Introduction: A Hitchhiker's Guide to Learning Theory

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When I had just graduated from secondary school, I decided to travel around the USA for a month, at least partially by hitchhiking—carrying a backpack, and asking for others to give me a lift toward my destination of California. I was looking for adventure, rebellion, and freedom. But more than anything, I came to realize, I was just hoping to learn more about the world around me.

I left Ohio in a car with a friend, and after canoeing in Minnesota, driving across Canada, and backpacking in the Rocky Mountains near the US/Canadian border, I finally set off hitchhiking on my own toward southern California, an additional distance of about 2600 kilometers. Amazingly, I am pretty sure I arrived there after only 6 different drivers giving me lifts. What I hope we can do together in this session of CALMet is to go hitchhiking through the world of training by getting rides from 6 different learning theories.

Some, perhaps many trainers and instructional designers have distrust or disinterest in theory. It can seem remote, coming from an ivory tower, or even ethereal and not grounded in the real world. So we borrow from theory just enough to make a case, if we need to argue about our design decisions, but otherwise the way seems obvious, and theorizing is just saying the obvious with big words. Or worse, it is saying obscure things that in no way relate to the project we are working on and need to complete by next month, or by tomorrow!

But everything we do is accompanied by theory, and whether consciously or not, we can't act without theory. Theories guide our actions by providing a rationale for decision making. We don't make decisions without them. For example, if you want to teach radar imagery interpretation, what is it that makes you decide to:

- conduct a simulation of a severe weather case study, versus
- present a lecture with lots of imagery examples, versus
- hold a class discussion in which students practice making their own interpretations of radar imagery, versus
- provide a series of interpretation exercises online as homework with immediate feedback, versus
- lecture about the basics with idealized imagery and then break learners into small groups to discuss regional radar data, versus
- ask students to capture their own radar cases from their locations to present to the rest of the students, versus
- set up a publicly available website where forecasters can share interesting radar cases after they occur?

So many choices, and there are learning theories behind each of them, but there are other considerations behind the choices as well. The theories we use are not always the best for every moment and for every situation we face. They are tools, and we should choose the correct tool for the

job, for the one it was designed to address, and for the situation demanding attention. Well, maybe that's a bit overstated. Theories do have biases, and come with values attached. We do, and probably should gravitate toward theories that reflect our values and what we know of the world.

But we shouldn't treat our theories, especially learning theories, like religions. The world is a pretty big place, and we can't know it all or keep it all in our grasp at any one time. We should use theories as starting points, as providing perspective, and then go on with our work trusting that we have some solid ground to base it upon. And we should be familiar with a variety of theories if we want to have the most options.

Should we treat our learning theories differently from our meteorological theories? Yes and no. "No" because all theories are incomplete. Even physical theories are subject to reevaluation and change, and should be thought of as tools. Remember the famous quote by the physicist Lord Kelvin in the 1890's that *"the future truths of physical science are to be looked for in the sixth place of decimals,"* which he said just a few years before the theories of quantum physics and general relativity were published and made physicists reevaluate all their existing beliefs. It is hard to believe that our fundamental truths might be questioned in just the next generation, or the next decade, but it happens.

But learning theories are different from physical theories because they are about people, and people are not the same as billiard balls or water molecules. Their behaviors are more complex, influenced by more things, and subject to personal beliefs and intentions. Billiard balls and water molecules don't change their minds based on feeling offended or having a conflict in values. Billiard balls don't have cultures. So, I think learning theories are harder to pin down, and learning theories have a more difficult time claiming certainty, if that is what we want from them.

I don't think we need certainty in education and training. We need truthful guidance that helps us move forward confidently in the situations we face, which is something different entirely. We need to hitchhike our way through the challenges of training by applying theories when they seem to meet our purposes.

In this series of discussions, which I hope will not just remain lectures, we will take rides with a few representative learning theories to see what they can offer to help us with our training decisions. I hope you will make them discussions by contributing your voices through Voicethread, or by contributing your text comments and questions through the discussion forum. I hope at least some of you will try Voicethread.

In this first discussion, we have been looking at the nature of learning theory and how it might be used, but to finish we will take a quick look at the theories that we will discuss during the rest of the session. It is in no way an exhaustive list, but it represents those most commonly used, and also the range that exists. This range will provide a feel for how broad the theoretical playing field really is. Learning is a big phenomenon to have theories about. Think how silly it would be to say we could get by with one meteorological theory. Learning is similar. Learning is one of the most pervasive activities in life, and perhaps even defines life. The ability to grow and adapt to better interact with and survive in a changing world is a defining quality of life. And that is what learning is. It deserves a few theories.

We will look at perhaps 6-7 learning theories, depending on how you slice it. And we'll look very briefly. They will fall into two broad categories. This organization might not represent what you will read in other places, but I think it is a useful one. It makes some big generalizations, and the lines are sometimes blurred. If you want to learn more about any of the theories, you can easily find websites, books, and papers that go in more depth. I'll supply a few papers. Maybe you will also.

First, there are the Psychological theories, those that look at learning from the perspective of an individual mind. Psychological theories look at the conditions that help minds change, and the kinds of changes minds go through. Some of these theories are concerned with the brain as the instrument of learning, and so they draw from neuroscience research. But not all. Psychological theories of learning are some of the oldest, and certainly the most pervasive. In this session, I will mention Behaviorism, Cognitive theories (which is a group of theories, really, so we'll look at a few), and Constructivism (which has cognitive and social flavors, so it bleeds into the next group). Very briefly, behaviorism in concerned with how behaviors change, not about what happens in the mind. It looks at how feedback, rewards, and punishments influence behavior. Cognitive theories care deeply about what happens in the mind, like how we remember and recall, how we process information, and how we make decisions. Constructivist theories are concerned with how we each create our own unique knowledge based on our unique accumulation of learning experiences and interactions with others.

The second group of theories contains those that are Ecological. These are concerned with a bigger picture, with how minds interact to create shared learning, and how they change the world in the process. The word Ecological makes analogy to the biological sciences. Ecology was a revolution in biology, because the unit of analysis shifted from organisms to communities of interacting organisms, and including non-living aspects of the environment as well. The same shift has occurred and is influencing the world of learning theories. (By the way, just to make things confusing, you can Google the term "Ecological Psychology" and find that this refers to a branch of psychology. Did I warn you that the lines will sometimes be blurred?)

Most of the Social Learning theories fall in this Ecological category, but it includes others. The first one I will mention is Constructionism, and a related theory called Connectivism. We will also discuss Activity Theory, which is derived from Constructivism, and finally Pragmatist Learning theory. Sorry for all the jargon. I am sure it is confusing, but I hope it will become clearer. For now, just remember that this group of theories is not about individual minds, but minds working together in their environment to create shared knowledge, not JUST individual knowledge. These theories value shared knowledge as the most prevalent and practical kind. They see individual knowledge as somewhat illusory. Those of you who are meteorologists might want to see those theories on top as hydrostatic models, and those below as non-hydrostatic models. Simplifying the equations by ignoring certain kinds of interactions is good for rapid results, but broader considerations might be better able to predict thunderstorms and, perhaps, epiphanies.

Briefly, Constructionism is concerned with how we collaboratively construct artifacts, like theories, training, and weather forecasts, and how learn in the process. Activity theory examines how people within communities work together toward common goals and learn as a community in the process.

Pragmatism is a way of seeing the world as transactions between individuals and the world, which includes other people, and the mutual changes and learning that result. It sees inquiry as the model for learning. Even though we'll talk about it last, the sources of pragmatism are probably the oldest of all the theories.

Obviously, learning is both psychological and ecological. We don't learn in isolation. Even if we are self-directed learners reading books and doing online learning, these are products coming from other people. And we don't learn without processing information and forming mental models and storing things in memory. And we don't learn if it doesn't eventually manifest itself as a change in our behaviors, even if those are behaviors are primarily thoughts.

When you go hitchhiking, it is not just the driver you benefit from, but the other passengers as well. So a few more ideas might creep into the discussions along the way. I will keep things brief, briefer than this introduction, but for each I will do my best to also try to show strengths, limitations, and applications. I am hoping your thoughts will trigger more in-depth discussion, and will trigger both me and you to dig a little more into the literature to find answers.

Now it's time to put out your thumb. Don't let the complicated names of the theories scare you. I think it is good to know the names, because you will hear them, but we'll keep the jargon to a minimum in the explanations. These will be short, a lot shorter than this introduction. It is probably safest to begin with behaviorism, since the later sections may assume you know some things about that.