constructivist philosophy is not to be approached without careful consideration, and clear thinking. While it can certainly be shown to be a very useful approach, it is also clear that its claims are not beyond fallibility. Those who would embrace constructivist strategies should do so with reasoned resolve, and yet be opened to making changes if they should become necessary.

Conclusion

If nothing else, this study has served to make it clear that the issue of constructivism is not nearly as clear cut, and direct as believed. For sure it is not an area that should be approached lightly and in an ill informed manner. Constructivism and constructivist classroom demands should transcend buzz word and new fad status. They are simply too important for this.

The foundation of constructivist philosophy in developmental psychology is clear. Whether one proceeds from the perspective of Piaget’s cognitive constructivism, or from the perspective of Vygotsky’s social constructivism, the result is the same. Both theorists address human psychological development and it has been shown to be possible to connect constructivist

philosophy to their theoretical schemas. With respect to brain based learning, there is also a clear link to constructivism.

Can constructivism be a useful educational philosophy? Unequivocally yes. There is an important place for constructivism in educational practice. It is vitally important though, that any move towards constructivism must be accompanied by a careful thinking and learning process. It should not be sufficient for school administrators to insist on teachers including “hands-on” activities in their teaching because this is how the administrators understand constructivism. Additionally, teachers would have to come to the understanding that constructivism does not exclude them from active teaching, but that it, in fact, would require them to be very much involved, and creative in the practice of their craft. Their constructivist challenge would be to find ways for their students to construct the knowledge that the teachers need them to discover. This is an especially critical consideration in this the age of standards based education, and No Child Left Behind demands.

It would be necessary that all parties involved take the time carefully and methodically to craft a path for the move towards good, positive outcomes for learners. This path would draw from a variety of different sources, incorporating the best practices from each of them. There would be input from developmental psychology, taken from theorists like Piaget and Vygotsky. New developments in brain-based learning research would also contribute to process. Further, the value attached to other approaches would also be drawn into the mix. Negative claims with respect to the merits of constructivism as an instructional strategy would be, at the very least, acknowledged. At the end of the process, a scheme that incorporates the best of constructivist philosophy and useful features from other theoretical constructs should have been created. After all, the objective must be an all out commitment to student success. The commitment cannot first

be to any one system. In a manner of speaking, the various systems, theories, and strategies ought to servants, and not masters.

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