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Learning Theories

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I was introduced to the Ertmer/Newby article (1993) during my last Instructional Design class and appreciated the authors' efforts to provide concise depictions and comparisons of the theoretical frameworks of behaviorism, cognitivism, and constructivism, as well as the thoughtful placement of these approaches into the instructional designer's toolbox. As someone with no formal background in educational theory, they were all new to me, yet the examples provided made sense, particularly once I thought about them in the context of the Adult Education programs where I teach.

In my Adult Education math study group, there are certain basics that I want the students to have down before we move on to more advanced topics. I want them to have their multiplication tables memorized, as well as the steps to solving a division problem and the metric prefixes, for example. I provide mnemonics to aid memorization in the latter two examples, and online games for the students to help with their multiplication tables. As discussed in your lecture, behaviorism is also employed heavily in classroom management. One of the behaviors that I instill in my students is to "clock in" and "clock out" of class. For our program's grant funding and testing requirements, we need to track their classroom hours, so we enlist their aid in this process. I train my students to remember to clock in and out by regularly asking them if they remembered to do so when they're still new to the program, and thanking them for doing so. This approach seems to fit closely with the behaviorist school (Ertmer & Newby, 1993).

At the electrical apprenticeship, when we first begin working with the students on electrical theory, we focus mostly on memorization of the characteristics of alternating and direct current circuits. This memorization is supplemented with some context (e.g., contrasting the creation and uses of AC versus DC voltage), and the students see these systems in action at work and in their daily lives. But for the most part, we want to make sure that they have memorized the rules. Basic vocabulary words, useful mnemonic devices, and electrical symbols are introduced and memorized, and the students are assessed largely based on their successful memorization. This approach seems to fit closely with the behaviorist school.

Most of my math students graduate to the stage where I present them with math problems of increasing levels of difficulty, up through basic algebra and geometry. With geometry, for example, students are provided with formula sheets and even a calculator, but are expected to be able to identify the different components (length, width, base, height, etc.) and to plug those values in and execute the formulas. In algebra, there are generally multiple ways to correctly solve a problem, so I ask students to walk me through problems, explaining their logic and applying the various rules they've learned about exponents, integers, etc. The idea here is that we want students to be able to apply their existing knowledge to a wide variety of mathematical problems. This stage of learning is based on the cognitive approach (Ertmer & Newby, 1993).

Once the electrical students have demonstrated mastery of the basic elements of electrical theory, we begin working with theoretical circuit blueprints, illustrating how changes in one variable affect others and how to use circuit formulas to calculate unknown circuit values. Students are allowed to use formula sheets and other notes, but are expected to use those notes to solve increasingly complex circuit queries. A wide variety of differing circumstances are introduced to truly test their ability to work within the frameworks whose individual components they have familiarized themselves with. Students are asked to explain their solutions so that faulty logic can be identified and addressed. Students continue their work in the field, but increasingly, are able to make better sense of the contexts in which they work—e.g., why specific equipment and components are used in a given situation—gaining an understanding of the "how" as well as the "why" of their industry. This stage of learning is based on the cognitive approach.

As math students build confidence with working through a wide variety of math problems, we move on to focus most of our work on word problems. These types of problems best represent "real world" math, are relied on heavily in the testing environment, and are traditionally the types of problems that give students the most trouble. What I focus on here is how to approach these problems. Before we even try to solve them, I give students highlighters and ask them to identify key information and questions. We discuss their thoughts about which information is necessary versus extraneous and which operations are implied by the wording of the problems. There are often multiple possible approaches. Once we've discussed and have some basic consensus on how to approach these problems, only then do we attempt to solve them. This approach is demonstrative of the constructivist framework (Ertmer & Newby, 1993).

Finally, as my electrical students transition to becoming journeyman electricians, actual work experience becomes more and more central to their learning and the classroom more of a place to process and add value to work experiences. They are given greater levels of responsibility, designing solutions to small problems themselves, being more actively involved in the work planning stages, and perhaps even managing other, less experienced apprentices. I spoke with one trainer who does relatively high level electrical contracting, and he chooses his trainees based upon their demonstrated abilities in the cognitive learning environment. He takes these students out into real world problem-solving situations and engages them in every stage of the process. He not only expects that they can demonstrate safe work practices in a wide variety of circumstances, but also quizzes them constantly to make sure that they fully understand what they're seeing. For instance, he will not let any of his trainees pull out a meter and take any measurements until after they tell him what they expect to find. His approach is definitely demonstrative of the constructivist framework.

While I’m sure that there is much more to each of these theories than I have yet grasped, for me, the figure that the authors presented (“Comparison of the Associated Instructional Strategies…”) was a very useful way to think about how each of these frameworks might be applied at different stages and in different learning contexts (Ertmer & Newby, 1993). As the authors note, the key question is “which theory is the most effective in fostering mastery of specific tasks by specific learners?” This question ties in well with the discussion of instructional design offered by Morrison et al (2013), which explains that designers approach instructional problems from the perspective of the learner rather than from the perspective of the content. Hence, different learning theories may be best suited to specific learners and specific learning objectives. We keep all of them available in our toolbox and employ the best theory and strategy for the best outcome in a specific situation. In this sense, we are approaching the task of teaching in the fashion of pragmatism, experimenting with a variety of strategies with the goal of maximizing student success (Elkjaer, 2009).

References

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