Chapter 9

Constructivism and Constructive Learning Environments

While developing the Andragogical Learning Culture Concept for the fire service, I chose the use of constructive learning environments, and constructivism as a basis for understanding how we learn.

Jonassen (1999) conveys the following about Objectivist vs. Constructivist learning designs. The Objectivist notion that knowledge can be transmitted by a teacher and received by a student, is in contrast to constructivist which says "knowledge cannot be transmitted, but must be "constructed" from experiences (p. 217).

For the fire service Learning Culture model, the constructive learning environment (CLE) is designed to address problem solving, and Jonassen (1999) states: "The fundamental difference between CLEs and objectivist instruction is that the problem drives the learning, rather than acting as an example of the concepts and principles previously taught" (p. . What this means is when we design a learning environment, whether it be on-line via the web site, or in the field as a practical exercise, the main focus will be to solve some relative problem. By using CLEs this way the individuals may construct their own learning, as individuals and in social settings.

The key elements to CLEs are, according to Jonassen (1999), 1) A problem context that the learner can feel they are a part of, or have "ownership" in (p. 220); 2) A "performance environment" as well as context that allows the learners to understand the problem better; 3) "Community of Practitioners/Performers/Stakeholders" (p. 220) which let's the learner know who the players are for their problem to solve; 4) "Problem representation/Simulation" (p. 221) which presents the representation of the problem to

the learners, and the quality of this is "critical to learner buy-in" (p. 221) According to Jonassen, this representation "must perturb the learner"; 5) The problem must be "authentic" which means "supporting the performance of specific real-world tasks" (p. 221); 6) The "Problem Manipulation Space" (p. 222) is where the learners are involved in "mindful activity" (p. 222) where "they must manipulate something (construct a product, manipulate parameters, make decisions) and affect the environment in some way" (p. 222). These are the key elements to Jonassen's CLEs, which I've adapted to use in the Learning Culture model. The CLEs are to be supported by solid domain information which allows for the learner to have the tools to understand and construct their own solutions to the problem.

In 2006 I utilized this CLE concept for Poudre Fire Authority (PFA) driver operator annual skills training. I'll use one example to describe the use of CLE's in the fire service culture. In August of 2006, the PFA driver operator skills CLE problem was accomplishing 2000 gallons per minute -- with two fire engines to PFA's Truck 1. All crews felt ownership in solving the problem, since none had ever previously flowed this volume of water in training. The performance environment was a known hydranted water system at our training facility, but unknown water system dynamics. The performers or stakeholders are the crews who are assigned to perform this exercise under actual fire scene conditions. The simulation was as would be accomplished, without the critical time elements and resource constraints of an actual fire scene. The mindful activity was presented (see Chart 4.1) by the instructors, then the fire crews on scene were allowed to problem solve and attempt to accomplish successful results. The progression for this paradigm of water flow began with instructor dependency by the

students to explain the scope and purpose, as well as pertinent safety information. The instructors assigned Fire Captains to assume key roles, and then the instructors passed into a facilitator role. As the simulation was developing, all involved were collaborative learners. Each simulation (3 days, and 5 classes each day) were different depending upon the methods chosen by the crews. I captured the relevant lessons learned and produced a presentation which was posted on the web site, as additional domain information (See Appendix G).

The most significant aspect of CLEs for us in the fire service, is the ability to maintain the complexity while training. What I mean by this is that many times instruction design "often filters out the complexity that exists in most applied knowledge domains" (Jonassen, 1998, p. 224). What this means for the fire service is that many times instruction tries to level the educational playing field to bring information to all cognitive levels at once. "Cognitive Flexibility", as Jonassen (1998) describes is when the complexity is allowed to remain in instruction, thus allowing all levels of cognitive development to construct their own knowledge from their specific levels. Jonassen et al, have described Cognitive Flexibly Hypertext as a means to take case based information which "provides multiple representations fo the content in order to convey the complexity that is inherent in the knowledge domain" (p. 224).

Virtual & Physical CLEs

Much of the published information about CLEs are designed for the virtual environment, as Jonassen (1999) indicates. The virtual environment is dependent on a

sound Internet or Intranet access, as well as the ability to construct web pages that are easily accessed. Chapter 10 will cover the Web in more detail.

For 2007 we are developing virtual CLE's prior to their field CLE's, so they may solve for what they think may happen, then actually try their hypothesis out in the physical environment. The web based presentation of the problem, the context, and manipulation space, allow for perturbation and problem solving in the station. The physical CLE, or realistic simulation, reconciles the hypothetical with the actual problem solving results.

Facilitation

In 2006 I hired many associate instructors to assist me with facilitating these CLEs. I attempted to share our Learning Culture facilitator philosophy with the other instructors. Without data to support the results, I conveyed this as our role and just oversaw the other instructors. All were into the spirit of facilitation, instead of "teaching" and directing the fire crews.

In 2007, I will hold an instructor meeting, prior to any learning environments, to present the Learning Culture, and their role as facilitators. Hopefully, they will be aware of the changes, and be willing to participate as teachers when needed, facilitators when needed, and collaborative learners when appropriate.

Facilitator Guides

I chose the use of facilitator guides to impart the problem and context, through learning goals, outcomes, and objectives. These facilitator guides were designed in 2006,

for PFA's Driver Operator skills training program. The intent was to have our training staff facilitate the CLEs, but recognizing the reality that many learners would miss the scheduled CLE, it was imperative that the company captain be able to facilitate these CLEs for their crews.

I fielded approximately 3 phone calls from company captains who had questions about the facilitator's guides (36 fire companies, 150 firefighters in PFA). When the question was asked about make up training, I asked them if they had any problems finding the PFA Training Division, driver operator skills web page? They all said they had no problems finding the web site. I asked them to please read the facilitator's guide, and call me if they didn't feel they could accomplish the learning outcomes, via the learning goals and objectives. I had no captains call and ask me for help. All PFA drivers accomplished their required skills training, with the exception of one, who chose to not participate for personal reasons (see Appendix G)

In 2007, we will rely on facilitator guides to present the CLE problem, context, manipulation space parameters, simulation required equipment, personnel, or logistics. (see Appendix H).