Learning Theories Analysis:

Objectivism, Constructivism, and Technology

Kathleen M. Marleneanu

University of Arkansas at Little Rock

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There are two main approaches to learning, each having separate components that offer strategies on how best to serve today's educational goals. One approach is objectivism, characterized by the traditional practice of direct instruction; the other is constructivism, characterized by the newer inquiry-based instruction. Both approaches have their foundations in numerous established learning theories, and both impact strategies for technology integration. While objectivism and constructivism offer distinct perspectives, they can both be used effectively to address certain instructional and learning needs, and be supported through the integration of technology.

Approach Components

Both the objectivist and constructivist approaches have multiple components. One basic component is the educational philosophy involved. Another closely related component is the perspective on what makes instruction effective, and both approaches rely on different views as to how best to accomplish their educational goals. These views employ contrasting forms of student assessment.

Objectivism

Roblyer and Doering (2013) provide the following summary of the objectivist philosophy: "Knowledge has a separate, real existence of its own outside the human mind. Learning happens when this knowledge is transmitted to people and they store it in their minds" (p. 37). Under this philosophy, objectivists perceive effective instruction as directed instruction, which occurs when "teachers transmit a pre-defined set of information to students through teacher-organized activities" (Roblyer & Doering, 2013, p. 35). Objectivists believe that this systematic instruction

is practical and promotes accountability. To monitor students' progress and hold teachers and

students accountable, traditional and standardized tests are endorsed (Roblyer & Doering, 2013).

Constructivism

Constructivists do not see standardized testing as effective, as it does not reflect their philosophy

that "[h]umans construct all knowledge in their minds by participating in certain experiences,"

and that "[l]earning occurs when one constructs both mechanisms for learning and one's own

unique version of the knowledge, colored by background, experience, and aptitudes" (Roblyer &

Doering, 2013, p. 37). This is reflected in constructivism's perspective of inquiry-based learning,

in which "learners generate their own knowledge through experiences and teachers serve only as

facilitators" (Roblyer & Doering, 2013, p. 35). In this way, learning is viewed as being hands-on

and student centered. Therefore, constructivists promote assessments that allow students to show

their knowledge in ways other than just traditional written tests (Roblyer & Doering, 2013).

Learning Theory Foundations

The contrasting philosophies that underlie the objectivist and constructivist perspectives

on effective instruction and assessment are based on a combination of different foundational

learning theories that have been established over many years. The concepts within these theories

have various implications for education today.

Objectivism

One theory to which objectivists look is Skinner's behaviorist theory, based on operant

conditioning, which promotes the concept of learning as stimulus-response chains. According to

Roblyer and Doering (2013), this theory holds that instruction should provide the correct stimuli

and reinforcement for students to achieve desired learned responses. Objectivism also draws

from information-processing theory, based on Atkinson and Shiffrin's model which focuses on

the connection between three types of memory: sensory, working, and long-term. Bruning, Schraw, and Norby (2011) define this as "a computer-like model of memory that portrays humans as acquiring, storing, and retrieving information" (p. 364). This theory, as explained by Roblyer and Doering, implies that instruction should gain attention and provide the right kinds of application as well as ample practice. They also explain that research on information-processing models influenced Gangé's guidelines for providing specific conditions for learning as seen in cognitive-behavioral theory, and that, according to this theory, there should be a sequence of instructional events in which students are to show prerequisite skills. Gangé was also influential in systems approaches to instructional design, which necessitate instruction to be sequentially structured and students' progress to be continuously monitored (Roblyer & Doering, 2013).

Constructivism

The learning theories that have influenced constructivism focus less on structure and more on the learners and their social interaction. For example, Dewey in his social activism theory, promoted student collaboration, "deplored standardization and believed that curriculum should arise from students' interests" (Roblyer & Doering, 2013, p. 41). Bandura's social cognitive theory encourages the modeling of skills, and emphasizes self-efficacy as well as the relationship between personal, behavioral, and environmental factors (Bruning, Schraw, & Norby, 2011). The scaffolding theory of Vygotsky presents learning as a cognitive building process in which instruction addresses the student's individual needs; and the child development theory of Piaget divides children's cognitive development into four stages in which they learn from exploration within their environment (Roblyer & Doering, 2013). Exploration is also key in Bruner's theory of discovery learning, as it enables children to be active participants in their learning by allowing opportunities for self-discovery. Lastly, Gardner's multiple intelligences theory likewise

accommodates the learner by identifying at least eight different types of intelligence in which instruction should allow students to demonstrate their competence (Roblyer & Doering, 2013).

Types of Instruction and Learning

As objectivism and constructivism are founded on different theories, the teaching and learning methods they promote vary as well. These methods are designed to address the particular instructional needs of each approach.

Objectivism

According to Roblyer and Doering (2013), objectivists use directed instruction to target quality assurance, accountability, individualization, and convergent thinking. This is accomplished by using traditional teacher-directed methods in which the teacher transmits a defined set of skills and knowledge to students using structured sequences in order to achieve specific objectives. The students usually work individually, learn prerequisite skills before moving on to new skills, and are assessed using traditional means such as multiple choice, short answer, and essay tests.

Constructivism

Roblyer and Doering (2013) point out that constructivist inquiry-based learning is less traditional in that it seeks to address higher level skills, increase relevancy, and develop cooperative group skills and divergent thinking. Teachers are responsible for setting up a student-driven learning environment that stresses exploration, collaboration, and real-life problem solving. Assessments are also nontraditional, utilizing portfolios, group projects, and self-report instruments.

Types of Technology

The instructional and learning methods of both the objectivist and constructivist approaches address specific educational needs, and can be supported by different types of technology integration. While modern technology resources to help implement integration

strategies are abundantly available, some require extensive funding, while others are completely free for public and/or educational community use.

Objectivism

Some needs of directed instruction include remedying skill weaknesses, promoting automaticity, and supporting self-paced review. For these instances, Roblyer and Doering (2013) suggest the use of tutorial and/or drill-and-practice software, and instructional games. Tutorials can also be used, along with distance learning courses, to help motivate students in self-paced learning.

Free Technology. An example of a free tutorial program to assist students is Mathtutor, designed for middle school (Carnegie, 2013). Examples of software that assist with drill-and-practice can be found at Microsoft Partners in Learning, which offers free downloads of Flashcards by Microsoft, and Math Worksheet Generator (Microsoft, 2013). Young students can play a variety of free instructional games on the PBS Kids website (Public, 2011).

Constructivism

According to Roblyer and Doering (2013), particular instructional needs of the constructivist approach include fostering creative problem solving and metacognition, building mental models, and increasing knowledge transfer. Technology that helps address these needs include video-based scenarios that pose problems, and multimedia tools/products that illustrate concepts and research. Constructivists also can use technology to enhance group cooperation skills and allow for multiple and distributed intelligences. For example, students can collaborate in their use of the internet for research and of various programs for the creation of group multimedia products.

Free Technology. A free technology available to foster student collaboration and multimedia product creation is cloud computing, facilitated through programs such as Google Docs, Microsoft Office Web Apps, and Dropbox (Siegle, 2010). Google Sites is free, as well,

and allows for website creation and collaboration (Google, n.d.). Students/teachers can use video

programs such as Windows Movie Maker and Open Movie Editor, and watch educational videos

through YouTube for Schools (Google, n.d.; Microsoft, 2013; Roblyer & Doering, 2013). Other

free multimedia resources are available at the Federal Resources for Educational Excellence

(FREE) website (Kickbush & Winters, n.d.). To assist with visualizing and building mental

models, Microsoft offers Mathematics 4.0, Deep Zoom, and Photosynth (Microsoft, 2013).

Conclusion

While objectivism and constructivism offer clearly different perspectives, philosophies,

and methods, it is possible to merge the two so as to gain the benefits of both. For example,

Hirsch (2002) "believes that directed learning is best for providing a foundation of skills, while

inquiry-based learning is probably best for developing global skills slowly over time" (as cited in

Roblyer & Doering, 2013, p. 48). In regard to technology, Roblyer and Doering (2013) similarly

state that "[p]roficient technology-oriented teachers must learn to combine directed instruction

and constructivist approaches and to select technology resources and integration methods that are

best suited to their specific needs" (p. 48). The approaches of objectivism and constructivism,

coupled with technology integration, offer effective strategies for supporting education today.

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