Final Thought Paper

Submitted by Beth Jo Woodell

Syracuse University School of Education

IDE 621 – Principles of Instruction and Learning

Dr. Rob S. Pusch

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Final Thoughts on the Concepts and Their Place in My Teaching Experiences

As I attempt to relate my past instructional development and training experiences to the three principal learning theories, I find that picking one "favorite" is a little like choosing a favorite vitamin: whether it be B_{12}, C, D, or K, they are all essential to my organismal life and growth. Similarly, I believe there is a place in training development for each of the three learning theories: behaviorism, cognitivism, and social learning.

What is learning, anyway? It surprised me, upon beginning this course, to hear learning being described as poorly understood and that the concept could be approached in multiple valid ways. All learning begins with gathering data from sensory channels: that which we see, hear, smell, taste, and feel. Depending on what the brain does with that input, learning can be defined as either objectivist, in which knowledge is based only on empirical data acquired; or constructivist, in which knowledge is constructed in the brain (or mind) through thought processes operating on the sensory input. The learning theories derived from those philosophies are descriptive; they don't purport to tell us how we *should* learn, only how we *do* learn. Because design is inherently purposeful, though, designing instruction is also purposeful: instructional design theory takes the philosophies of how we *do* learn and prescribes methods and strategies for how we *should* learn. In this sense, instructional design is prescriptive in a way that learning is not. Because instructional design is purposeful and prescriptive, there must always be a goal in mind that drives the content and structure of instruction.

Upon first reading of Merrill's (2002) paper on first principles of instruction, I was rather at a loss as to why the principles were considered revelatory at the time: some of it sounded to me like principles I had used in my prior ID consulting assignments, and some of it seemed to be just common sense. To review, the five principles are:

1. Learning is promoted when learners are engaged in solving real-world problems.
2. Learning is promoted when existing knowledge is activated as a foundation for new knowledge.
3. Learning is promoted when new knowledge is demonstrated to the learner.
4. Learning is promoted when new knowledge is applied by the learner.
5. Learning is promoted when new knowledge is integrated into the learner's world.

Upon re-reading, I realized that, besides the timing (this paper was published in 2002 and I started ID work in 2004), the organizational approach my employer took to designing and developing adult technology training was exactly this. Merrill also describes a "tell me–show me–let me" approach to designing instruction in which learners are first told a problem, asked to consider how the problem fits into their previous experience, shown the tasks they could master to solve the problem, and then given the opportunity to do the tasks and see how the results solve the problem (or not). Although Merrill explains these principles from the standpoint of a child learner, they apply to adult learners as well, with the added nuance that adults have a need to fit what they are learning into their immediate needs (the "what's in it for me?" aspect of learning

described by Knowles in his theory of andragogy (1984)). My employer expanded upon these principles to incorporate a "tell me–show me–let me–help me" approach to instructional design and development. Because Merrill also specifically refers to attaching material being learned to that which the learner already knows, building on existing schemata, as well as giving feedback and allowing the learner to make adjustments (accommodations) based on that feedback, his approach strikes me as being decidedly cognitivist in nature.

At this point it might be useful to distinguish between the three major learning theories and how they impact instructional design:

- **Behaviorism**: Learning is a (more or less) permanent change in behaviors that comes from sensory experiences. Instruction should be designed to take advantage of the stimulus-response relationship by including instruction in small parts, continual reinforcement, and removal of distractions that interfere with the stimulus-response sequence.
- **Cognitivism**: Learning is a (more or less) permanent change in mental structures that comes about from experience. In this sense, cognitivism and behaviorism are similar in that they are objectivist—learning comes about as a result of neutral external experiences. Cognitivism, however, diverges from behaviorism in that the learner has the capability to apply reasoning to those experiences to build new knowledge. Only *Homo sapiens* can learn in this way. Instruction, therefore, should be designed in such a way to leverage the uniquely human capability to reason: activate prior knowledge and allow the learner to link it to what they already know; structure the content so it has deeper meaning to the learner rather than just rote, "monkey" learning; and alert learners to what they will be learning by using advance organizers.
- **Social learning theory** posits that learning comes about by constructing behavior patterns which society expects, however one defines "society" (it can be a universal, large or small group, and it is not restricted to *Homo sapiens*). Learners observe others in the society (the environment), perceive what behavior patterns to construct to be accepted by the society, and perform accordingly (the behavior). Social learning is constructivist—knowledge is constructed from the input from the group. Instruction, therefore, should be designed in such as way as to take maximum advantage of observing others in the society and the environment, give the learner an opportunity to try out their newfound skills, provide the learner with feedback, and allow them to modify the behavior incrementally until it's correct, however one defines "correct." In this regard, social learning shares some features with cognitivism in allowing for assimilation, accommodation, and relating new information to prior knowledge.

The three theories differ in certain specific ways:

- Behaviorism is directly observable, whereas cognitivism is not.
- Behaviorism can apply to any animal, whereas cognitivism is unique to humans, and social learning may apply to certain non-human animals, such as apes, that form social structures during their lifespans.
- Behaviorism and cognitivism are objectivist, whereas social learning is constructivist.
- Behaviorism can be directly measured, whereas cognitivism cannot.

- Behaviorism and social learning depend on interaction with the environment, whereas cognitivism doesn't have to.

Based on the above, and pondering my past experiences and successes, some of which I describe below, I find myself coming down on the side of cognitivism as my favorite, if I had to choose. Logic and reasoning appear to be peculiar to humans. In my training experiences, as well as my academic endeavors, I expect to be able to figure out new facts and new knowledge from the material I have to work with, and I expect my learners, all of whom are adults, to do the same. The types of tasks and procedures I'm teaching are typically sufficiently complex that they can't be explained with a simple stimulus-response mechanism. That rules out behaviorism. Nor can they rely solely on social learning interactions; at some point the learner must figure out for herself/himself how to do a task, how to modify a task under different conditions, and how to correct an error if one happens. I even say as much in my training classes: I often tell the participants, "look, much as I like you folks, I can't be there with you every day! I want to equip you with the tools to figure out how to do the tasks on your own and build your skill set from there. Then you'll be truly self-sufficient on the job."

Virtually all of my instructional design and development experiences have occurred within a work context: training employees on how to use a system or tool that has been implemented at their job. Sometimes the learner is the only one who will be performing a given task, for example a manager approving documents in a structured approval workflow; sometimes it's a shared task, for example a department of Accounts Payable clerks and accountants posting invoices. In the case of the single performer, they need to be able to figure out how to solve simple issues they may be having with the task without much, if any, input from others. For example, they may know the steps to approve a purchase requisition with a high dollar value (procedural knowledge: click here, type in the field, press Save, and it's approved), but they also need to be able to reason whether that purchase requisition also needs to be escalated to additional approval levels, whether the requisition contains errors and needs to be rejected and sent back to the requisitioner with an explanation of why it's wrong and what needs to be fixed. The behaviorist approach isn't going to be useful in a situation like that. I hope to convey to such a learner how to reason what needs to be done and then take the necessary steps to do it—cognitivism at work.

In the scenario of several clerks learning the same procedures, social learning may be useful—up to a point. I have seen training situations in which I, as the instructor, am teaching a given procedure, and a learner will share a shortcut or trick they learned elsewhere. Adult learners may like learning shortcuts from me, but they especially like learning from each other, all doing the same tasks in the same environment. However, if they are all learning a new procedure and have the same base knowledge, which is common, learning from one other is not possible in the long run; they must all be presented with the same new material, given a chance to try the new procedure, observe successes, and identify and correct errors as needed. The ability to assimilate new information into existing mental models implies a cognitivist approach. Once a baseline of knowledge has been established in this peer group, if new members enter the group the experienced members can share that knowledge within the group. Observers within the group can vicariously experience a sense of success when someone else gets the procedure right, a (hopefully) common outcome of social learning.

Saidi, Abdulkarim, & Ousama (2019) point out that at some universities, SAP is being incorporated into AACSB-accredited degree programs in business and accounting. AACSB itself (2018) has established accreditation standards that reach beyond mere accounting skills to tackle

a more integrative approach to business learning goals. Therefore, SAP curricula at the university level must also be integrative, meaning the learner must be able to relate new SAP knowledge to accounting, business, ethics, management, and other areas they may already be familiar with. This also implies assimilating new knowledge into existing schemata, implying a cognitivist approach.

Deciding which learning theory resonated with me the most took some thought, but I knew immediately it wasn't the behavioral model. Initially, the behavioral model struck me as being, for lack of a better term, animalistic, and the supporting premises of the model seem to support that. It is true, however, that *Homo sapiens* is an animal, and so behavioral principles first described by Pavlov would still be applicable. John Watson proved as much with his Little Albert experiments.

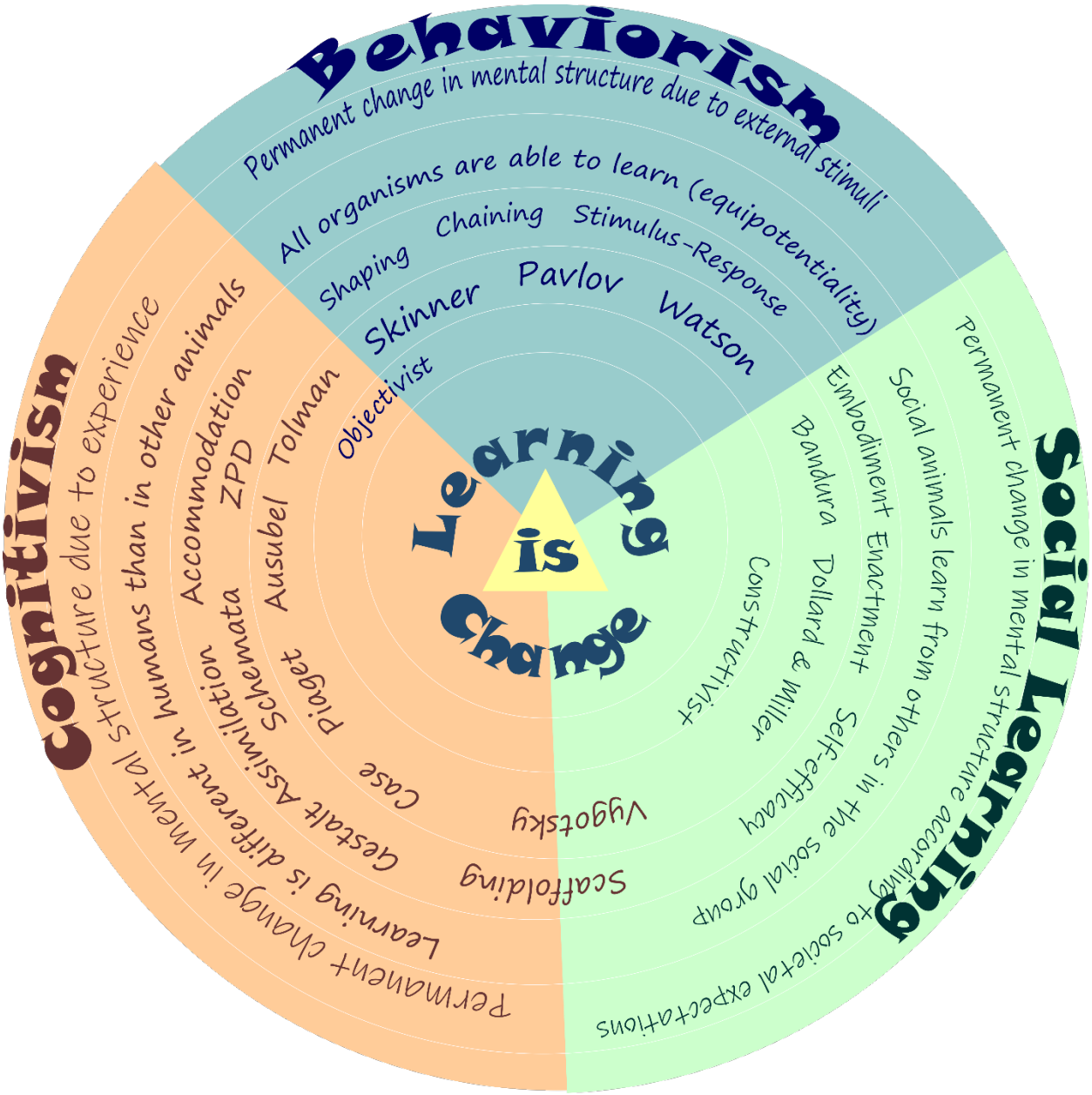
Odd thing about behaviorism, though: the basic principles—a stimulus causes a response, the response is rewarded or punished, the stimulus therefore causes a similar response even when no reward (or punishment) is forthcoming, and all animals can develop similar stimulus-response patterns regardless of degree of development of the brain—still apply, and those principles don't go away just because other learning theories have been identified and described. As long as animals have brains, there will be behavioral learning and behavior-based responses, and not just in formal learning settings, but throughout life. As I am writing this paragraph, two items I read in *The Washington Post*, my daily news vehicle of choice, describe typical, if inadvertent, examples of conditioned responses in learning. In one scenario, a reader writes in to the paper's advice columnist for help on how to handle a pushy mother who's demanding grandchildren. The advice columnist recommends that the letter writer patiently but persistently refuse to engage in the dialogue by giving brief "cease and desist" responses to nosy questions, multiple times if necessary, and by cutting off the conversation if necessary. Simple stimulus-response-punishment sequence. In the other scenario, a reader who never makes or takes phone calls, preferring to text on her mobile device, expresses a literal dread of her cell phone actually ringing. No one without bad news would actually call her. She even tried changing her ringtone a couple of times, thinking the negative association was with the ringtone. Of course, we can infer that would not work in the long run: the association is not with the specific ringtone, but with the phone call itself and the presence of *a* ringtone. Stimulus (the phone rings)–response (she answers)–she receives bad news and reacts to it as expected. Now, the mere presence of a ringtone evokes, in her words, anxiety and terror regardless of the impending message. What could be more Pavlovian?

In the technology training context, I believe there is a place for behaviorism principles in the design of instruction, but not as an initial learning experience with regard to a given task. In my knowledge base, I've shared a past experience on a 2011 ERP implementation in which a well-meaning but inexperienced instructional developer, rightly wanting to show learners how to troubleshoot errors, deliberately wrote incorrect steps into a task procedure. The learner, perhaps not knowing that an error is coming, dutifully performs the task steps, gets an error message (and maybe a red light and a beep), and goes back and corrects the error. Then the rest of the procedure is performed correctly, with a success message and a tangible result at the end. The learner may therefore learn to do the task this way, error and all, every time, enduring negative reinforcement in the form of that red light or beep. There's definitely a time in the learning event and a place in the curriculum for a sequence of events like that, but not in the initial exposition of the task. I experienced a better application of the stimulus-response-punishment sequence on an

ERP implementation I was involved in as an instructor, but not designer or developer, in 2016. The curriculum for a certain course was designed so that the learners got three different scenarios to practice a given procedure. The first two scenarios were correct, with minor variations in the data details. The third scenario was deliberately written incorrectly, with a chance to rectify the error during the practice. I believe this was more effective as an instructional tool, since the learners got positive reinforcement first in the previous two exercises; I as the instructor was able to foreshadow the negative event with a warning, so the learners knew this was the way *not* to do the task; the learners did the task wrong and got the punishment in the form of a red light; and they corrected the error, getting positive reinforcement in the process.

The Graphic

I pondered for a while on whether to draw the graphic that, literally, came to me in a dream the weekend of November 12. Seeing a classmate present virtually the same concepts in the same, but artistically more elegant, format dissuaded me at first from doing so. However, in this summary paper I decided to give it a shot. One feature I decided to apply after the initial concept was to increase the amount of space given to cognitivism and decrease the space given to behaviorism, given my affinity for cognitivism as I describe above.



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