How we e-Learn: A Learning Theory for how we

Learn Through e-Learning Courses

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Abstract

This paper takes a look at the idea of creating a learning theory for how learning occurs through e-learning courses. A theory is proposed by looking at three key components: motivation, the student, and technology. These three components are combined to create the *e-learning theory triangle*. Motivation is seen as the most important aspect of the triangle, because for learning to occur it is essential that a learner is motivated and engaged. The theory uses the ARCS model of motivation developed by John Keller (1987) as the basis for motivation. In looking at the student three learning theories are considered to be the foundation for how learning occurs in the student – cognitivism, behaviorism, and constructivism. Each of having their own basis for how learning occurs that can be directly applied to e-learning. Lastly technology is examined to see what role it plays in information acquisition. It is broken down into what has been termed the 5 C's: Content, Communication, Collaboration, Context, and Connection (Sims, 2008; Aparicio, Bacao, & Oliveria, 2015). Each playing an integral part in technologies influences of the learning process.

Introduction

With the continuous growth of e-learning (Aparicio, Bacao, & Oliveria, 2015) it is about time that a theory for how we learn through e-learning courses was developed. This paper will explore the idea of an e-learning theory that is based on three key components: The motivation of the learner, the technologies used in e-learning, and traditional learning theories for how someone learns.

Motivation by the learner is key to success in any course, from face-to-face classroom settings to webinars and conferences. So it should be assumed that e-learning courses are the same. "A learner (it is argued) who is fully motivated will overcome barriers of situation and time, find ways of developing appropriate skills and be able to deal with the stress of study with very little extra external support – the 'independent learner' concept" (Simpson, 2008, p. 160). If the student has no motivation, how are they supposed to succeed?

When it comes to the learner you have to consider multiple theories of learning – cognitive, behavioral, constructive, etc. These have been put forward for how we learn in a traditional classroom setting, hence it would only seem appropriate to look at how these same theories work towards enhancing learning in e-learning.

"Prompted to investigate whether the fascination with new technologies can lead educators astray and away from effective and sustainable learning, I would argue that the opposite can and should be the case – that this fascination can lead to both creative, emergent, strategies and effective, sustainable learning" (Sims, 2008, p. 154). Since e-learning relies completely on technology to make it work, it is important to see how this technology effects the learning process. With these three components the purpose of this paper is to take a look at traditional learning theories, as well as motivation and technology, and apply them to e-learning to create a theory of e-learning that captures how we learn online.

Literature Review

Simpson (2008) stated that "…whilst learning skills may be a factor in student success, a much more important one is learner motivation. Without appropriate focus on motivation, learner support for developing or remediating learning skills may be largely wasted." (p. 164). The ARCS models of Motivation (Keller, 1987; Driscoll, 2005) is the pinnacle model for building motivation in courses and has been shown to be successful in building motivation in e-learning courses (Gromley, Colella, & Shell, 2012).

Alzaghoul (n.d.) looked at the classic learning theories – cognitivism, behaviorism, and constructivism – and suggested a number of implications for designing online learning using these theories. In relation to cognitive learning theory Alzaghould (n.d.), along with Banikowski (1999), Driscoll (2005), & Willingham (2007), stressed the importance of cognitive information processing and how our brains encodes information into long term memory through our working (short-term) memories, as well as looking at the importance of sensory memory in relation to focusing a learners attention to help learning occur. Hillen & Landis (2014) looked at cognitive load as an important factor to consider when designing e-learning courses that are manageable for the learner, "the brain with too much information can be counterproductive" (p. 204).

Taking the view of behaviorists that the mind is a "black box," Alzaghoul (n.d.) expressed a number of theories for how behaviorism can be used to design online learning courses. He noted that learners must have clear objectives, be tested to assure they have achieved the learning objectives, and break down operations into parts. Using a number of behaviorist strategies – reinforcement, shaping, chaining, and behavior maintenance (Driscoll, 2005) – designing e-learning courses with a behaviorist theory in mind should help to create stronger and more effective courses.

"Research agrees that constructivism learning theory, which focuses on knowledge construction based on learner's previous experience, is a good fit for e-learning because it ensures learning among learners" (Alzaghould, n.d., p. 29). Constructivist also put forth 5 recommendations that explain how to design e-learning with the learner in mind: Complex environments, social negotiation, multiple perspectives, ownership in learning, and awareness of knowledge construction (Driscoll, 2005).

"…emergent technologies and interactions have opened doorways to new ways of learning and that these deserve new models of thinking about the very essence of the teaching and learning dynamic" (Sims, 2008). With the advent of ever evolving technologies that assist with distance and (e) learning, Sims (2008) and Aparicio, Bacao, & Oliveira (2015) began taking a look at how technology plays a part in the creation of e-learning and more importantly how technology can assist students in the learning process.
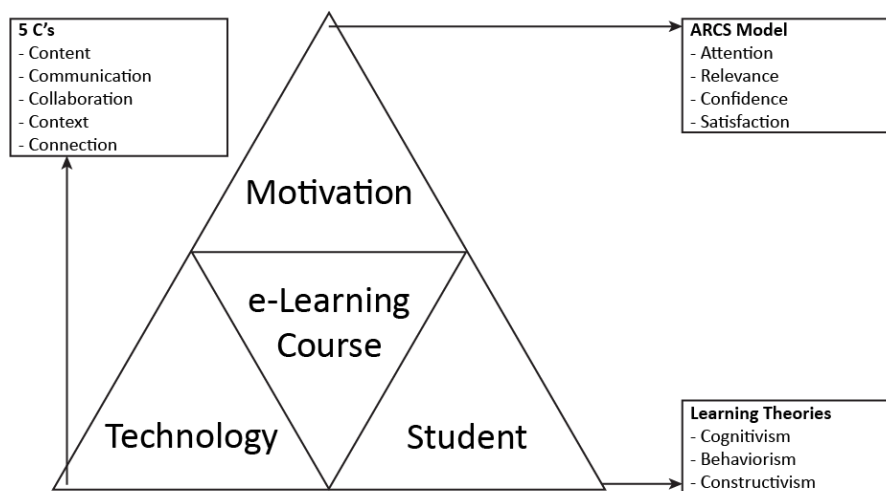
Discussion

Figure 1. e-Learning Theory Triangle

e-Learning Theory Triangle

Figure 1 is a visual representation of the e-learning theory proposed in this paper. It is a triangle made up of three key components: Motivation, Technology, and the Student. It is

proposed that each of these three key components are what help a student to learn thru an e-learning course or training.

  To begin it is important to understand how the e-Learning Theory Triangle works and how each of the three components of the triangle fit together. Motivation is placed at the top of the triangle because it is seen as the most important factor when considering if a student is going to learn. John Keller (1987) stated, "… no matter how motivated learners are when they begin a course, it is not too difficult to bore them, if not kill their interest totally" (p. 2). If a student has no interests in the course and there is no motivation, learning will not occur. The next piece of the triangle is the student. This portion of the triangle looks at traditional theories of learning and how each of them plays an important role in how the student learns. Without knowing how the student acquires knowledge it is impossible to propose an e-learning theory. At this point it is important to notice that motivation and the student are important components in any theory of learning, but what makes the e-learning triangle theory unique is the third piece of the triangle – technology. Technology is what makes an e-learning unique. When deciding what type of technology should be used to assist in the learning process 5 principles must be considered – these have been termed the 5C's: Content, Communication, Collaboration, Context, and Connection (Sims, 2008; Aparicio, Bacao, & Oliveria, 2015). Each of these three key components – motivation, the student, and technology – are what make up the proposed e-learning theory triangle and are essential to designing e-learning that will support knowledge acquisition.

Motivation

  "Learning online requires more self-regulation, intrinsic motivation, and independence from the student than the traditional classroom education" (Gromley, Colella, & Shell, 2012, p. 177). Motivation is the top of the e-learning triangle because it is the most important factor to

consider when designing for learning through an e-learning course. For learning to occur in an e-learning course the student has to be motivated to enroll in the course, pay attention to the course, finish the course and pass all of the assessments. All of this without anyone there looking over their shoulder to make sure they get it done. This is exactly what Gromley, Colella, and Shell (2012) are talking about – the learner has to have the motivation and drive within themselves to complete the online course. Hence motivation being at the top of the e-learning theory triangle, without motivation how are students supposed to learn?

The ARCS model of motivation was designed by John Keller as a way of understanding how motivation effects learning (Driscoll, 2005). ARCS stands for: Attention, Relevance, Confidence, & Satisfaction. Each of these has a key role to play in relation to motivation and e-learning and below are some suggestions for how to apply them in an e-learning course:

Attention: E-learning courses have to be designed so that they not only gain the attention of the learner, but also sustains the learner's attention (Keller, 1987). Sustaining attention during an e-learning course can be difficult, a few tricks to use are: Using alternating narrators, chunking the material into smaller modules, having a lot of interaction in the course, and allowing the learner to navigate the course freely.

Relevance: The material being presented in an e-learning course has to connect the learner to their desired goals (Gromley, Colella, & Shell, 2012). This can be done in a number of ways: having the narrator state how the course relates to the learner's school or job, running the learner through scenarios so they can see the relevance, or having them take a pretest that shows their current level of knowledge compared to where they should be.

Confidence: E-learning course have to be designed to build self-efficacy in the learner (Driscoll, 2005). Confidence building in e-learning is tricky because you have to build this confidence

without having an instructor present to instill that confidence. This can be done through the use of assessments or practice scenarios that provide direct and immediate feedback to the learner.

Satisfaction: Creating an environment where the learner can showcase what they have learned is important (Driscoll, 2005). A few examples of how to create satisfaction would be: Certificates of completion at the end of the course, online scenarios where the student can test out their new knowledge, and feedback lets the learner know they have proper understanding of the subject material.

Student

Learning online in an e-learning course is no different than learning from an instructor, reading a textbook, or practicing a skill independently. Even in an e-learning class the learning theories – cognitivism, behaviorism, and constructivism – still apply to how a learner learns. In fact, many, if not all, of the e-learning courses designed can be broken down to show how each of these learning theories plays an integral part in assisting learning. Take for example an e-learning course on first aid; in this course there is lecture about different injuries – cognitivism, scenarios designed to tests your abilities at first aid – behaviorism, and problem solving situations where you have to think critically about how best to apply first aid – constructivism. Each of these various learning theories applies directly to e-learning and is necessary in constructing an e-learning theory.

Whether learning a new language, the alphabet, or the various parts of an F-16 fighter plane it is important to take into consideration how a learner goes about learning this information. Memory is broken down into three parts – sensory memory, working memory, and long term memory (Driscoll, 2005; Willingham, 2007; Banikowski, 1999). Each of these three memory systems work together to process information and encode it into long term memory for later recall. This is important to understand when considering e-learning, because courses must

be designed in a way that does not overwhelm the learner. This can be done by chunking information within the course to help reduce cognitive load (Hillen & Landis, 2014). An example of this would be breaking e-learning courses into manageable modules that the learner can then complete on their own (Alzaghoul, n.d.). This reduces cognitive load and chunks relevant information together for better recall of the information.

Though being able to actually see whether a learner can perform what they have learned through an e-learning course is difficult, and often times impractical, behaviorism still plays an important role in e-learning. Alzaghould (n.d.) suggests a number of strategies that can assist in learning with respect to behaviorism: setting clear objectives, testing learners to see if they have achieved the objectives, and providing feedback for learner performance. Reinforcement is also important in e-learning whether through the form of praise, a token system, or punishment (Driscoll, 2005). One examples of how behaviorism can be implemented into an e-learning course is through the use of assessments that measure whether the learner was able to repeat what they learned. It is important to provide feedback to assist the learner with figuring out the correct answers and praise should be provided for correct answers.

Constructivism can have a powerful impact on e-learning and how learners learn through e-learning courses. Driscoll (2005) mentions 5 recommendations of constructivism that can be directly applied to e-learning. The first of these is creating complex and realistic environments. The good thing about e-learning is its ability to create virtual environments that would be impossible to recreate in a classroom setting. This allows the learn the opportunity to learn in a more realistic setting that can be tailored to fit them. The second recommendation is providing social negotiation. Technology allows learners from around the world to come together and work collaboratively in a way that otherwise would be impossible in a traditional classroom setting. The third recommendation is the use of multiple modes of representation. E-learning has the

ability to create as many learning environments as possible with a countless number of situations and scenarios. Something that would be impossible to set up in a traditional classroom setting. The fourth recommendation is having the learner take ownership of their learning. When it comes to e-learning this is what it is all about, giving learners the opportunity to take and complete courses at their own convenience, leaving them to be responsible for their own learning (Alzaghould, n.d.). The last recommendation made by Driscoll (2005), is nurturing self-awareness of knowledge construction. E-learning is incredibly flexible in that it can create courses that are completely laid out for the learner or where the learner is responsible fully for their learning. Because of this it is up to the learner to figure out how to approach each and every course.

Cognitivism, Behaviorism, and Constructivism by no means account for every type of learning that occurs through e-learning, but they do give a good glimpse into how students are able to learn through e-learning. It is important to remember though that these learning theories are only part of the e-learning theory triangle, and only after taking into consideration all three components can you begin to understand how learning acquisition occurs through e-learning.

Technology

After seeing how both motivation and the student play important roles in the learning process it is only natural to then look at technology and its role in regards to e-learning and the learning process. Technology such as CD-ROMs, DVD's, and text books, to more advanced technologies like, augmented reality devices, web cams, or the internet can all be used in the design process of e-learning courses. However, it is how that technology is used that has a real effect on how we learn through e-learning courses. Aparicio, Bacao, and Oliveira (2015) stated that, "Technologies provide support to integrate content, enable communication, and provide collaboration tools" (p. 301).

In addition to the 3 principles that Aparicio, Bacao, and Oliveira (2015) looked at – content, communication, and collaboration – 2 more by Sims (2008) – context and connection – are also important in looking at how technology effects learning. Each of these 5 principles will be expanded upon below:

Content: The content is what is used to create the e-learning course, whether that is videos, images, authoring tools, text, narration, music, etc. This is probably the most important of the 5 C's, because this is how the information is being presented to the learner. When using technology, the content and use of technology to enhance learning must be done in a way that increases germane cognitive load and motivation, and reduces extraneous cognitive load (Nguyen & Clark, 2005).

Communication: According to the constructivist framework social negotiation is crucial to successful learning, and only through proper communication channels can e-learning successfully allow these social interactions (Driscoll, 2005). Technology offers a number of avenues for communication, that traditional learning styles do not offer, such as e-mail, web conferencing, and social networking sites. These can be used to connect with others from around the world and offers a variety of new learning opportunities.

Collaboration: "Through collaboration and active manipulation, students are able to engage at levels only achievable through the affordance of e-learning" (Sims, 2008, p. 158). With technology learners are able to work collaboratively anywhere, at any time, with anybody from around the world offering them learning insights they couldn't possibly get from traditional learning environments. When possible technology should be used to create learning that allows for collaborative interaction amongst students and the instructor.

Context: With the world becoming increasingly connected it is important to begin considering the learner with whom the course is being targeted and how this may impact their learning.

Technology can allow for a single e-learning course to be tailored to fit numerous contexts without much extra time or money being invested to redesign the entire course. The learner has to be taken into account and technology allows this to become possible.

Connection: As with communication and collaboration, people are connected to one another through social media, gaming, and a number of other communities of practice that allow them to learn from one another.

Technology is growing at an exponential rate and it is important to always consider how technology is effecting knowledge acquisition, and to consider how it can be used to assist the learning process.

Conclusion

The purpose of this paper was to create a learning theory that accounts for how people learn through e-learning courses. By taking into consideration motivation, how the student learns, and technologies role in information acquisition a theory was proposed, labeled the e-learning theory triangle. Each component of this triangle is essential to the learning process and has to be considered in the design of e-learning courses. Though this triangle is far from being all encompassing and comprehensive it does a good job of setting up a foundation for future research into how learning occurs through e-learning.

Only three of the major learning theories were addressed in this paper – cognitivism, behaviorism, and constructivism. Future research should be conducted to see how other learning theories, such as situation cognition theory, interactional theory, or experiential theory, play a role in e-learning. Only after a thoughtful and thorough analysis of all the possible contributors to learning acquisition, can you truly have a complete theory of how people learn through e-learning courses.

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