A DISTANCE LEARNING MODEL FOR TEACHING HIGHER ORDER THINKING

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A teaching model for distance learning (DL) requires a system (a technology) and process (a way of linking resources) that makes distance learning no different than learning in the traditional classroom.

The process must support a design that provides for learning, ensures maximum transfer, and is student-centered. The process must provide a methodology for harnessing the DL technology taking into account learner motivation, learner styles, and learner assessment. This article describes a teaching model for distance learning and provides design factors and interaction possibilities to implement the model.

How do we learn best? Any teacher will tell you that direct experience is the best teacher. Often, classroom teachers will conduct experiments and demonstrations or have the students watch or participate in variety of experiential activities. A good teacher is a facilitator and allows students to share ideas and explore. Today the teacher has another tool in the classroom that allows students to do the same things as in the past. This new tool is hypermedia.

A prime example of powerful hypermedia is the worldwide web, which provides more material than presently exists at most schools' media centers.

The material it offers can be accessed in many forms-graphics, video, texts, and sound—and in some cases is interactive. Material can be accessed from many starting points and along many paths.

Despite the emergence of powerful technologies, the process of developing ways to use these technologies to provide meaningful learning activities for students is taking a backseat to the learning of the hardware and software programs. Previous attempts have included the development of resource centers and classrooms without walls. But, these new learning environments are, for the most part, not fully developed to create new roles for students and teachers.

We also know that students learn best when they are highly motivated. Heightened motivation creates an emotional component that increases retention and increases the amount of time the student
is engaged with the learning material. Simulations, games, and exploration are used in the classroom today, but they are usually paper-based or board games. With the computer in the classroom, more sophistication is available. Our students have become accustomed to sophisticated materials and to sustaining lengthy periods of engagement in them.

How do educators learn the motivational and embedding techniques that these games use to provide information for the game player to reach the next level of play? What is the process? Game players learn how to play the games from peers and/or mentors who provide constant feedback. One learns very quickly the consequences of a mistake when the dragon eats the player and the game is over. Children and adults playing sophisticated games will persist past the usual concept of tolerable frustration to achieve a goal in a game. How can the educator provide these motivators in DL?

**Bloom’s Taxonomy: A Need to Climb the Ladder**

In 1956 Benjamin Bloom developed the taxonomy for the cognitive domain of learning—a linear progression through knowledge, comprehension, application, analysis, and synthesis to evaluation. The classroom teacher focuses on addressing the cognitive levels of knowledge and comprehension as building a foundation for critical thinking, and there are some teachers who work at the application level. The higher-levels of the domain (analysis, synthesis and evaluation) are now coming to the forefront as we teach how to think, not what to think. This move toward critical/conceptual thinking is to be applauded. However, DL is currently no further along than the classroom in supporting high-level cognitive skills development. Much of DL appears to be geared to focus on knowledge and comprehension, which works well with procedural and technical training.

**Needed: A DL Process**

How do we teach the higher cognitive skills using DL? The answer lies in a dual approach to cognitive skills learning. The classroom teacher is taught very early in the schooling experience the system and process needed for learning to take place in the traditional classroom. The DL educator, too, must know the system and process of DL learning.

The hardware and software portions of the system are being taught to educators, but the delivery system’s strengths and weaknesses, the interconnectivity, and customer’s capabilities are not. If the learners cannot receive what is being developed for them, or if one network does not talk to another, the design and development of material can miss the learning goal. Thus, technologists are providing educators with a wide assortment of tools, but, they are not providing parameters for the design, development, and implementation of material.

To the extent that process is being taught, it is in the realm of flow diagramming and storyboarding. This approach puts the cart before the horse. Until the designer/developer of DL applies learning theory, learning styles, and design features to the production of the product, thinking will remain at the knowledge and comprehension cognitive levels.
The technological system can provide the learning environment, the architecture for delivery of material, but the process is what will provide the synapse connectors for learning to take place. Distributed education is a mix of “space” and “place” education. It is enriching background. It must be cohort and application based.

One of the first steps in the process is to use the DL formula for cognitive learning. This is a very simple formula: 

**objectives + learning process + relationship to instructional media = cognitive learning.**

This same formula has been used in education from the beginning of organized instruction. Organizational influences in cognitive learning are attitudes/values, knowledge, skills, and experience. To account for these influences, educators must develop protocols (as used in medicine, procedures), scenarios, models, and configurations that account for the interplay of these organizational factors. This requires establishing a knowledge base that is modular and embedded in experience too.

The difference today is that the relationship to instructional media has changed to the tools of DL rather than printed books or colored chalk. Likewise, there have been significant changes in our understanding of the learning processes. As mentioned earlier, a key variable in DL is motivation because of the sophisticated experiences many students are gaining through their interactions with games and commercial educational materials. Stoney and Oliver (1997) explain how learners are motivated: immersion, reflection, flow, collaboration, learner control, curiosity, fantasy, and challenge. Our students watch television and spend billions of dollars to play electronic games based on these motivators. Similarly, whether the instructor agrees with him or not, Gardner (1999) stated that people are capable of at least seven different ways of learning. Gardner believes that the ways in which people process information can be classified as linguistic, logical, musical, spatial, bodily, intrapersonal, interpersonal, and intelligence of the naturalist. The new multimedia teaching materials for the classroom are evidence that developers of these materials are listening to Gardner or others like him.

**Constructivism and Cognitive Flexibility**

As mentioned earlier, the role of the teacher in the classroom has changed to facilitator/mentor. This role is part and parcel of student-centered learning, a DL perspective to the formula. Two other key aspects of the process are the constructivist approach to learning and cognitive flexibility theory. These theories help us understand how a teacher assumes the facilitator role and increases the students’ motivation to stay engaged in the learning process.

The constructivist approach asserts that meaning is constructed by the learner, and not imparted by the teacher. Today, classroom teachers impart knowledge to give the students what they, the teachers, know, yet, students do not always understand. Why? Because the way the teacher learned the material may not be the way a student can process the material. Johnny was told to sit up straight and keep his eyes open as the teacher read the story to the class. How-
ever. Johnny was listening to the teacher with his eyes closed, visualizing the story. But sitting up in class and watching the teacher read, he saw the other students and was distracted. The cognitive flexibility theory states that information, procedures, and principles are best applied using the judgment of the problem solver in a given situation.

What about the three higher-level activities of Bloom's cognitive domain—analysis, synthesis, and evaluation? How do instructors develop them and apply them in authentic problem solving situations? They do so by using best judgment of the problem solver in a given scenario to an interesting problem.

To this point a number of questions have been posed on the need for a teaching model or process in distance learning without any answers being provided. This model or process must basically address methodology when students are not sitting in front of the instructor. The answers to most of the questions are a well-developed teaching model, design factors for material development, and venues for person-to-person interaction, be it with fellow students or the instructor.

**A Teaching Model for DL**

The following is a teaching model for interactive distance learning (Figure 1).

The model is centered on learning

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*Figure 1*

A Teaching Model for Distance Learning

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With Apologies to
Benjamin S. Bloom
David Krathwohl
Mortimer J. Adler
Abraham Maslow
objectives and uses the fundamental teaching strategies. The model works with any subject area. In fact, the model is similar to learning models used in the last 50 years. These student needs listed in Maslow's Hierarchy are the same. Whether the instructor is teaching in the cognitive or affective domain, the other domain has implications and associations. The teaching strategies are basic; what we have been doing still works. While the basics are the same, where and how they are delivered are different in distance learning.

Cuban (1986, 1995) concludes that little has changed in the development of instructional technology because the fundamental goals and understandings of education have not changed. Bradshaw (1997), on the other hand or paradoxically, indicates that learning technology is a nontrivial and life-changing event. It is qualitatively different from learning other new skills, knowledge, and activities. Both authors' comments are relevant and valid. Both statements pertain to teaching using the new technology and the new teaching environment. Earlier it was mentioned that the advent of television era gave us the radio "talking head." We are at the same point in time with distance learning. Whether doing the news on radio or television, the basics of news did not change. News is who, what, why, where, when, and how. However, how it was delivered changed - first, the "talking head", now voice over video or on-the-scene reporting.

Lohr (2003) states that technology driven products are not designed well from either a practical or a visual perspective. Lohr labels technology driven design as "Technocentric" thinking: instruction driven design is "learner-friendly." In learner-friendly instruction, the designer's focus is more on the instruction than on using the tool to create the instruction.

Design Factors for DL

Curriculum content has remained constant, but delivery methods have changed. Several institutions and researchers are providing clues to improving the learning process in distance learning. The University of Phoenix chose intimate classes, practical lessons, and workmanlike technology to deliver DL (Shea 2000). Notar, Wilson, & Ross (2002) provide design factors for higher cognitive level distance learning instruction. When implemented, these design factors will provide for a template for use of the new technology and environment for the new and veteran teacher (Table 1).

The design factors address the requirements of delivering objectives-based instruction. The design factors are provided as discrete for purposes of thought and discussion, but they are also interrelated. Once instructors select their teaching objectives and methods, they select the design factors that will best facilitate that method.

An example would be a seminar on contemporary issues in education or a current event. The components of the distance learning delivery system being used in the example are a combination of teleconferencing, Blackboard (an internet presentation system) as a supplement, email, and regular mail. Course design factors chosen are 1, 2, 4, 7, 9, and 11.
Table 1
Design Factors

1. Embed learning activities in an overarching scenario.
2. Employ rich learning activities.
3. Use pictures, not text, to the extent possible.
4. Embed the data needed to solve problems in the learning context.
5. Have student provide "story" resolutions before they are exposed to "expert" solutions.
7. Present knowledge from multiple perspectives.
8. Use active learning techniques.
9. Stimulate the collaborative process by presenting problems so complex that students must work together to solve them.
11. Provide support at critical junctures to push student past current limitations.
12. Expose students to expert performance.
13. Provide pairs of related stories (vignettes) to learning to establish transfer outside the macro-context.

There are no correct answers or combinations. The use of the design factors must fit the delivery mode(s), objectives, method, content, and teaching style. The key is that the design factors provide configuration to accomplish the endless combinations.

All types of instruction require dialogue. Learning is sharing. Most learning occurs in communication between students and instructors and among students themselves. The design factors provide the development of material for the model. The teaching model requires person-to-person interaction or as they say in business, point-of-sale is where you must have power and impact. Notar, Restauri, Wilson, & Friery (2002) provide the interactive distance learning possibilities and interaction methods and criteria to help provide the powerful person-to-person interaction in the chart, which appears in Table 2.

Synchronous interaction occurs when the instructor is with the group. The group that has been assigned work and does not have the teacher present is doing an asynchronous interaction. The design factors will ensure that activities have in both instances been well planned and structured for learning to take place.

The first step in applying Interactive Distance Learning Possibilities is to determine which Interactive Distance Learning Possibilities satisfy the student needs por-
<table>
<thead>
<tr>
<th>Purpose</th>
<th>Benefit</th>
<th>Synchronous</th>
<th>Asynchronous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email/Digital Mailbox</td>
<td>Deliver and share assignments; personal one-on-ones</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Group Work/Pages</td>
<td>Groups given control over own interaction; various interaction possibilities available; peer critique</td>
<td>Easier sharing of documents; independent yet collaborative work</td>
<td>X</td>
</tr>
<tr>
<td>Group Appointments</td>
<td>Virtual office hours; track progress of group work</td>
<td>Instructor feedback given only to students in group</td>
<td>X</td>
</tr>
<tr>
<td>Individual Appointments</td>
<td>Virtual office hours; track progress per student</td>
<td>Instructor feedback given only to one student at a time</td>
<td>X</td>
</tr>
<tr>
<td>Web Research/Online Library Resources</td>
<td>Provide access to articles/information on web to supplement that provided in course</td>
<td>Students allowed choice of material; obtain practice in researching for valuable material on Internet</td>
<td>X</td>
</tr>
<tr>
<td>Presentations</td>
<td>Allow students to lead class in area of expertise</td>
<td>May be individual or group; can be presented through many different methods (modes)</td>
<td>X</td>
</tr>
<tr>
<td>Website Assignments</td>
<td>Hands-on/interactive activities on Internet</td>
<td>Use of preformatted quizzes, tutorials</td>
<td>X</td>
</tr>
<tr>
<td>Discussion Board</td>
<td>Equated to traditional class discussion</td>
<td>Clarify concepts for students; provide multiple views on topics</td>
<td>X</td>
</tr>
<tr>
<td>Virtual Classroom</td>
<td>Whiteboard illustrations, text chat, presentation/navigation with webpages</td>
<td>Class interaction with one another and instructor; review for exams, answer questions about assignments; archived sessions</td>
<td>X</td>
</tr>
<tr>
<td>Videotape/Videostreaming</td>
<td>Illustrate principles difficult to describe in text</td>
<td>May be video of instructor lecturing, interactive lectures with PowerPoint, or videos of special topics</td>
<td>X</td>
</tr>
<tr>
<td>Audio (CD)/Audiostreaming</td>
<td>Give students access to material that must be learned through auditory channel; interactive or pre-recorded lectures</td>
<td>Useful for foreign language studies; also helpful for real-time or delayed-response chat</td>
<td>X</td>
</tr>
</tbody>
</table>
trayed in Maslow’s list.

The next step is to facilitate the viability of the teaching method of instruction selected. Present technology is adequate for using these three methods. The availability to all learners of video and auto streaming, the growth of broadband, and other improvements will only increase the ability to be multidimensional in class presentation.

The introduction of the overhead projector, the computer, and the world-wide web into the classrooms has been life changing for many teachers. Distance learning and the many tools that come with it are also going to be substantial and life changing. The model for teaching has not changed. Instructors must still understand and quantify what they are going to teach, ensure that students’ needs are being met, and choose methods which will enable learning to take place, regardless of location. The educational environment and delivery modes will continue to change. The model for distance learning presented and its implementing tools will assist in leveraging technology to meet the challenge of these changes.

REFERENCES


