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MODEL FOR E-LEARNING CURRICULUM:

DIFFERENCES FROM TRADITIONAL CLASSROOM CURRICULUM

MODELS

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Abstract

With the popularity of e-learning and computer-aided training, the need for curriculum designed specifically for the electronic environment needs to be evaluated. Many curriculum models developed over the past 30 years are proven and have stood the test of time, but their design is aimed toward the purpose of designing traditional classroom training.

This article looks at some of the differences between the traditional student and the e-learning student and compares their needs to some of the traditional models of designing curriculum. The author then combines the needs of an average e-learner with a curriculum model to form a model for designing electronic environment curriculum.

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Introduction

"The only constant is change." It would seem that when this statement was originally declared, technology was the root of its purpose. Technology is changing on a daily basis and the use of technology for educational purposes is quickly becoming a necessity for proper instruction. "It is estimated that workers would have to prepare for two to three career changes in their lifetime" (Molnar, 1997, ¶ 12). E-learning or Internet based instruction is gaining popularity because of the need for additional training to compete in the job market (Judy & D'Amico, 1997). Many young people who work, go to school, and try to maintain a personal or family life are looking for training they can complete in their own time frame (Magoulas, Papanikalaou, & Grigoriadou, 2003).

Although the popularity of e-learning is increasing, many curriculum developers are using the same models to create e-learning instruction as they use to design and develop face-to-face teacher/learner instruction. "Too often e-learning simply regurgitates pages of text pulled from books and classroom courses. E-learning more often than not amounts to e-reading" (Honey, 2001, p. 201). The final product is classroom instruction on the Internet without the instructor (Munro & Rice-Munro, 2004). Most educators agree that there is a significant difference between on-line learning and traditional classroom learning. The first question arises, should there be a separate curriculum model for e-learning than for traditional classroom learning? If so, what differences need to be incorporated in an e-learning curriculum model to ensure proper education of its students?

A Review of Curriculum Models

Models used for curriculum design are developed to give educators a map or guideline from which to develop curriculum or instruction for use in their field. The models are designed so that by following a process the educator can produce complete and instruction-ready material for their students on a consistent basis. There are numerous curriculum models available that are specialized to fit any given situation but Gustafson and Branch (1997) divides them into three categories: Classroom Orientation, Product Orientation, and System Orientation.

Classroom Orientation models are designed for teachers in the classroom to develop their instruction for their own students and can be used by teachers at every level including K-12, vocational school, college, and university level. These models are also used in some business and industrial applications (Gustafson & Branch, 1997). Some examples of these models include:

- The Gerlach and Ely Model
- The Kemp, Morrison, and Ross Model
- The Heinich, Molenda, Russell, and Smaldino Model
- The Reiser and Dick Model (Brinkerhoff, 2001)

Product Orientation models assume that the product being developed will consist of several hours or days worth of instruction and would normally be used in producing a new instructional product that involves extensive testing. A teacher could use this model for larger amounts of instructional material or at the administrative level in developing curriculum for a class or department (Gustafson & Branch, 1997). Some examples of these models are:

- The Van Patten Model

- The Leshin, Pollock, and Reigeluth Model
- The Bergman and Moore Model (Brinkerhoff, 2001)

System Orientation models assume that an entire course or large amounts of instruction are being developed. This model could be used at the administrative level during planning and implementation stages of a new program or the retooling of existing programs (Gustafson & Branch, 1997). Some examples of this model include:

- The IDI (Instructional Development Institute) Model
- The IPISD (Interservices Procedures of Instructional Systems Development) Model
- The Diamond Model
- The Smith and Ragan Model
- The Gentry IPDM (Instructional Project Development and Management) Model
- The Dick and Carey Model (Brinkerhoff, 2001)

 "An instructional development model should contain enough detail to establish guidelines for managing people, places, and things that will interact together, and to estimate the resources required to complete a project" (Gustafson & Branch, 1997, p. 23*).* **The Dick and Carey model (see Figure 1 below), is one of the more versatile models and requires a ten-step process that incorporates all aspects of design and implementation of a curriculum program.** Although this paper describes classroom and product orientation models**,** this author believes that the ideal starting point to develop a continued change in the process of developing e-learning curriculum would begin with a system orientation model similar to the Dick and Carey model.
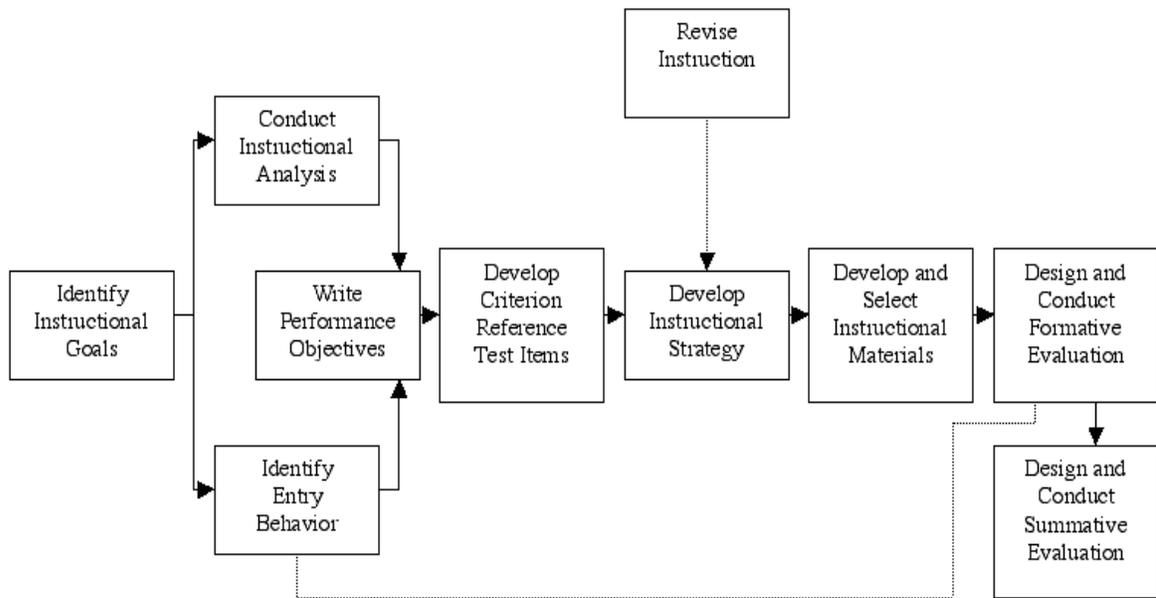
Figure 1. The Dick and Carey model (*Keystone Community Network*, n.d.).

E-Learning Technology: Present and Future

Present Technology

After World War II, the term "industrial arts" lost favor in the industrial and business communities and was replaced by the term "technology." The term "technology" captured more the impact of the sciences and steered away from the word "arts," which suggest more of a nonscientific activity (Herschbach, 1997). During this period technology included manufacturing, construction, communication, transportation, management, and electronics. Throughout this era and up through the present the public school system wrestled with a progressive student-centered education system where emphasis is given on a broad based education, which included vocational training as part of the basic education system and teacher-centered instruction designed to promote the mastery of specific subject matter (Herschbach, 1997). Technology and technology education have been redefined over the years to take on an electronic connotation with today's definition referring more to computers and computer operated equipment.

A student's success in today's world requires not only basic academic skills but also social and collaboration skills, higher order and critical thinking skills, problem solving skills, fluency in communicating in many modes and media, technical skills and the skill to initiate action (Fulton & Honey, 2002). The educator must decide the best medium for their students to attain these skills. Today, "Industrial technology educators must decide on how much technology they should use in their programs and which types of technology will prepare their students for the 21st century workplace" (Mosley, 2002, p. 30). Much of the current technology available is expensive and requires technical expertise to both install and maintain the equipment. Many of the decisions for

educational technology are based on financial analysis rather than needs analysis. However, with the increasing number of technology grants and the decreasing cost of electronic equipment, current technology is becoming more available to the education community.

Some of the current technology used in education today includes:

Computer Conferencing. Computer conferencing is an electronic vehicle that facilitates learning with dialog and interaction between an instructor and his or her student either asynchronous or synchronous (Gunawardena & Duphorne, 2001). Examples of asynchronous conferencing are e-mail between the instructor and the learner or posting messages and responses on an electronic bulletin board. Synchronous interactions happen electronically for example in a chat room situation or during a video conferencing session.

Smart Room Technology. A smart room incorporates the latest technology in a classroom or e-learning environment. A podium at the front of the room provides instructors with a microphone; VHS format VCR, computer, document camera and controls for all devices, sound and room lighting (Media Support Services, 2005). Cameras and projectors are used to capture or display information on the screens and send information to a remote location. Education through video conferencing is normally done in a smart room environment.

Virtual Technology. Virtual technology allows the learner to interact with an electronically generated artificial environment as if the environment was real. The virtual environment allows the learner to develop experiential knowledge from the interaction

(Molnar, 1997). This technology can be used to implement problem-based learning into an electronic environment.

   Wireless Technology. Wireless access has improved the availability of the Internet making it easier for users to retrieve and send information from anywhere their signal can be reached. This allows students not only to use their laptops in any room on campus that the signal reaches but also allows them to use benches and shaded lawns outside the buildings when they want to enjoy the weather on a nice day. This technology also allows student to access the internet via palm pilots and cell phones (Nasco, 2004).

What the Future Holds

   The advancements made in technological applications over the last 10 years are remarkable and surpass the thoughts of educators of the previous decade. The future of technology in education is as vast as our imagination can wander. Wearable computers and global wireless networks will make information instantly available anywhere in the world (Emerson, 1999). Technology that is already available such as virtual reality will allow users to build three-dimensional models in computer graphics environments. Medical students can perform surgery on simulated patients just as they would in a real situation (Emerson, 1999).

   In their article, "A Vision of Education in the Year 2010," Cadena-Smith and Shelly (2002) discuss a typical student's day in the year 2010. The student reports to the Learning Center (school), hooks up his or her electronic notebook, and downloads his or her homework and any notes from his or her parents. The information is immediately processed and his or her schedule for the day's activities are uploaded based on his or her previous and current personal data. He or she then reports to his or her learning pod to

start the day's activities with other students, either younger or older, and to receive instruction from his or her learning facilitator.

This type of education promotes learning centers focused on specialized areas of study with flexibility and personalized instruction for each student. Technology and technological instruction can allow this personal touch with large numbers of students. With the current trend leaning toward educating more students with less money, using technological resources will help the education process become more personalized with fewer financial resources.

<div align="center">**Difference of E-Learning Verses Traditional Classroom**</div>

Traits of the Average E-Learner

E-learning is more popular today than it ever has been**,** partly because of the increase of the non-traditional type of student. The need for additional training to compete in the job market coupled with the already overloaded schedules of most young people make the idea of accessing training on their own time frame an attractive way to enhance their careers (Magoulas, Papanikalaou, & Grigoriadou, 2003). The idea of regularly scheduled classes attended at the community college or local university is not a feasible or desirable alternative for the non-traditional student's academic or technological advancement.

Just as in any other type of learning situation, not all e-learners are alike. Someone who enjoys learning, in general, will aspire in any learning situation yet some learning styles or personality traits seem better suited for the e-learning environment. Social aspects of the learner, self-motivational skills, and the learner's confidence with

technology will all affect the level to which a student will prosper in the e-learning environment (Shepherd, 2002).

The non-traditional e-learning student does not have a daily classroom instructor to motivate and encourage him or her through difficult periods of a class. In a traditional classroom, a good instructor can sense when his or her students are becoming uninvolved or disinterested in the subject matter and can change gears by approaching the subject from a different angle (Eggen & Kauchak, 2001). A different approach to the subject can sometimes renew the interest of a student or the class, however in Web-based learning, this indifferent attitude is hard to appraise and even harder to counter because of the lack of on-site instructors.

Interaction among students and instructor has been a subject of study for many years; however, these studies have mostly been limited to the classroom (King & Doerfert, 1995). A simple model for communication as shown in Figure 2, requires a sender, a medium to send the message, a message to send, and someone to receive the message. In this simple model, the medium could be the sender's voice as in verbal communication, non verbal communication as in pictures or body movements, a word processor as in written communication, or electronic communication including e-mail, chat rooms and video conferencing.
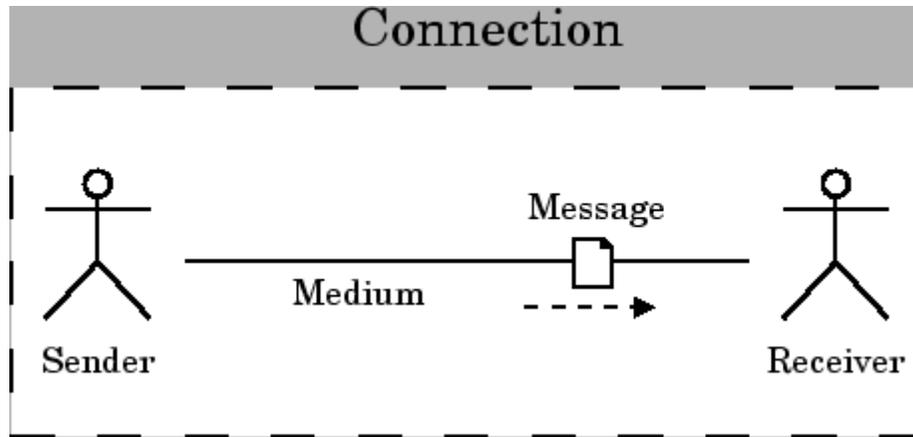
Figure 2. A simple communication model. (Bowers, n.d.).

When one communicates electronically, one adds a new dimension to the process (see

Figure 3), which is the encoding and decoding of information. Depending on the medium

used, the sender must encode the message so that the reader can receive and decode the

message. In other words, the medium must be compatible to both users in order for the

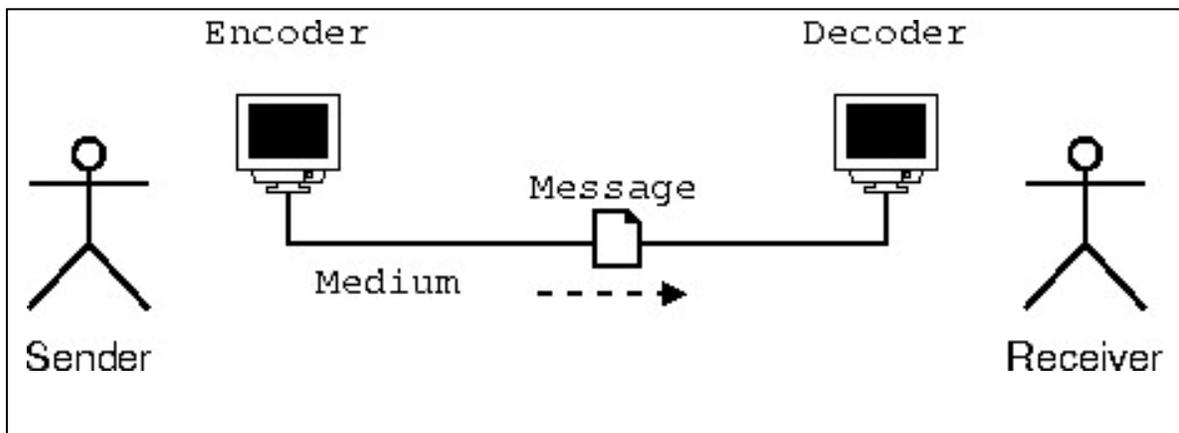communication process to be complete.

Figure 3. Communication model including electronic source (Bowers, n.d.).

There have been four interactive relationships associated with e-learning in a distance-learning environment: interaction between learner and content, interaction between learner and instructor, interaction between learner and learner (Moore, 1989), and interaction between learner and a technological medium or interface interaction (Hillman, Willis, & Gunawardena, 1994). Since all of these interactions are based on the comfort levels of the learner with the medium, the learner-interface interaction is of vital importance in the distance learner environment. This interaction is less important or not present in traditional classroom instruction.

Positive Aspects of E-Learning

Web-based learning with it's "anywhere, any time, any place" (Honey, 2001) aspect of education can be the answer to the non-stop schedules many individuals are challenged with in today's lifestyle. This is a way that even the busiest schedules can find time to advance themselves. With the current and future needs for technologically trained personnel to fill positions in the U.S. workforce, Web-based learning could provide the difference in having or not having the individuals needed in order to satisfy the necessary workforce requirements (Judy & D'Amico, 1997).

Discussion

A Model for E-Learning Instruction

Much of the current electronic instruction is based on tutorial models, which present a page of instruction (normally in textbook style), ask questions about the instruction, and provide feedback to the learner (Merrill, 1987). A typical tutorial model, as in Figure 4, shows the tutor or designer selecting information from the content, which

he or she provides for the learner's access, the learner chooses from the available

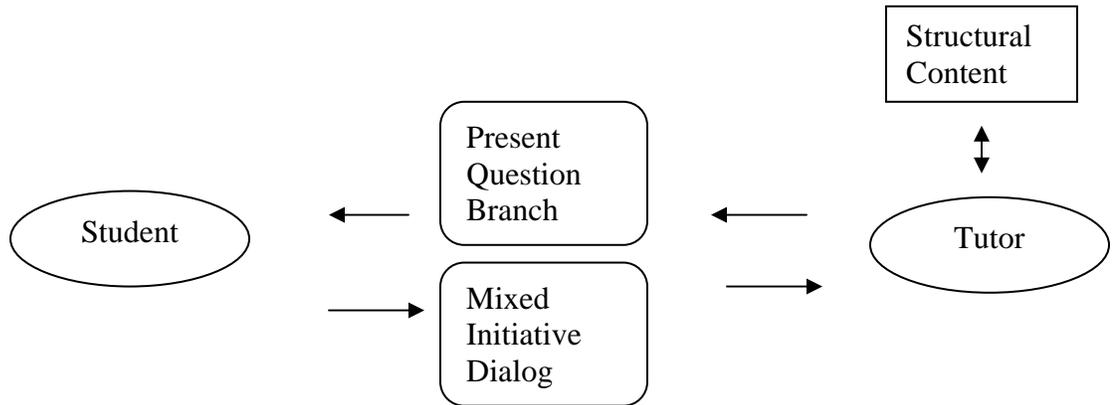information and gets feedback from the programmed information.

Figure 4. The Tutorial Model (Merrill, 1987).

Although this model is sufficient for review of information learned in prior

settings, it does not incorporate the interactions necessary for learning and

comprehending new information on a stand-alone basis. The tutor model could be used

successfully in a traditional classroom as a review tool to help the learner study for exams

or further the learning process.

Interaction between the learner and the interface is crucial in an e-learning

environment. A model for e-learning instruction should include a section for creation and

evaluation of this section of the curriculum. An ideal model will include all four of the

learner interaction procedures as shown in Figure 5 and have a strong developmental

stage that covers the complete process of designing curriculum from start to finish.
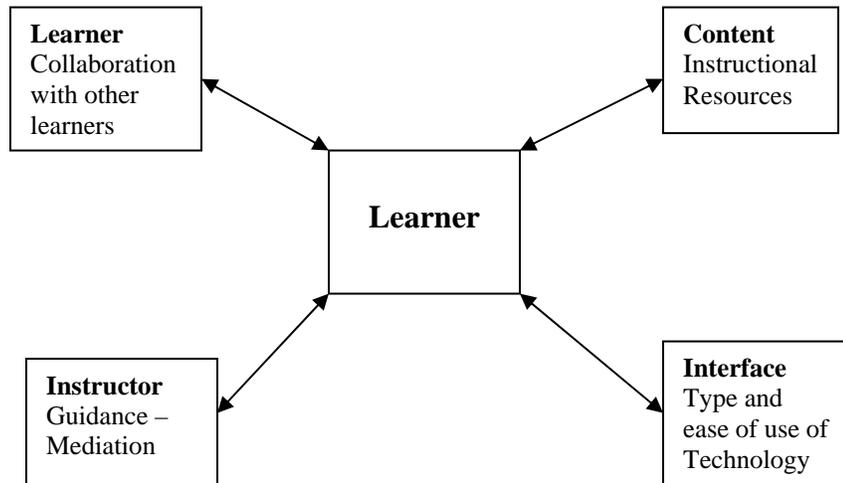
Figure 5. Learner Interaction Levels (Hillman, Willis, & Gunawardena, 1994).

Many of the models mentioned above can be adapted to the e-learning instruction by adding steps to incorporate learner interaction into the process. The Dick and Carey model would work well for e-learning curriculum with minor modifications. The Dick and Carey model is used intact until the "Develop and Select Instructional Material" stage is reached (see Figure 6). At this stage, the curriculum would be evaluated for interface, content, e-learner, and instructor interaction with the e-learner. The process would then go back to revision and development until the evaluation fits the outlined objectives.
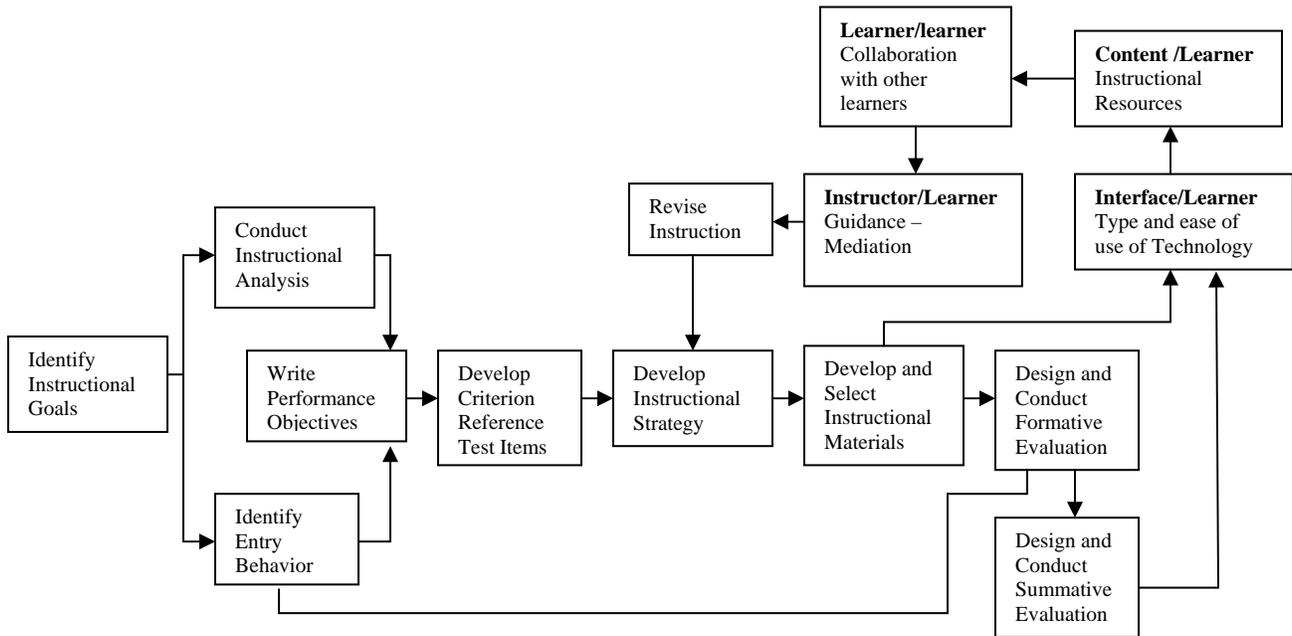
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┌─────────────┐         ┌─────────────┐
│ Learner/    │         │ Content /   │
│ learner     │         │ Learner     │
│ Collaboration│◄───────│ Instructional│
│ with other  │         │ Resources   │
│ learners    │         │             │
└─────────────┘         └─────────────┘
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Figure 6. Dick and Carey model adapted by author to e-learning curriculum.

       Entrance into these steps comes at two different areas. The curriculum designer

can enter the steps during the design and selection phase of the process so they can ensure

that the instructional materials fit the criteria for the e-learning module or they can enter

after the evaluation phase of the program to evaluate the effects of the e-learning module.

       The order of design through these steps relates to a hierarchy this author believes

is important to the design of the e-learning model. The technology should be first because

of access issues and continual change of resources. If the technology is the most up to

date, a learner may have entry problems into all aspects of the learning environment.

Adversely, if the technology is antiquated (which in today's world could be a few years)

the training may not be as interesting or interactive as necessary to provide the needed

training. Secondly, the content must work with the technology and be appropriate to the

knowledge needed for the students learning. Content also changes fast in some fields so

content must be examined from both the use of it though e-technology and the learning that will take place.

Third of importance is the learner-to-learner interface. Learners must have multiple communication sources and be motivated to communicate among themselves. One of the most important aspects of learning is the sharing of ideas among peers. This aspect is often overlooked in the e-learning environment and should be an import part of the design process. Fourth, but not to be slighted is the instructor-learner interaction. Most e-learning programs have a system for instructor communication. This interaction must be easy with immediate feedback. Without ease of communication and feedback in a timely manner, students become frustrated and disinterested in the process.

Interface interaction could be assessed through e-learner satisfaction analysis based on surveys designed for responses pertaining to online features and ease of use of pilot programs (Gunawardena, Carabajal, & Lowe, 2001). E-learning programs can have tools built into the system to measure the time an e-learner uses the system and how many areas or features are used by each e-learner. Content assessment is an ongoing process and should be analyzed against the learning objectives for clarification.

E-learner or collaboration interaction evaluation can be built into the e-learning program to track time spent in chat rooms and responses to discussion topics. Collaboration can also be assessed with surveys geared toward perceived interaction during training. Instructor interaction can also be built into the system by tracking e-mails, instructor lead chat room attendance and participation, and instructor lead discussion topics. By doing these evaluations, the curriculum designer can re-evaluate the

instruction, make changes and start the development process over to refine the e-learning product.

Conclusions

The model presented in this paper is a combination of ideas from several authors and although not proven as a collaborative effort, the individual projects of each author have been tested and proven to be of use in the development of curriculum for educational purposes. The author of this article has taken the liberty of combining the models to design a model that would meet the criteria for the needs of a typical e-learning student. The model needs to be tested and further research performed to ensure the model will perform as stated.

E-learning is still in its childhood and many changes are expected in the near and distant future. Problem-based learning is a plausible format of the electronic learning process as well as customized and individualized training for academic and corporate education. Electronic education will see many changes in both equipment and software, and educators must be ready to utilize these innovations to train future learners in the most effective and time efficient methods to keep up with the demand for a highly trained workforce.

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