Behaviorism vs. Constructivism

Choosing the Right Framework for Math Instruction

Melissa A. Gallagher

May 2025

When selecting professional development programs and instructional resources for mathematics, understanding the underlying educational philosophy is essential. Behaviorism and constructivism offer distinct approaches to teaching and learning, each with unique implications for classroom practice. At the US Math Recovery Council, we embrace a constructivist perspective, emphasizing deep understanding and intrinsic motivation. This paper explores the two approaches to help administrators and educators make informed decisions that align with their instructional goals.

Behaviorism

Behaviorism, rooted in the work of theorists like B.F. Skinner (1954), views learning as a change in observable behavior caused by external stimuli (Woolfolk, 2018). This approach emphasizes clear, measurable outcomes and relies on reinforcement to shape and maintain behavior (Woolfolk, 2018). It is particularly effective for teaching discrete skills where accuracy and repetition are key (Skinner, 1954).

Learning

Behaviorism emphasizes that learning is a change in observable behavior caused by external stimuli (Woolfolk, 2018). This approach focuses on the relationship between stimuli and responses, using reinforcement and punishment to shape behavior (Woolfolk, 2018). The learner is viewed as passive, responding to stimuli and external reinforcements (Ertmer & Newby, 1993). Behaviorists believe that knowledge is formed through associations between stimuli and responses, and repeated practice and reinforcement ensure retention and mastery. Further, this theory emphasizes that motivation relies on external factors such as rewards and punishments (Ertmer & Newby, 1993).

Teaching

Teaching aligned with a behaviorist perspective on learning is designed with clear, measurable objectives, proceeds in small, incremental steps, and can be characterized as teacher-centered instruction (Schunk, 2012). Teachers deliver information directly, and learning is viewed as a predictable outcome of well-structured lessons (Schunk, 2012). Reinforcement is a key component—students receive positive feedback for correct responses, strengthening desired behaviors (Woolfolk, 2018). Context is minimized, with an emphasis on creating standardized learning conditions that yield consistent outcomes. Social interaction is also deemphasized, as the focus is on individual learning and observable behaviors.

What Does Behaviorism Look Like in an Elementary Math Classroom?

In a behaviorist math classroom, a teacher might focus on mastering basic arithmetic through drills and practice. For example, students could work on addition and subtraction facts using timed worksheets. Correct answers earn small rewards like stickers or extra recess time. Lessons follow a clear sequence, with each skill building on the previous one. If a student struggles, the teacher provides additional practice until the correct behavior (accurate calculation) is consistently demonstrated. The emphasis is on accuracy, speed, and repetition to reinforce learning.

Constructivism

Constructivism, influenced by the work of Jean Piaget (1952) and Lev Vygotsky (1978), posits that learners actively construct their own understanding through experiences and social interactions. This perspective emphasizes the importance of context, collaboration, and reflection in the learning process (Piaget, 1952; Vygotsky, 1978).

Learning

Constructivism posits that learning is an active process where individuals construct their own understanding through experience and reflection (Schunk, 2012). Learners are seen as active participants, engaging in problem-solving (Ertmer & Newby, 1993). They interpret information through their personal lens, and understanding deepens through discussion, exploration, and reflection (Schunk, 2012). Knowledge is constructed through active engagement and the application of ideas in diverse contexts (Ertmer & Newby, 1993). This theory emphasizes intrinsic motivation, suggesting that students are naturally curious and learn best when they find personal meaning and relevance in the material (Schunk, 2012).

Teaching

Constructivist instruction is flexible and contextual, providing multiple representations of concepts and encouraging exploration. Learners are encouraged to ask questions, make connections, and reflect on their thinking to deepen understanding. A constructivist approach to teaching is often referred to as student-centered instruction. Authentic tasks and real-world applications are considered essential to meaningful learning (Ertmer & Newby, 1993). Social interaction plays a crucial role, with dialogue, collaboration, and peer discussion helping learners articulate and refine their understandings (Schunk, 2012).

What Does Constructivism Look Like in an Elementary Math Classroom?

Constructivist math classrooms promote first the development of deep conceptual understanding and then procedural fluency. A teacher might present students with a real-world problem without one prescribed way to solve it. Students would then work in groups to explore different ways to solve the task while justifying their decisions. The teacher would facilitate discussion, asking questions like, "How did you decide on that strategy?" and "Can you explain your thinking?" Mistakes are seen as learning opportunities, and students are encouraged to explore multiple methods to solve problems. The emphasis is on students developing deep understandings of mathematical relationships before developing fluency with algorithms. As students' conceptual understanding develops, constructivist teachers use games, self-reflection, and peer interaction to promote procedural fluency. Through this approach, teachers construct learning opportunities that intrinsically motivate students to gain fluency with both math facts and procedures.

Final Thoughts

When selecting professional development resources, it is important to align the instructional approach with your educational philosophy. Behaviorism offers a structured, teacher-centered framework that emphasizes observable outcomes and skill mastery. This approach can be useful for building procedural fluency in the short-term. Constructivism, on the other hand, supports a learner-centered model that values active exploration, critical thinking, and intrinsic motivation, fostering a deeper understanding of mathematical concepts before developing procedural fluency, leading to long-term retention of ideas and procedures.

At the US Math Recovery Council, we advocate for a constructivist approach, recognizing the value of inquiry-based learning and meaningful engagement with mathematics. By understanding the strengths and applications of both theories, educators can make informed decisions that best support their students' mathematical growth.

References

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