MSIDT525 MIDTERM EXAM (15 POINTS) SPRING, 2010

1. The distinguished authors of *How People Learn* recommend designing instruction for both children and adults using a framework that is "learner-centered, knowledge-centered, assessment-centered, and community-centered." These four "centers" are very broad descriptors. What does each "center" mean to you? Fully discuss your conceptual understanding of each of the four centers. In addition, provide a concrete example of each "center" drawn from your experience as a learner, a teacher, an instructional designer, or a facilitator of adult learning.

Learner Centered

The National Research Council uses the term "learner centered" to refer to instruction that focuses attention on the "knowledge, skills, attitudes, and beliefs of the learners" (2000). In short, learner centered instruction means that teachers need to "get a sense of what students know" (Council, 2000). For myself there are many methods that I apply to affect learner centered instructions in the classes I teach. On the first day of class I have each student stand and tell the class a few things about themselves, like where they work, what their experience is with the subject matter, and what their expectations are of the class. Through this process I find that several things are being accomplished. First and foremost it helps to create an environment where students become more comfortable with each other. In technical courses students are often intimidated by others students, fearing that everyone else knows more than they do. By the time each student is done talking about their experiences with the subject they'll be learning, for the most part, students quickly find out that they are all at about the same level – beginners. The student introductions also help students find other things they have in common and it gives them an opportunity to bond around their commonalities. The second thing I do is to try and convey to

students that this class is not organized around a student/instructor paradigm, but is instead a classroom of peers who are all interested in learning more about a particular subject. I achieve this in part by making my students an active part of my lectures. Instead of lecturing to them, I make it more of an exploration of information. It becomes more of a discussion than a lecture and it lets me check for student comprehension of the material without having to just sit them down and give them a multiple choice quiz on every chapter we're learning in class. Another method I find very helpful is giving students the reins to control their own learning. When teaching programming languages like HTML, CSS, XML, or ActionScript, I find that students put more effort into learning and get a better understanding of the material when they are allowed to come up with their own projects instead of using the ones that are included in their textbooks. It has been my experience that when students set their own goals they put a lot more effort into it and better retain what they are learning.

Knowledge Centered

Knowledge centered overlaps with student centered instruction and "begins with a concern for students' initial pre-conceptions about the subject matter" (National Research Council, 2000). As I stated in the section above on student centered learning, I use the first day of class to hear what the students have to say about why they are enrolled in one of my classes and what they expect to attain as a result of the class. This gives me an early opportunity to clear up any misconceptions students might have about the subject they will be learning and to plan ahead on how to incorporate certain parts of the subject matter into class discussions. It is a process that allows me to, as the National Research Council puts it, "focus on the kinds of information and activities that help students develop an understanding of disciplines" (2000). I think the in-class discussions give the students an ability to apply metacognition to their learning

because they can speak their mind on a subject we are covering and get feedback from myself or their peers which helps to facilitate an opportunity for them to reflect on how well they are grasping the material. I try to also incorporate progressive formalization into my classrooms by allowing students to choose their own projects. This motivates them into using their own interests to influence the goals that they set for themselves in the course. At first their work is very coarse and unorganized, but as they progress through the course they start to learn how to apply a structure to their work that gives their projects a more cohesive and professional look and feel. I believe that one of the things that my courses are most successful at accomplishing is giving my students the ability to "learn the landscape" of the discipline they are encountering. To meet this end, I go way beyond the standard "rutted paths" that are traditionally used to teach a subject. I try to give them the big picture, a feeling for what it is like to work in the environment that they are striving towards. My courses give students a much richer learning experience than just memorizing programming syntax because they are constantly involved in developing projects just as they would if they were working on real job. I encourage them to use their ingenuity and locate resources outside of the classroom to help them to better understand the subjects we are covering and to experience each application in a real world scenario. For instance, I have them build a library of URLs from Web sites that are similar to the type of Web site they are building for themselves, this way they can see the way others organize their HTML code, how to implement certain features that pertain to that genre of Web site, and what already exists in the development community. I also give my students deadlines and enforce them in an effort to impress upon them that this is something they'll need to get used to, in that their real job will constantly have deadlines that they need to meet.

Assessment Centered

I agree with the National Research Council when they state that "in addition to being learner centered and knowledge centered, effectively designed learning environments must also be assessment centered" (2000). When I first started teaching I viewed this concept from more of a behavioral perspective and used a multitude of quizzes and exams to assess my student's learning. It has only been in the last few years that I realized that my previous methods weren't creating learning that was giving my students the ability to transfer what they were learning in the classroom room to real world scenarios. I'm not sure how it came about, I think by mostly trial and error, but I slowly converted my teaching methods from lecture and test to more of discussion and project process. I have found that my student completion rate has increased dramatically since I began this new process. I have also changed my assignment scoring process from one in which their first submission was the only one that counted, to one where they still need to meet the initial deadline, or be penalized on their score, but more like it would be in the real world, I give them feedback on their submissions and allow them to improve upon their work based on my comments. I have had many students tell me how much they appreciate this type of methodology and, as I said, my student completion rates have increased dramatically because of the change.

Community Centered

The National Research Council uses the term "community centered" as a reference to "several aspects of community, including the classroom as a community, the school as a community, and the degree to which students, teachers, and administrators feel connected to the larger community of homes, business, states, the nation, and even the world" (2000). In order to

help the entire classroom to come together as a community, one of the first things I try to do is to dispel some of the standard "unwritten norms" about how students should interact within the classroom environment, especially when it comes to students asking or answering questions. I tell my students that there are no stupid questions and that the only stupid questions are the ones that go unasked. During class discussions when I or another student poses a question, if a student blurts out an answer, right or wrong, I praise them for answering. In the case of the wrong answer instead of saying "no, that's the wrong answer," I'll say something like "well that's a good answer, I can understand why you might think that, but in this case it's not the one we're looking for." It is my feeling that this creates an environment where students aren't fearful of being wrong and instead are encouraged to ask and answer questions. When they feel they are uncertain of their comprehension they'll feel at ease to ask necessary questions. When they think they know the answer they'll feel comfortable in providing an answer even when they might not get it right. In the past, before I adopted this technique I can remember seeing students "turn-off" as soon as I told them "no" that they didn't have the right answer. Now, they seem to interact during discussions with a lot more enthusiasm and less inhibition. Another technique I find to be very successful with students is when they have made a mistake, say by mistyping syntax, I'll tell them a story about how I got it wrong once too and maybe share a trick I use to help myself remember how to organize the information in my brain. I think it helps too that I emphasize how much I am a student just like them and talk about my successes and failures when I was in their shoes learning this subject. As far as bringing the larger communities into the classroom, I find it is helpful to talk about how I use the knowledge that they are learning when dealing with the "real world," like how to deal with client issues, sometime these are issues that I have just experienced, sometimes they have happened in the distant past, but students seems to be able to

better comprehend what they are learning when they understand how it might be used in real world scenarios. I also like to talk about and expose my students to the "development" community. I like to expose them to where all the standards, and rules, and regulations come from. Like why do we use "alt" tags when adding images to a Web page. I explain to the students that some viewers of their Web sites might be using screen readers and are unable to see the images that they are putting in a page. I'll even include a little introduction to the Americans with Disabilities Act, so that they'll understand that alt tags are more than just a courtesy, it's the law. I find a good motivational technique is to introduce students to some of the businesses and individuals who have had success in the field of Web design. It has the same effect as up-and-coming athletes who idolize their favorite sports figure; it gives them role models who they want to be like. Finally, one of my favorite things about teaching career education courses at the community college is our internship program which allow us to give students actual real world experiences and in many cases a foot-in-the-door to help them get started in their career field before they have even finished college.

2. The theoretical framework for this course is shaped by the predominant learning paradigms that evolved during the past two centuries: 1) behaviorism; 2) cognitive information processing; and 3) constructivism. Define the tenents of each paradigm using scholarly citations from authors in the professional literature. How is the role of the learner and the role of the teacher conceptualized from each perspective? Which paradigm do you most resonate with and why?

Behavioral Learning Theories

Behaviorism is the study of observable behavior, with an emphasis on behavioral objectives, analysis of learning tasks and activities, and teaching to specific levels of learner

performance. Instructional Systems Design (ISD) is based largely on behavioral psychology (Dempsey & Reiser, 2007). Behaviorism can be basically divided into two main areas, operant conditioning: the use of rewards and punishment to modify behavior and classical conditioning: conditioned stimulus = conditional response. Operant conditioning can be broken down into several sub-categories including: positive reinforcement, negative reinforcement, punishment, extinction, and the principal of indeterminate reinforcement. Positive reinforcement is behavior that is followed by positive environmental effects which increase in frequency. Negative reinforcement is behavior that is followed by the withdrawal of negative environmental effects with increasing frequency. Punishment is behavior that is followed by negative environmental effects which decrease in frequency. Extinction is when behavior that was previously increased in frequency through reinforcement is no longer reinforced making it decrease. Finally, the principle of intermittent reinforcement has two corollaries: first, if behavior is always rewarded and increased rapidly in frequency, but then afterwards the reward ceases, the behavior also extinguishes rapidly; and secondly, if behavior rewarded intermittently increases in frequency more slowly, it is more long lasting or resistant to extinction (Alessi & Trollip, 2001). In all behavioral learning places the focus on the objectives to be accomplished and does not take into consideration the variability of the learner. One of the claims that keep behavioral learning methods pervasive is the number of empirical studies that have been done involving behavioral learning. Supporters feel strongly that they have the numbers to back the continuance of their teaching methods and that the newer theories which challenge its dominance, do not.

Cognitive Learning Theories

"Cognitive psychology places emphasis on unobservable constructs, such as mind, memory, attitudes, motivation, thinking, reflection, and other presumed internal processes"

(Alessi & Trollip, 2001). According to the authors of *Multimedia for Learning*, Alessi and Trollip, cognitive learning theory is divided into three schools of thought, Information Processing, Semantic Networks, and Schema Theory (2001). Information Processing, considered to be the most dominant approach, consists of two foundational assumptions: "(1) that the memory system is an active organized processor of information and (2) that prior knowledge plays an important role in learning" (Gredler, 1997). Information Processing studies how information in the world, enters through our senses (modality), becomes stored in memory (short-term & long-term), is retained or forgotten (transfer), and is used (applied) (Alessi & Trollip, 2001). Semantic Networks tries to parallel how biologists view the connections of the human brain, conceptualizing learning as nodes of information connected by links characterized by similarity, as shown in figure 1 below.

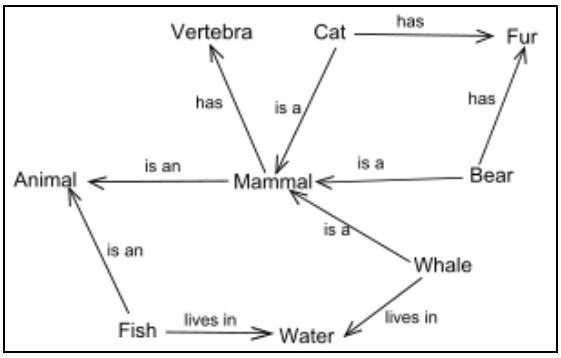

Figure 1 – Example of a semantic network from Wikipedia.org, 2010.

A third cognitive learning theory, Schema Theory is very similar to the Semantic Network theory.

The authors of *Learning in Adulthood* offer a slightly different perspective stating that cognitive theory is divided into information processing, memory and metacognition, theories of transfer, mathematical learning theory models, the study of expertise, computer simulations,

cognition and culture, and artificial intelligence (2007). From the perspective of Dempsey and Reiser, who are focused mainly on theories which have strongly influenced instructional design, cognitive theories can be broken down into two areas, Information Processing and Schema Theory. What the three groups of authors appear to agree on is that Cognitive theory includes Information Processing and Schema theory. In contrast to Behaviorism which, as we mentioned earlier, focuses on the learning environment, Cognitive approaches to learning shift the focus to the learner and the role of prior knowledge in learning new knowledge and skills (Dempsey & Reiser, 2007).

Constructivism

Constructivism is the newest theory of the three covered here. This theory is also the most controversial in that its results are less quantitative and more qualitative by nature. Constructivism views learners as active creators of knowledge, who learn by observing, manipulating, and interpreting the world around them. The teacher's role in constructivism is more to support the learner than to lead them. Alessi and Trollip divide Constructivists into three categories: social constructivism where learning is inherently social - norms, interpretations and knowledge are constructed by social groups; moderate constructivism where understanding of the real world is very individual and changing; and radical constructivists who believe that we can never really know the exact nature of the real world, so it is only our interpretations that matter. Radical constructivists argue that educational institutions are in grave danger if they continue to function based on behavioral or cognitive principals and that our educational systems must be redesigned along constructivist principals (2001). Alessi and Trollip offer these principals as tenets of the Constructivist philosophy: emphasize learning rather than teaching, emphasize the actions and thinking of learners rather than teachers, emphasize active learning,

encourage learner construction of information and projects, use discovery or guided discovery approaches, have a foundation in situated cognition and its associated notion of anchored instruction, use cooperative or collaborative learning activities, use purposeful or authentic learning activities, emphasize learner choice and negotiation of goals, strategies, and evaluation methods, encourage personal autonomy on part of the learners, support learner reflection, support learner ownership of learning and activities, encourage learner to accept and reflect on the complexity of the real world, use authentic tasks and activities that are personally relevant to learners (2001). To sum up Constructivism, it is very much a learner-centered approach to learning, but its methods are not proven by any empirical research.

My Theory of Choice

I wouldn't say that my teaching methods adhere strictly to any one theory specifically. I find that I use bits and pieces of all of them and apply them based on the learning situation at hand. For instance, in my Introduction to Networking and Data Communications class, there is a lot of lecturing and multiple choice testing going on in addition to hands on learning of some basic networking skills. This is a survey course that lays the foundation for all of the certificate programs that we offer in our department and there are literally hundreds of acronyms that learners need to understand conceptually and contextually. The lectures, which include a lot of diagramming on the white board, give the learners a good understanding of the concepts they are also reading about in their textbook. The quizzes, which can be repeated as many times as they want during the course of a week, give them the repetition necessary to drill the acronyms into their heads. I would say this class is primarily directed using behavioral learning methods. However, based on what I have been learning in my instructional design courses I have been

adding instructional tutorials into the mix that offer both visual and auditory stimulus; an approach which are more cognitively oriented.

In my programming courses there is also a lot of drilling going on in the sense that students are writing code repeatedly in order to help them learn the syntax through repetition. But, I am also using cognitive techniques like motivation by allowing students to define what their assignments will consist of, making them more relevant to their particular interests. Then there are the Systems Administration courses that I teach which are more constructivist oriented in that I provide the students with a framework to work within but they are calling all of the shots and I am just there to help them achieve their objectives which they define as we proceed through that course.

3. You have been introduced to many "brain facts" during the course of reading Chapter 5 in *How People Learn* and Part Four: Learning and Development in *Learning in Adulthood*. What information did you acquire about how the brain perceives, processes, and stores information that was most interesting to you? Given the extant research on biological development, psychological development, psychosocial development, age-stage theories, multiple intelligences, memory, and cognitive style, how does each area relate to designing instruction for adults?

Mind and Brain

The *How People Learn* chapter on *Mind and Brain* was a nice refresher on neural networks and how they work. Subjects like this are really interesting, and it is amazing how far the science has come in the last couple of decades. What I learned, that I didn't know before, is the theories concerning the overproduction, pruning, and adding of synapses in the brain. That

whole bit about how infants will lose their neural pathways for sight in a particular eye and never be able to have use of the eye regardless of what surgical procedures are applied due to visual abnormalities occurring at birth was both tragic and fascinating. In fact, I would have thought that it would be the case with most any visual impairment. However, when you think about it, people who get cataracts or other visual impairments later in life are often able to have the problem corrected. The timing of the synapses overproduction process really explains this phenomenon well. The same is true regarding the ability of infants to learn language. I see this as being genetically influenced, but the authors also make a good case for the fact that so much of our synaptic production is environmentally influenced. I'm not one who argues that it is one or the other, genetics or social influences; I've pretty much always felt it was a combination of both.

Adult Development

I thought the chapter on *Adult Development* in *Learning in Adulthood* was also quite interesting, especially the four approaches to adult development; most specifically the part on biological development and the three theories of why primary aging occurs. I had never heard those theories before, but each one seems as if it could be valid. Normal metabolism of oxygen causing cellular damage seems plausible, as does the cell's lessoning ability to repair daily breaks in DNA strands, but I'm leaning towards daily caloric intake as being the most influential culprit when it comes to aging. I saw a study reported on the Discovery Channel about researchers who have studied Indians; we're talking middle easterners here not Native Americans. Indians apparently have the largest number of people in the world who live to be over 100 years of age and researchers believe it has something to do with their diet, specifically their relatively smaller amounts of daily caloric intake. Partly they believe that the brain is forced

into a survival mode which, in the long term, keeps the body healthier and increases the longevity of the organs and critical life support systems.

Cognitive Development

The chapter on *Cognitive Development in Adulthood* was also very enlightening. I was not familiar with Paiget's work; most of the cognitive research I've read has been work done by Richard E. Mayer. I think that the neo-Piagetian scholars' theory on postformal thought has a lot of validity; I'm guessing this is where the metacognitive aspects of cognitivism come from. I also agree with Perry when he says that the "context of knowledge is as important as the knowledge itself." Perry's positions and transitions between them also makes a lot of sense, at least these are things that I see occurring in my own life.

Cognitive research and Adult Learning

I think that one of the biggest surprises for me was reading how the authors of *Learning in Adulthood* and other researchers feel that cognitive research "is at best a set of working hypotheses" (Merriam, Caffarella, & Baumgartner, 2007) and that there has not been enough empirical research on the subject to be able to reliably apply any of it principles to actual teaching practices. In fact, I would have to disagree with their statements at least with regard to one area I have been studying, that of cognitive load and its relationship to learning. Richard E. Mayer has done a substantial amount of research and developed some very plausible learning theories including the multimedia principal, the coherence principal, the signaling principal, the redundancy principal, the spatial contiguity principal, the temporal contiguity principal (Mayer, 2009) just to name a few. Mayer has performed numerous empirical studies and gathered a significant amount of data which seem to prove out each of his theories. He has also published his results in several peer reviewed journals including Psychology Today and he has published

several books about his findings. I'm not sure if Merriam et al are familiar with Mayer's work, but in my opinion Mayer's research has provided some valuable insight into what multimedia techniques work best when it comes to adult learning.

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