An Exploration in the Behaviorist’s Way of Knowing

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Abstract

The present paper discusses the behaviorist’s way of knowing through the lens of an instructional designer and provides a historical overview of behaviorism and its key principles. Additional subtopics include the application of behaviorism to instructional design methodology, academic management, and performance management. Behaviorism is also compared to two other prominent learning theory models, cognitivism and constructivism. Finally the paper discusses how behaviorism has impacted the author and her personal way of knowing, and considers potential research questions pertaining to the re-design of instructional design methodology to move away from behaviorism and instead to a more constructivist approach.
An Exploration in the Behaviorist’s Way of Knowing

Instructional designers and learning facilitators (e.g. teachers, trainers) study learning theories in order to create effective learning experiences for their students. As one of the earliest models of learning, behaviorism has provided the foundation for many other models of learning that are applied in modern classrooms. The behaviorist’s way of knowing emphasizes observable learning outcomes that are influenced by environmental stimuli (Ertmer & Newby, 1993). The author chose the topic of behaviorism due its profound influence on learning development models and its important applications to the author’s profession, employee training and performance improvement. The present paper provides a historical overview of behaviorism and its key principles. Additional subtopics include the application of behaviorism to instructional design methodology, academic management, and performance management. Next behaviorism is compared to two other prominent learning theory models: cognitivism and constructivism. Finally the paper discusses how behaviorism has impacted the author and her personal way of knowing, and potential research questions are introduced.

**Historical Foundations of Behaviorism**

Behaviorism partially grew from psychology’s need to provide observable data to explain behavior, and similar to the practices of the other sciences (Schunk, 2004, p. 29). Schunk (2004) traces the origin of behaviorism back to the early 1900’s through Thorndike’s work on “trial and error” learning (p. 30). Trial and error learning suggests that the most basic form of learning results from associations between sensory stimuli and neural responses (referred to as “connectionism”) (Schunk, p. 30). Trial and error learning occurs over time as correct responses become engrained in the learner. Central to Thorndike’s paradigm are the Law of Exercise and the Law of Effect (Schunk, p. 31). The first principle, the Law of Exercise, denotes the
requirement for learning to be practiced or used in order to maintain the connection. Disuse leads to broken connections. The Law of Effect describes the need for consequences to learner responses to determine future responses.

Thorndike’s ideas paved the way for classical conditioning and operant conditioning models of behaviorism. Classical conditioning refers to the process of generating involuntary responses resulting from a conditioned stimulus, often called “respondent behavior” (Driscoll, 2000, p. 36). The first model of classical conditioning is traced to Pavlov and his research on the digestive system of dogs. Accidently discovered, Pavlov noticed the dogs drooling (saliva production is part of the digestion process) before the food was provided (Schunk, 2004, p. 36). Schunk (2004) provides the following example of classical conditioning (p. 37). In the first phase, the researcher identifies the unconditioned stimulus (food powder) and the unconditioned response (salivation). During the second phase, the researcher presents a conditioned stimulus (metronome) followed by the unconditioned stimulus (food powder), which results in an unconditioned response (salivation). Over time, the conditioned stimulus (metronome) solicits the conditioned response (salivation) when presented on its own without the unconditioned stimulus (food powder).

If a response is voluntarily emitted, the behavior is referred to as an operant behavior, which was made famous by Skinner in the mid 20th century (Driscoll, 2000, p. 36). Skinner modified the behaviorist paradigm by arguing behavior could be explained by environmental cues and their results (Driscoll, 2000, p. 34). This description of learning is frequently illustrated by the black box metaphor, where the learner’s mind is compared to a black box because nothing inside can be seen, however, the responses can still be observed (Driscoll, 2000, p. 35). Skinner’s
research primarily utilized pigeons and rats as participants, which allowed him to control the environment and environmental cues (Alonzo, LaCagnina, & Olsen, 1977).

Through the concept of operant conditioning, Skinner introduced the ideas of reinforcement and punishment (Alonzo, LaCagnina, & Olsen, 1977). To strengthen a response or increase the likeliness of it occurring in the future, Skinner paired the desired response with a reinforcer (Driscoll, 2000, p. 39). A reinforcer (similar to a reward) can be positive (given) such as a bonus, or negative (taken away) such as decreasing the number of chores required. To decrease the likeliness of an undesired behavior, the learner may receive a punishment. Punishment can also be positive such as a traffic ticket, or negative such as taking away a privilege. Reinforcers are generally favored whereas a punishment is typically unwanted by the learner (Driscoll, 2000, p. 39).

Skinner’s theoretical framework on operant conditioning provided the foundation for the discovery of other concepts in behaviorism. For example, “learned helplessness” is a phenomenon where the learner’s behavior has been continuously paired with a punishment that when the punishment is removed the learner still believes they are unable to perform the behavior (Driscoll, 2000, p. 43). Another concept is “extinction” where the reinforcement contingencies disappear and consequently the paired behaviors disappear over time as well (Driscoll, 2000, p. 44). Learners can also identify how to generalize reinforced behaviors to other situations and discriminate in different situations (Schunk, 2004, pp. 57-58). A key component to successful reinforcement methodology is identifying when the reinforcer should be presented after the desired behavior is displayed. Four different contingency schedules are widely accepted: fixed ratio, fixed interval, variable ratio, and variable interval (Driscoll, 2000, p. 51).
Many of the concepts described here have been applied to develop other behavioral methods including behavior modification also known as behavior therapy (Schunk, 2004, p. 61).

**Behaviorism’s Modern Applications**

Behaviorist-based principles have numerous applications to the modern classroom and workplace. As discussed previously, behaviorism requires observable performance to indicate learning has occurred (Ertmer & Newby, 1993). Although learning requires both the learner and environmental factors to take place, behaviorists place more emphasis on arranging the learning environment to include appropriate stimuli and consequences for learner responses (Ertmer & Newby, 1993). This section reviews three examples of behaviorist applications. First, instructional design methodology is analyzed on how it provides the foundation and structure for learning through the behaviorist lens. Next this section will discuss behaviorism in the classroom in regards to the management of long-term academic goals. Finally, performance management represents the key to creating top performing organizations. The author chose these topics because of professional interests (instructional design and performance management) and personal interests (academic management to pursue a doctoral degree).

**The Instructional Design Process**

Behaviorist-based methods can be easily observed through the instructional tools and strategies applied by instructional designers, primarily because instructional design was founded on behaviorist principles (Ertmer & Newby, 1993). Consider the instructional design process, ADDIE, which is described as the most basic of models (Brown & Green, 2006). The acronym ADDIE stands for Analysis, Design, Develop, Implement, and Evaluate – the five basic phases for successful course development (Brown & Green, 2006). In the Analysis phase, the instructional designer conducts task analyses, learner analyses, and performance gap analyses.
Each type of analysis relies on observable data, a requirement of behaviorism (Ertmer & Newby, 1993). During the Design phase, the instructional designer writes behaviorally based learning objectives and arranges content for mastery learning (Ertmer & Newby, 1993). The Development phase may include creation of simulations through computer-based instruction (Cooper, 1993). The instructor during the Implementation phase provides opportunities for practice and reinforces content through rewards and feedback (Ertmer & Newby, 1993). Evaluation of the course derives from observable learning through assessments, practice, and application of learning (Ermer & Newby, 1993).

**Academic Management**

In addition to course development, behaviorism may also be applied to the management of learners and the achievement of academic goals through different types of reinforcement techniques. Breslaw (1973) manipulated the grading system of her college classes where the goal of students was to achieve points (instead of detracting points for poor performance). Students received points for attendance and for completing course assignments (pass/fail basis). Test scores were points that contributed to their total points. Students were able to choose the assignments to complete based on their motivation to achieve a certain number of points. The result was increased participation, higher test scores, and higher pass rate compared to previous terms. However, students complained of “too much work” in comparison to their other classes.

Even the achievement of (very) long-term instructional goals can be assisted by the application of behaviorist principles. Malott (1993) questioned the motivation of college students to achieve a degree. Whereas homework assignments provide opportunity for more immediate reinforcement, the achievement of a college degree required on average 120 credit hours over a four year period. Malott suggested distinguishing the university as a “performance manager” for
students. This role includes breaking down large tasks required for graduation (e.g. master’s thesis or doctoral dissertation for graduate students) into smaller tasks with defined deadlines. Specific behavioral expectations increased the percentage of tasks completed by students compared to students with the traditionally “vague” tasks and deadlines for completing long-term academic tasks.

**Performance Management in the Workplace**

Beyond the classroom, successful organizations apply performance management principles to build a high performing workforce. Daniels and Daniels (2004) define performance management as “… a technology for creating a workplace that brings out the best in people while generating the highest value for the organization” (p. 7). Founded in behaviorist principles, performance management assists organizations in achieving short-term and long-term results through the introduction of behaviorist methods (Daniels & Daniels, 2004, pp. 10-17). For example, employers can apply reinforcement techniques to promote desired behaviors from employees while reducing the frequency of undesired behaviors (Daniels & Daniels, 2004, p. 60). Key points about workplace reinforcers include periodically changing the type of reinforcer, using primary and secondary reinforcers, and applying social reinforcers (Daniels & Daniels, 2004, pp. 65-69). Daniels and Daniels also provide tools, such as the PIC/NIC Analysis, that can be used to identify antecedents to behaviors and their consequences (p. 41) in three dichotomies: positive or negative consequences, immediate or future consequences, and certain or uncertain consequences (p. 44). Tools such as the PIC/NIC Analysis tool represent an easy method for identifying components of an employee’s behavior and for creating a tailored approach to modifying the behavior, all through the use of behaviorist concepts and principles.
Behaviorism and Other Learning Theories

Behaviorism belongs to a group of prominent learning theories that have significantly shaped learning and instructional design methodologies. Two of these learning theories are cognitivism and constructivism. These learning theories can be illustrated on a spectrum of instructor-centered (external factors; e.g. behaviorism and cognitivism) to learner-centered (internal factors; e.g. constructivism and humanism). The models for each learning theory were developed as researchers’ interests moved away from a need for observable evidence of learning and embraced more learner-centered approaches (Ertmer & Newby, 1993). This section provides a general illustration of cognitivism and constructivism, and compares each theory with the behaviorist model of learning.

Cognitivism

Cognitivism, also referred to as information processing theory, relies on external factors to guide learning but emphasizes the learner’s mind as a mediating factor in how that knowledge is stored (Driscoll, 2000, p. 76). Information processing theory illustrates a series of phases that make up the learning process (Driscoll, 2000, p. 77). Phase 1 (sensory input) refers to how information is collected by the senses (i.e. vision, audition, touch, taste, and smell), which is then stored in sensory memory (Phase 2). Mediating factors such as attention and pattern recognition determine whether or not this information is transferred to short-term memory (also called working memory) in Phase 3. Short-term memory leads to either immediate responses or is stored in long-term memory for future retrieval (Phase 4).

Cognitivism developed as a response to psychologists moving away from the need to observe learning in order to say learning has taken place (Ertmer & Newby, 1993) and the need to acknowledge individual differences (Cooper, 1993). Whereas behaviorism focuses on how to
elicit specific responses, cognitivism recognizes learning as a change in state of knowledge where the learner is an active participant (Ertmer & Newby, 1993). Both cognitivism and behaviorism emphasize the value of the learning environment. Behaviorism structures the environment to reward desired responses and correct undesired responses, however, cognitivist methodologies emphasize how to structure to make it more meaningful to the learner, and to relate the information to other information already in the learner’s memory (Ertmer & Newby, 1993). Also both behaviorism and cognitivism favor similar instructional strategies such as practice and corrective feedback. In addition to these observable activities, cognitivism recognizes external cues and strategies alone cannot ensure learning takes place and therefore recognizes the need for mental practices such as rehearsal and metacognition (Ertmer & Newby, 1993).

**Constructivism**

Constructivism moves away from “objectivism” (the need for observable learning) and instead views learning as solely an internal process (Cooper, 1993). Whereas behaviorism and cognitivism consider the mind mostly a receptacle for information, constructivism believes the mind is the builder of knowledge (Cooper, 1993). Constructivists contend true scientific knowledge does not exist; instead knowledge is constructed as a result of learner experiences (Driscoll, 2000, p. 376). In order to construct knowledge, instructors structure situations where learners have the opportunity to learn through a variety of perspectives that require active participation on behalf of the learner in a social learning context (Schunk, 2004, p. 288). Constructivism mirrors some aspects of cognitivism in that learning is reliant on the student’s knowledge structure and places value on mental organization of information (Ertmer & Newby, 1993). However, constructivism’s focus on internal processes significantly differs from
behaviorism’s emphasis on external factors to influence learning. Humanism, a related learning theory to constructivism, actually rejects behaviorism’s focus on animal research as its foundation and relies on human needs as motivators to learning (Alonzo, LaCagnina, & Olsen, 1977). However, Cooper (1993) suggests the differences between behaviorism and constructivism may be beneficial to different learners. For example, lower ability learners may require a more structured environment to perform (a behaviorist model) whereas higher ability learners need a much less structured learning environment to achieve a higher performance level (a constructivist model).

**Personal Reflection**

The purpose of the present paper was not necessarily to explore a completely unknown way of knowing, but instead to analyze a way of knowing from a new perspective. Although I have taken classes on adult learning theory, the topics were typically brushed over and only the key elements discussed. Before writing this paper, I was already fond of behaviorism and I discovered this was because of the observable performance data requirement for this way of knowing. When something is learned, you can see it. For instance, a red octagon signals a driver to stop his car and if he doesn’t stop his car, the driver may be issued a ticket or worse, hit another vehicle. Observable data makes it very easy to determine whether a student has learned the content of a given course.

Through reading various sources for this paper, I discovered that perhaps I am already a behaviorist in many other ways as well. Previously I had not realized that the instructional design models we use to build courses were founded on behaviorist principles. (I have studied a few of the most popular models, and they share enough characteristics in each phase that textbooks do not stray far from the traditional five phases.) Everything from the pre-course analyses to writing
the learning objectives to how the class is designed and implemented to the methods used to
evaluate the course are grounded in behaviorism. True, we include cognitivist strategies (e.g.
venn diagrams, lecture format) or constructivist strategies (e.g. self discovery activities).
However, the framework for structuring the course is still rooted in behaviorism. The training
profession actually encourages behaviorism through the need for observable learning, the use of
job aids, and rewards throughout the duration of the training program. Consequently, I wonder
how a different instructional design model might look if we rooted it in a different learning
theory such as cognitivism or constructivism. Also, I wonder if we are limiting ourselves by
using a behaviorist approach. Perhaps instead a single N design (where each learner contributes
to determining his own learning plan and is evaluated on his own merit instead of as part of a
group) would be a better instructional design approach instead of a behaviorist approach where
the learner participates in a pre-determined learning experience (designed based on group
analyses) and presents what they know through the same assessment or demonstration as all the
other group members. Although more costly and timely, the single N design (a more
“constructivist” approach) could be doable in smaller organizations. The long-term learning
results would be interesting as well as other measures such as self-efficacy and on-the-job
performance.

Summary

The present paper discussed the behaviorist’s way of knowing through the lens of an
instructional designer. From its beginning, behaviorism has focused on the need for observable
data resulting from the manipulation of environmental cues to create learning (Schunk, 2004, p.
29). Many of behaviorism’s key concepts evolved from Skinner’s work on reinforcement and
punishment to modify the likeliness a behavior will continue to occur in the future (Driscoll,
Today, behaviorism’s applications include providing the structure for instructional design, academic management, and performance management. Compared to other influential learning theories such as cognitivism and constructivism, behaviorism relies much less on the human mind as a mediator or creator of information (Ertmer & Newby, 1993). However, the author believes the human mind is of value in the learning process and discusses potential research questions pertaining to re-designing basic instructional design methodology to move away from behaviorism and instead to a more constructivist approach.
References


