Technology Strategies for Teaching and Learning in Education and the Workplace

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Abstract—This paper discusses how educators and/or trainers need to be mindful when using technologies for their instruction. It encompasses the technologies that will be effective and those that will not when designing courses. It reviews both asynchronous and synchronous technologies and whether it matters which is used. It discusses that an educator or trainer needs to create a comfortable learning environment for learners and the consequences of not doing so.

This paper reviews different learning modalities along with technologies. It discusses an educator or trainers’ approach when designing content involving technology and how important it is to build confidence in the learner’s use of the technology. Based on the learning modality and technology, it discusses the interactions between an educator and learner along with the relationships between the learners. It discusses different strategies such as discussion boards, lectures, active learning and the role learning modalities and technologies play in these different strategies.

Index Terms—Instructional design, technology, social presence, teaching presence, cognitive presence

I. INTRODUCTION

Instructional design is a key factor when educators and/or trainers create instruction. Educators and trainers need to understand the concepts and strategies pertaining to instructional design and human performance. When designing instruction with technology it should be effective for the learner. The educators and/or trainers should design the course such that the learner has a comfortable learning environment. A comfortable learning environment could mean the content is structured such that the learner feels it is meaningful to the context or environment of their course. Pertaining to the learning environment, it is also important for the instructor to build confidence in the learner’s use of technology. As comfortable learning environments are being created it is equally important that interactions are an integral part of the course. These interactions could include learner-content, learner-instructor, and learner-learner interactions. Many of these will build relationships between the learners and create a meaningful learning experience. Building these relationships is an effective approach when designing instruction. It allows the learners to interact, ponder, and consider what they are learning [5]. It actively stimulates the learner’s mind to do things that improve their ability and readiness to perform effectively [1].

Instructional Design hinges on linking learning objectives to specific learning activities and measureable outcomes [7]. It is equally important when designing instruction to keep in mind teaching styles and students’ learning styles. One teaching style will not work for all learners. That is why a variety of teaching styles should be utilized to benefit the learner and help them feel comfortable with their learning environment. Technology can provide a variety of learning opportunities. Integrating technology into learning objectives and learning activities can help teach students of various learning styles.

These learning styles could include auditory, visual, or tactile learners. An auditory learner is usually an independent learner. Some teaching styles could include lectures, discussion forums and verbal questioning. The visual learner is a dependent learner. Some teaching styles could include group learning, demonstrations, activities that involve creativity, and visual images. A tactile learner learns by doing and they tend to be creative. Some teaching styles could include experiential learning activities and simulations.

Instructors need to be motivating and positive in corresponding with learners whether it is in educational or business training. If instructors don’t respond reasonably quickly to learners, they may get anxious, nervous and sometimes angry. This is especially true with an online class. Learners need to know what is expected of them and the instructor needs to provide feedback in a timely manner. When designing instruction, the instructor needs to include many activities to promote learner engagement. Instructors and/or trainers need to be compassionate for their learners and their learning. Most important, they need to be open to change and to be constantly evolving no matter what learning modality is utilized.

II. TECHNOLOGIES

Many instructors have found that technology has helped them better connect with their learners [3]. To stay better connected with their learners, it is important for instructors to embrace technology. It could bridge the instructional gap between instructors and learners. New technologies may make a significant change in instructor-learner and learner-learner relationships. When designing instruction, instructors need to look at different technologies that will be an appropriate method of teaching to utilize most of the learning styles. It is always a good idea to keep a positive attitude toward the use or integration of technology in the classroom, regardless of the learning modality. Educators and/or trainers may deliver instruction via face-to-face, hybrid, or online.

When delivering face-to-face instruction, instructors and learners are in the same location. When delivering hybrid instruction instructors and learners are sometimes in the same location and sometimes in different locations.
It is a combination of face-to-face instruction and online instruction. When delivering instruction in just an online environment instructors and learners are engaged in learning activities in different locations. No matter what type of delivery is utilized educators and/or trainers can incorporate an asynchronous learning environment and/or synchronous learning environment. Asynchronous or synchronous learning environments can hopefully help educators and/or trainers realize how meaningful interaction between instructor and learners is so important.

An asynchronous learning environment is one in which learners and instructors are engaged in “anytime-anyplace” learning. Learners do not have to be in the same room with other learners or their instructor, nor do they all have to be engaged in a learning activity at the same time [10]. Examples of asynchronous tools are Blackboard and Moodle, but there are many others.

In an asynchronous learning environment instructors can post learning materials such as a syllabus, a welcome message, readings, additional resource materials, powerpoints, recorded powerpoint lectures, podcasts, external links, assignments, discussion forums, links to upload assignments, and online quizzes to name a few. It is up to the educators and/or trainers how to organize and design their course so it is effective for the learner.

A synchronous learning environment is one in which students and instructors engage each other at the same time, but not necessarily at the same location [10]. Examples of synchronous tools are Wimba, and Eluminate, but there are many others.

In a synchronous learning environment instructors can allow learners to interact with each other and the instructor. The instructor can share their desktop, explore internet sites, and facilitate inking with a tablet PC during a session and actually archive the session. By archiving the session the instructor can post the link for learners to access later. By doing this, the instructor can utilize the synchronous learning environment in a similar fashion to an asynchronous learning environment. The instructor can also create breakout rooms for the learners so they can present material for an assignment and archive it for other learners to view later. Other learners can also be present when the recording is taking place.

Asynchronous and synchronous learning environments can be utilized for all modalities. Again, depending on whether the course is being delivered face-to-face, hybrid, or online, it is important for the instructor to design the materials such that they are meaningful and effective for the learner. It is important to focus on effective teaching methods and/or effective training and not just on the technology. As educators and/or trainers start out utilizing different technologies, it is important to keep it simple for the learner.

In the future, educators and/or trainers need to be mindful which technologies will be effective for learners. As educators, trainers, and learners master a technology, a new technology emerges. It requires instructors, trainers, and learners to make adjustments. The important thing to remember is technologies can enhance and improve performance in a course, but technology needs to be effective for the course work and activities.

Another use of technology may include a tablet PC. A tablet can change the way learners and instructors interact. It can support active learning and add value to interaction in different learning modalities. In all learning environments instructors can markup diagrams, graphs, sketch, draw, annotate with a stylus, and markup math equations in class. It is possible to share notes electronically, work out problems on the fly, markup and annotate websites and provide written feedback to students on assignments via inking. The tablet gives the instructor collaboration and integration opportunities.

Additional uses of technology include podcasting, streaming video, blogging, social networking, digital books, YouTube videos, and Panopto, to name a few. No matter what technology is utilized it is important that it is effective for the different learning modalities. The most difficult modality to design are the online courses. This requires more time planning and designing effective strategies that include looking at the appropriate and effective use of technology, consistency in the course, promoting interaction and communication, aligning goals to learning objectives, integrating learning objectives in the assignments (which should enhance learning), and engaging learners throughout the course.

Besides the technologies discussed in this section, we are beginning to see some universities utilize the iPad in medical education. Some of these universities include University of Minnesota, Stanford, University of California-Irvine, and University of Central Florida. The iPad has a significant number of apps that can benefit educators/trainers in their classroom. As these apps are being discovered and discussed among the educator/trainers’ worlds, we will begin to see more universities implement the iPad for a specific audience such as medical education. It will be very interesting to see the different strategies educators/trainers utilize for their classrooms.

Since this is the most difficult, the remainder of this paper will address strategies and technologies that will enhance online teaching and learning. Garrison, Anderson, and Archer argue that social presence, teaching presence, and cognitive presence are three important elements in online teaching and learning [9]. We will look at each one individually because they are very important components in online courses.

III. SOCIAL PRESENCE

Social presence is the ability to present oneself socially and effectively in a virtual environment [9]. The educators and/or trainers needs to present themselves as a real person. As an educator and/or trainer it is important to be available 24/7 to learners via email/phone and get back to them in a timely manner. At the beginning of a course it is important to provide the learner with a bio of the instructor such as a photo, phone numbers for contact information, email, office location, virtual office hour
schedule, background of the instructor such as degrees and employment background. An introductory audio podcast welcoming them and explaining general information about the course is a great touch.

Besides the instructor presenting oneself socially and effectively in a virtual environment, it is also important for the learners to feel comfortable in the learning environment. An introductory discussion forum for learners can be set up at the beginning of the course to provide information about the learners such as uploading their picture, their phone number, and some basic background information. By completing the discussion forum everyone in the class should begin to feel comfortable and connected with each other. This allows names, faces, and students’ background information to be connected. Besides the introductory discussion board another discussion board can be set up at the beginning of the course for the learners to ask questions or make comments about anything during the course. Learners are usually willing to share with each other and this can be beneficial to the instructor.

A social network is another way for learners to stay connected with each other by utilizing Twitter, LinkedIn, and Facebook. Educators and/or trainers can also socialize using these technologies. Learners can appreciate that their instructor is willing to utilize social networking. As educators and/or trainers utilize the synchronous technologies such as Wimba, their learners hear their speaking tone and, if video is included, they can see their facial expressions. This adds a personal touch and adds more detailed information for the learner. It is important for educators and/or trainers to provide a comfortable, safe learning environment. Learners should feel that the instructor shows respect to the learners, values everyone’s opinion, encourages active participation, treats everyone equal, and provides timely feedback. The degree to which an instructor is perceived as a real person contributes to the social presence. It helps learners feel comfortable conversing online and interacting with others. This is an effective component which fosters expression of emotions and feelings and has been pointed out as a fundamental aspect of social presence [8].

IV. TEACHING PRESENCE

Teaching presence refers to the work of teaching before and during a course [10]. It is the educator’s and/or trainer’s responsibilities to design, develop, facilitate, and implement instructional materials for a course that are relevant to the course. Instructional materials could include a syllabus, chapter readings, recorded lectures, a short audio podcast explaining concepts, articles, assignments, content presentations, discussions, external links, videos, audio files, and interactive links. The syllabus should include goals and objectives and what is expected of the learner. If the assignments provide interactivity, it can give students’ ownership of their work which can enhance their self-confidence in the course. Interactivity increases students’ interest, improves cognitive processes, and develops group learning skills [6].

Assignments should have clear instructions, due dates, and expectations. Some examples of assignments could include:

- A self assessment where learners describe three things about themselves, how they learn, what motivates them, and the most effective teaching strategies
- Presenting an assignment individually or a group in Wimba and archiving it
- An online syllabus including goals, learning objectives, and contact information
- Designing a class unit
- Creating a rubric
- Creating an ePortfolio
- Describing attitude strategies
- Reflecting on course materials

When facilitating a course, all the materials can be organized in an asynchronous technology such as Blackboard. The course could be organized into weekly modules consisting of theory and practice components. Theory could consist of reading, listening, planning, or exploring. Practice could consist of discussion board postings, quiz preparing, completing assignments, and research topics. A synchronous technology could be incorporated into the course such as Wimba to record and archive lectures. Learners would also have assignments where they need to present in Wimba and archive it. If a tablet PC was utilized during a synchronous session, the instructor would have the ability to write directly on the screen and mark up drawings and develop material on the fly. The tablet’s ability to write directly on the screen opens up many new possibilities to the pedagogy of teaching.

V. COGNITIVE PRESENCE

Cognitive presence focuses on the construction of meaning through a process of individual inquiry or community inquiry instead of merely covering course content [9]. The educator and/or trainer needs to shift instructional strategies from giving or recording lectures to questioning, and open inquiry which helps students construct their knowledge through reflective thinking and practice. This creates a learning environment that captures the learners’ attention and promotes the curiosity for learning.

If educators and/or trainers emphasize student-to-student interaction through group and cooperative activities, the learning environment will increase from a teaching to learning paradigm [2]. This is sometimes difficult for educators and/or trainers because they may want to be in control. If group work can slowly be introduced into the course, the educator and/or trainer will begin to see the differences among the learners. The instructor can encourage the learners to understand the concepts by providing feedback and encourage the learners to reflect on their learning.

There are times when groups don’t get along. There can be resentment from students who feel they have done more work than others. Some learners are reluctant of group work because they prefer individual work. But
group work can increase opportunities for communications for the learners since the learners are working together to accomplish a shared goal. It can enhance communication and collaborative skills. Researchers say students working in small groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats [4].

VI. CONCLUSIONS

Some of the concepts this paper focused on included instructional design, learning environments, interactivity, asynchronous and synchronous technology, modalities such as face-to-face, hybrid, and online, social presence, teaching presence, and cognitive presence. All of these concepts are very important for educators and/or trainers when designing and developing effective instruction. Depending on whether it is developed in an asynchronous learning environment or synchronous learning environment or a combination of both, educators and/or trainers need to pay attention to interactivity, group work, social presence, teaching presence, and cognitive presence and integrate these strategies into their courses. If they are able to do so, their learners will appreciate it and will experience an excellent course.

VII. REFERENCES


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