

**Constructivist Design Theory**

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## **Overview**

If you have heard phrases such as student-centered classrooms, real-world problem solving, and active learning environments, then you have heard about some of the key ideas associated with constructivist design theory. Constructivist design theory is a learning theory in which “learners actively construct their knowledge, rather than simply absorbing ideas spoken to them by teachers” (Lunenburg, 1998, p. 1). Because learners have a wide range of backgrounds, experiences, and skills, knowledge is individually constructed as learners work to make sense of the problems they are faced with (Richey, Klein, & Tracey, 2011).

To help further explain constructivist design theory, let us look at the three key principles: personal experience, active learning, and social interactions (Richey, Klein, & Tracey, 2011).

### **Personal Experience**

The belief is that learners construct knowledge based on experiences they have encountered in the real world. Learners are actively creating and modifying thoughts, ideas, and understandings based on their experiences (Doolittle & Hicks, 2003). Knowledge does not look the same for every individual. It is unique and exists in a variety of formats.

To foster this type of learning environment, teachers that utilize constructivist design theory present students with problems and activities that are relevant and meaningful to them. This allows students to make connections with previous experiences. Teachers facilitate and guide learning by helping students make meaningful connections between their past experiences and new information (Lunenburg, 1998).

### **Active Learning**

The second principle of constructivist design theory is active learning. In an active learning environment, learners are more than passive recipients of information. Learners are actively engaged in their learning by solving problems and analyzing complex questions (Richey, Klein, & Tracey, 2011). Often times the phrase “learning by doing” is associated with this type of learning environment.

Teachers create active learning environments by employing instructional models such as cognitive apprenticeships and project-based learning (Richey, Klein, & Tracey, 2011). Both of these instructional models provide students with real-world contexts in which they must gain knowledge through exploration and inquiry. Additionally because the active learning activities that learners engage in are grounded in realistic and relevant contexts, assessments reflect that. Instead of focusing on rote memorization techniques often associated with standardized tests, authentic assessments are often used. Authentic assessments require students to utilize critical thinking skills to apply what they have learned (Lunenburg, 1998).

### **Social Interactions**

The third principle of constructivist design theory is social interactions. The process of interacting with peers as well as the teacher helps learners “construct new understandings or reflect on their existing ones” (Lunenburg, 1998, p. 1). Because the experiences of individuals are different, social interactions allow learners to hear other perspectives and ideas. Through these interactions learners must work to make sense of the new ideas presented as they consolidate new information with their own experiences (Doolittle & Hicks, 2003).

To foster this type of learning environment the teacher’s primary role is to serve as a facilitator or guide (Tam, 2000). The teacher should create a collaborative learning environment in which students feel comfortable sharing ideas and having discussions. Often times group

projects are a key component of constructivist design theory. Group projects require learners to communicate and collaborate with each other to come to a consensus. Teachers must work to guide these “group discussions into meaningful communication about subject matter” (Lunenburg, 1998, p. 1).

Now that I have identified the key principles of constructivist design theory, I will review the history of this learning theory.

### **History**

The constructivist design theory evolved from the ideas and beliefs associated with constructivism. The epistemological beliefs associated with constructivism date back to John Dewey. Dewey was an American psychologist who believed that people learn by doing. His research dates back to the early 1900s (Martin, 2002). Although the belief of learning by doing is a key principle of constructivist design theory, these ideas were not identified as constructivism or constructivist design theory until many years later.

Swiss psychologist, Jean Piaget, is often thought of as the founder of constructivism. Piaget believed learners construct knowledge by interacting with the world around them. He believed a learner's experiences and development have an impact on how they approach learning. His work from the early to mid-1900s helped form the basis for constructivism (Driscoll, 2005).

Another key contributor in the evolution of constructivist design theory is Russian psychologist, Lev Vygotsky. Vygotsky's research involved looking at how learners develop and learn based on experiences and social interactions. His zone of proximal development concept helped articulate his ideas on stages of development and gaps in knowledge (Driscoll, 2005). These ideas were consistent with constructivist beliefs and expanded on Piaget's work by considering the social aspect of learning.

From the beliefs and research of people such as Dewey, Piaget, and Vygotsky, as well as growing interest from many others in educational fields, constructivism and constructivist design theory have continued to evolve (Richey, Klein, & Tracey, 2011). One item that has helped increase interest in constructivist design theory is student achievement data gathered from exams such as the National Assessment of Education Progress (NAEP). The data gathered from the NAEP exam “suggest that student outcomes in American education are little better--and in some cases worse--than they were 25 years ago” (Lunenburg, 1998, p. 1). Traditional, teacher-centered instructional approaches have received some of the blame for these results (Lunenburg, 1998). This has helped fuel interest in instructional approaches that utilize constructivist design theory. In these instructional approaches teachers are encouraged to provide real-world learning experiences that are interdisciplinary and meaningful for students. They are encouraged to move learners beyond simply memorizing facts for standardized assessments (Brooks & Brooks, 1999).

Another phenomenon that has increased interest in constructivist design theory in the past several years is the growth of technology usage in our educational system. Although at first glance it may not appear as though technology supports the principles of constructivist design theory — personal experience, active learning, and social interactions — it in fact does. “Telecommunication technologies easily lend themselves to constructivist principles by providing students with opportunities to communicate with people all over the world, conduct research, discuss issues and work cooperatively” (Tam, 2000). In constructivist design theory learners are engaged in real-world problem solving. This not only lends itself to technology, but in many cases technology is a requirement for this type of activity. When technology usage is

aligned to constructive design theory, students have the opportunity to construct their knowledge using tools they will encounter in the real world (Tam, 2000).

Finally, the growth of distance education has played a role in the historical evolution of constructivist design theory. “Constructivist principles provide a set of guiding principles to help designers and instructors create learner-centered, technology-supported collaborative environments that support reflective and experiential processes” (Tam, 2000). With distance education in particular, the principle of social interaction has been of great interest to people. When distance education courses are designed using constructivist design theory, learners have the opportunity to engage with each other electronically. Through these interactions learners have the opportunity to pose questions, draw upon the experiences of others, and construct new knowledge through the process (Bryant & Bates, 2015).

### **Key Persons**

From a historical perspective there have been many individuals that have helped formulate the ideas inherent in constructivist design theory. Some of these individuals were mentioned previously, but I will elaborate on them here.

#### **Jean Piaget - 1896 -1900**

Jean Piaget was a biologist, philosopher, and child psychologist from Switzerland. He called his view on how people learn constructivism. He is viewed as the founder of constructivism. Piaget identified his view as constructivism because “he firmly believed that knowledge acquisition is a process of continuous self-construction” (Driscoll, 2005, p. 191). Expanding upon Dewey’s views of learning by doing, Piaget “believed that children actively approach their environments and acquire knowledge through their actions” (Driscoll, 2005, p.

191). Piaget believed this construction of knowledge happened as learners move through specific stages of development based on their age and cognitive development (Driscoll, 2005).

### **Lev Vygotsky - 1896-1934**

Lev Vygotsky was a clinical psychologist from Russia. He was considered a “progressive” in terms of his educational views. This meant he believed learning should break away from traditional approaches that focused on textbooks and rote learning. Instead it should involve hands on experiences that involve interaction with peers (Veer, 2007). Similar to Piaget, much of Vygotsky’s work focused on cognitive development. However, unlike Piaget who viewed development as being very individualistic, Vygotsky believed social interactions played a key role in how learners develop their cognitive abilities. Vygotsky’s zone of proximal development ideas looked closely at skill development, gaps in knowledge and the impact social interactions have on these areas (Driscoll, 2005). The social interactions principle associated with constructivist design theory can be linked back to the work of Vygotsky.

### **Jerome Bruner - 1915 - Present**

Jerome Bruner is an American psychologist whose ideas expanded upon many of beliefs of Piaget and Vygotsky. Bruner’s work focused on how people make sense of the world around them. He believed people develop different ways of representing experiences they encounter (Driscoll, 2005). Bruner is also known for his work on the discovery learning instructional model. In this model, learners construct knowledge by exploring the world around them and making connections with what they already know (Richey, Klein, & Tracey, 2011). The ideas associated with discovery learning relate specifically to the principle of active learning in constructivist design theory.

### **Contemporary Contributors**

In addition to those individuals who have laid the groundwork for constructivist design theory, there are a number of contemporary researchers, authors, and teachers who have continued to expand on the ideas and provide implementation support. Below are two that have written several publications on constructivist design theory and instructional strategies that employ this theory.

Dr. Jacqueline Brooks is a professor at Hofstra University. Dr. Brooks has authored or co-authored several publications on constructivist design theory including *In Search of Understanding: The Case for Constructivist Classrooms* and *Schooling for Life: Reclaiming the Essence of Learning*. In her book, *In Search of Understanding: The Case for Constructivist Classroom*, which she co-authored with Martin Brooks, she states that although many schools claim to be utilizing constructivist approaches that is not always the case (Brooks & Brooks, 1999). The book provides support and guidance for teachers that are looking to integrate constructivist design theory into their classrooms.

Dr. Robert Marzano is another contemporary author, researcher, and advocate for constructivist design theory. Dr. Marzano has written numerous books on teaching practices. Dr. Marzano's books, *The Art and Science of Teaching* and *Classroom Instruction that Works*, are just two examples of his many publications. Both of these publications contain chapters that focus on the principles of social interactions and past experiences associated with constructivist design theory (Robert J. Marzano, 2015).

### **Differentiation**

To help further explain constructivist design theory, I will contrast it with behaviorist learning theory. These two learning theories are at opposite ends of the spectrum in terms of the beliefs about how people acquire knowledge. Behaviorist learning theory supports the idea that



knowledge is external to and separate from the individual. This is often referred to as “objectivism.” With this belief knowledge exists and is acquired by exposing learners to it (Driscoll, 2005).

With constructivist design theory, the belief is that knowledge is unique to the individual. This is often referred to as “interpretivism.” With this belief knowledge is constructed by individuals as they interpret the world around them by making connections with what they already know (Driscoll, 2005).

If you look at these two learning theories from an implementation standpoint, they look significantly different. If instruction is delivered using behavioral learning theory techniques, it is often done using direct instruction teaching approaches. This is a teacher-centered instructional approach in which students receive information from the “expert.” Once the information is received, learners have the opportunity for practice. The teacher then provides feedback to the learner (Richey, Klein, & Tracey, 2011). The goal is to change the learner’s behavior by providing new information (external knowledge), have them practice, and then use feedback to reinforce the desired behaviors.

The implementation of constructivist design theory has several distinct differences. In instructional strategies that utilize constructivist design theory, the teacher is viewed as the facilitator or guide. Information is not “presented”, but instead it is embedded in the activities and problems that learners explore. Learners have more control of their learning based on their interests, prior knowledge, and past experiences. Because students are exploring subject matter that may be new to them, the teacher provides guidance along the way to make sure students are moving in the right direction (Lunenburg, 1998). In addition teachers work to foster discourse that requires students to use critical thinking, communication, and collaboration skills

(Brooks & Brooks, 1999). The goal is to have learners construct knowledge that that will be able to retain and apply to other situations.

### **Summary**

While it appears as though there is a desire to increase the implementation of instructional approaches that utilize constructivist design theory, there are critics of this learning theory. Matthews (2003) cites the lack of empirical evidence that indicates the effectiveness of this learning theory. In addition, constructivist design theory has been criticized because it is difficult to structure appropriate assessments and it can be costly (Tam, 2000). Finally implementing constructivist design theory requires that teachers have the ability to foster deep conversations that focus on subject matter, utilize technology, and provide structure while at the same time giving students autonomy (Lunenburg, 1998). All of these things can be a challenge, but can lead to developing critical thinkers that are prepared for the world in which they live.

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Retrieved from [www.pbs.org/teacherline/courses/inst335/docs/inst335\\_brooks.pdf](http://www.pbs.org/teacherline/courses/inst335/docs/inst335_brooks.pdf)

This chapter has information on the characteristics of teaching using constructivist design theory.

Bryant, J., & Bates, A. J. (2015). Creating a constructivist online instructional environment.

*TechTrends: Linking Research & Practice to Improve Learning*, 59(2).

This article provides information on the role of constructivist design theory in distance education settings.

Doolittle, P. E., & Hicks, D. (2003). Constructivism as a theoretical foundation for the use of technology in social studies. *Theory & Research in Social Education*, 31(1), 72–104.

<http://doi.org/10.1080/00933104.2003.10473216>

This article provided information on how the role technology plays in constructivist design theory.

Driscoll, M. P. (2005). *Psychology of Learning for Instruction* (3rd ed). Boston, MA: Pearson.

This book provides a lot of really good information on the history and key figures involved with constructivist design theory.

Lunenburg, F. C. (1998). Constructivism and technology: instructional designs for successful education reform. *Journal Of Instructional Psychology*, 25(2), 75-81.

Available at:

<http://ezproxy.memphis.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=eft&AN=507648045&site=ehost-live>

This article contains a lot of good information about why constructivist design theory has become popular, what it is, and what are the key elements that teachers should do to implement it.

Martin, J. (2002). *The Education of John Dewey : A Biography*. New York: Columbia University This book provided information on the background of John Dewey.

Matthews, W. (2003). Constructivism in the classroom: Epistemology, history, and empirical evidence. *Teacher Education Quarterly*, 51–64.

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This article provides information on why people are critical of constructivist design theory.

Richey, R. C., Klein, J. D., & Tracey, M. W. (2011). Chapter 8: Constructivist Design Theory. In *The Instructional Design Knowledge Base: Theory, Research, and Practice* (1st ed., pp. 129–144). New York, NY: Routledge.

This book provides a lot of really good information on the history and key figures involved with constructivist design theory.

Tam, M. (2000). Constructivism, instructional design, and technology: Implications for transforming distance learning. *Educational Technology & Society*, 3(2), 50–60.

This article contains information on how constructivist design theory has influenced distance learning. It also provided a nice overview and explanation of the theory.

Veer, R. D. (2007). *Lev Vygotsky*. London: Continuum.

This book provided information on the background of Lev Vygotsky.

### **Web Sites**

Alber, R. (2009). Letting go in the classroom. *Edutopia*. Retrieved from <http://www.edutopia.org/students-guide-learning-constructivism>

This web site provides a good example of what constructivist design theory looks like in a classroom.

Alber, R. (2013). Tools for teaching: How to transform direct instruction. Edutopia. Retrieved from <http://www.edutopia.org/blog/tools-for-teaching-transform-direct-instruction-constructivism-rebecca-alber>

This web site provides a nice step by step explanation of how to transform a traditional classroom.

Brooks, M., & Brooks, J. G. (1999). The courage to be constructivist. Retrieved from

<http://www.ascd.org/publications/educational-leadership/nov99/vol57/num03/The-Courage-to-Be-Constructivist.aspx>

This site has an excerpt from the book, *The Courage to be Constructivist*. There is good information on the challenges of implementing constructivist approaches.

Concept to Classroom: Constructivism. (2015, April 2). Thirteen Ed Online. Retrieved from

<http://www.thirteen.org/edonline/concept2class/constructivism/>

This web site provides more background information on constructivism including information that compares it to a traditional classroom.

Dr. Jacqueline Grennon Brooks. (2015, April 1). Pride and purpose: Hofstra University.

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[http://www.hofstra.edu/Home/News/UR/pridepurpose/pridepurpose\\_Grennon\\_Brooks.html](http://www.hofstra.edu/Home/News/UR/pridepurpose/pridepurpose_Grennon_Brooks.html)

This web site has information on Dr. Brooks. Dr. Brooks has done a lot of research and writing on constructivist teaching approaches.

Epistemology and Learning Theories. (2015, April 3). University College Dublin. Retrieved

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[http://www.ucdoer.ie/index.php/Education\\_Theory/Epistemology\\_and\\_Learning\\_Theories](http://www.ucdoer.ie/index.php/Education_Theory/Epistemology_and_Learning_Theories)

This web site provided a little more guidance and clarity for me on epistemological beliefs.

Robert J. Marzano. (2015, April 2). Marzano research: Leading the way. Retrieved from

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This web site has information the Dr. Marzano's book.