

# **The Evolution of the Student Centered Learning Model from Constructivism to Connectivism and beyond via the application of Technology**

**Karl Leonhard Werner  
EDTECH 504: Instructional Design  
Boise State University  
Dr. Dazhi Yang  
April 12, 2011**

**Abstract:** In the following paper we will begin with an overview of constructionism and its growth into The Student Centered Learning Model. We will then examine two case studies from different eras and point out the SCLE principals both explicitly and implicitly evident while tracking the ever-present issues of technological implementation and learner latitude within the design. Finally, we will examine an emerging technological breakthrough and the SCLE inspired models that are currently being employed to harness this powerful new tool.

## Introduction

*You dropped a hundred and fifty grand on an education you could have gotten for a dollar fifty in late charges at the public library.*

### **The Question of Technology in education**

The quote above comes from a scene in the movie *Good Will Hunting* in which Matt Damon's character exposes a Harvard graduate student as merely a parrot of other people's knowledge rather than being a genuine thinker. This scene reminds educators that a fundamental goal behind instruction is not content delivery or our students' ability to regurgitate knowledge. Instead, we are obligated to ensure that our students are engaging in higher-order activities such as creation, composition, and evaluation of the knowledge they encounter. As students approach their university years, this goal becomes increasingly pertinent.

Since the 1970's visionaries have claimed that computers and related technologies would aid us in our quest of enriched instruction by fundamentally changing the way learning is done. The benefits to students were said to include faster, more convenient learning, broader lesson content, immediate feedback, and a more personalized educational experience (Phelps, Ruskin, & Thorsen, 2000, p.01). Yet, the impact of computer-based education has been brought into question by studies that show little to no advantage behind the inclusion of computers or computer based learning systems in the classroom (Keengwe, Onchwari, & Wachira, 2008, p.78). Jochems, Wim and van Merriënboer go further and indict the related technology of e-learning by stating that;

*The designers of e-learning applications themselves... sometimes refer to e-learning as CSPT (computer supported page turning) or 'Simon says' training, where the computer demonstrates something that must be imitated by the learner (Jochems, van Merriënboer, & Koper, 2004, p. 13).*

It behooves all instructors to consider what role technology should play in their instruction. After all, no one wants to design high-tech "simon says" lessons with expensive equipment that results in student learning more easily achieved through "a dollar fifty in late charges at the public library." The realization that educators must come to is that technology is merely a delivery tool and that successful educational models must be employed in consort with technology if we are to avoid producing the type of student that Matt Damon's character so righteously chastised.

With this realization in mind, the following paper beings by exploring constructivism and its growth into the Student Centered Learning Environment (SCLE). We will then go onto explore how SCLE related models were implemented in the past and in the present. Finally, we will examine the latest in online 3D simulated environments and the burgeoning models that are begin used to focus their awesome potential.

## **A Principle that Bends Reality**

*There is no spoon...*

### **Constructivism the road to the Student Centered Learning Environment**

The quote above expresses the sentiments of Keanu Reeves' character Neo in the film *The Matrix (1999)* as he tries to realize that the world around him is merely an individual perspective to be altered at will. Constructivists would no doubt applaud Neo's efforts since they believe that "the primary source of knowledge and reality is constructed rather than discovered" (Smith & Ragan, 2005, p. 19). This sentiment derives from the philosophical roots of rationalism and its emergence onto the educational stage thanks to Jean Piaget. Piaget is considered the architect of modern constructivism because he postulated that knowledge is constructed rather than transmitted (Smith & Ragan, 2005, p. 19). As educators grew to adopt constructivism over the past century, many variations born that ultimately lead to what has come to be known as the Student Centered Learning Environment.

According to Smith & Ragan (2005), Piaget's work evolved into several factions including Individual Constructivism, Social Constructivism, and Contextualism. For the individual constructivists, knowledge is established through an active process involving personal viewpoints on knowledge based upon experience developed over time. Social constructivists added to this individualist viewpoint with their belief that construction of knowledge also depends upon collaboration amongst members of the same group or society. Knowledge and its meaning will vary from group to group in the societal context based on perspective. Contextualism adds a further environmental caveat to the equation by stating that an authentic setting is necessary for learning and that assessment should only be carried out as a part of a genuine context rather than artificially grafted upon it (Smith & Ragan, 2005, pp. 19-21).

"Renewed interest in student-centered teaching and learning has yielded a myriad of approaches purported to provide flexible and powerful alternatives to the design of instruction" (Land & Hannafin, 2000, p. 1). In a student centered classroom the student takes a self-directed approach towards their learning rather than the teacher-centered model in which the instructor is the primary source of knowledge and educational direction. SCLE's invite students to explore, discover and construct meaning based on individual and societal associations. Furthermore, students in an SCLE environment are expected to encounter problems as a result of the environment and to overcome these obstacles using authentic problem solving methods (Jonassen, 2000, p. 90). A teacher's purpose in an SCLE environment is to facilitate student learning and to possibly limit environmental factors depending on the purity of the instructor's belief in SCLE principles (Smith & Ragan, 2005, pp. 19-21).

## Technology as the Vehicle for Application

*Roads?...Where we're going we don't need... roads...*

### Variations on SCLE Implementation in K-12 Education and the link to Technology

In this quote from *Back to the Future*, Christopher Lloyd's character Dr. Emmett Brown reassures his young protégé Marty McFly that the technology of the future has rendered the roadways of the past obsolete. In a similar way, technology in consort with the SCLE model has the potential to free learners from the prescribed pathways and predictable destinations that more traditional modes of instruction adhere to.

However, despite these exciting possibilities various implementation issues have haunted SCLE since this model was introduced. The first such issue asks the instructor to decide how much latitude to give students with regards to their own learning and the second is to explore exactly what technologies be used in SCLEs.

We begin to explore these issues by examining one of the first attempts at a SCLE model although it was not referred to by this name at the time. Our example is situated in the one-room schoolhouses of Oklahoma during the first quarter of the twentieth century and is recounted in Ellsworth Collings' *An Experiment with a Project Curriculum*. Even at this early stage, we can see different constructivist viewpoints merging into a coherent whole, critical implementation questions tackled, and the role of technology being considered. Collings beings by stating that he owes his own educational success to the common sense of one country school teacher who

*Installed, at his own expense, a small laboratory and workshop in the rear end of the little school and began all sorts of experimentation in agriculture, and construction in wood and cloth. He afforded his pupils much genuine opportunity to realize their own purposes-to play games, construct rabbit traps, make doll dresses, go on excursions, and tell stories...Today members of this little class...owe their beginning, if not more, to the courage, common sense, and vision of this one country school teacher... (Collings, 1923, pp. 3-4).*

Here we can clearly see that the unnamed country schoolteacher in Collings' example was not only implementing an SCLE but his reference to a "small laboratory" also hints at the relationship SCLE environments have historically had to educational technology. Interestingly, Collings then goes on to seemingly obfuscate this connection. In his summation, he advocates each rural school be equipped with an extra "workshop" and supplied with "apparatus for child experimentation," which appears to be yet another endorsement of technology. However, in the same summation he believes these workshops and apparatus should be purchased at the expense of obtaining "large globes, maps, charts, dictionaries, and encyclopedias" (Collings, 1923, pp. 341-342). Collings appears to be favoring one form of educational technology over tools, such as encyclopedias and maps, which were no doubt regarded as the 'internet' of their day. In this fashion he is demonstrating a clear preference in learning tools that fit his particular

implementation of SCLEs given the learning needs of his students. Throughout his work, Collings also betrays his preference towards some type of control over the learning environment. He includes a school day schedule in his work, as well as offering some instructional guidance in student learning. However, he offers as little as is necessary to fulfill the learning desires of his pupils. Even at this early stage, we still see can see a fledgling implementation of SCLE wrestling with the dual issues of technological implementation and a new type of academic freedom that abandons the roads of traditional education.

Over the course of its repeated implementation, SCLEs and the forms they take have naturally evolved to suit different environments. One theory that has recently emerged and bares some resemblance SCLE principals is Connectivism. According to Kop and Hill, Connectivism has several main tenants, which includes

- The ability to ‘know’ is more important than what is currently ‘known.’
- Learning is a process in which connections are made
- Ability to see connections between nodes of information is key.
- Knowledge and learning originates from a diversity of opinions (Kop & Hill, 2008).

Within connectivism, knowledge exists within a system and the individual discovers connections between linking points, or nodes, within that system. It is the ability to make these connections that defines the learning process and the more timely connections one can make about the topic under consideration, the more knowledgeable the individual becomes (Kop & Hill, 2008, p. 6). The focus of connectivism on the individual as central to discovering their own concept of knowledge via the creation of links within networks holds striking similarities to SCLE theory but it would be mistaken to think that connectivism was born from the SCLE model. However, that does not mean that recent research hasn’t shown that these links, in fact, do exist.

Researchers have begun point out links between this new connectivism and the older SCLE models. The result of exploring these links has been a hybrid approach, which is becoming known as the Networked Student Model. Drexler (2010) in her study (*The networked student model for construction of personal learning environments: Balancing teacher control and student autonomy*) not only outlines this newest model, but she also delves into the issues of technological implementation and freedom for the learner within the learning environment. As we have seen, these are the same two issues that have haunted more traditional SCLE models in the past.

Drexler’s article (2010) is based around a case study in which “fifteen students participated during a nine-week term as part of a contemporary issues research project... each student selected a contemporary issue or topic for which he or she had a strong interest” (Drexler, 2010, p.374). Note that in Drexler’s instructional design, the student is essentially choosing their own course of learning which is also central

to SCLE models. Furthermore, after some initial guidelines and instruction students were allowed to use the World Wide Web to construct a body of sources for use in their research project. In this way she is also allowing them to explore and discover their own meaning, which is also another central tenant to the SCLE model of instruction. However, also like the SCLE model put forth by Collings, Drexler exercised some control over the learning environment through the application of technology and by controlling the learning environment to a certain degree. For example, the final product for this project was uniformly a research paper, which required instructing the students on proper ways to collect and cite research. An interactive open source piece of management software called *Moodle* was also employed to offer students the opportunity to interact online (Drexler, 2010, pp. 374-375). Students were also awarded with a standard letter grade at the end of the course, which is in itself a form of guidance and control. Again, we see that instructional freedom is encouraged within SCLE related models but control still exists and rests with the instructor. It is also important to notice that, while being instructed on proper research methods, students were asked not to use certain sites in their research. In this way, Drexler is behaving in much the same way as Collings when he favored apparatus over “charts, maps, and encyclopedias.

### **Emerging technology and SCLE**

*I'm going to show them...a world without rules or controls, borders or boundaries; a world where anything is possible. Where we go from there is a choice I leave to you.*

We again revisit the world of the *Matrix* in our penultimate quote. In this scene the main character Neo informs the evil machine antagonists of his intention to reveal the layers of control that enslave mankind. Such a move is afoot in the realm of education as well but, in contrast to Neo's efforts, the freedom from borders or boundaries exists within a computer-generated world rather than beyond it. This realm has been named *Second Life*. Some brave educators are currently exploring the possibilities and leading the way towards a brave new world of instruction powered by technology and harnessed by design theories like the SCLE.

In this last section we will gaze into the future and explore the technology of virtual reality through a web application know as *Second Life*. We will also determine what educational models are being used to employ it, whether or not SCLE echoes can be detected, and if the twin issues of implementation and control are still present.

*Second Life* is a virtual reality simulator where people can live in a form of alternate reality. Many of the activities found in the *Second Life* universe are remarkably similar to those found in reality and one of those activities is educational instruction. According to Wankel and Kingsley (2009) seminars and teaching is becoming more and more common in this alternate reality. Even a mailing list known as SLED (Second Life Educators List) exists so that educators interested in second life can exchange ideas

(Wankel & Kingsley, 2009, p. 11). As second life grows it was inevitable that instructional designers and those interested in teaching models would wish to explore how best to use this new technology and to discover how well their instructional models would survive in this alternate universe. Story & Wolf (2010) took up this challenge by running a three-week course at Lynn University, which allowed undergraduate students in education to explore the *Second Life* world in preparation for lessons later in their profession. These activities included a scavenger hunt, designing a school uniform, and building a playground within the *Second Life* world. Students completed these tasks in a variety of fashions and some even went beyond the confines of the island where the course took place and explored other areas of the *Second Life* world. Students were required to engage in reflections and give feedback via the *Blackboard* online course design tool after each foray into *Second Life* and debate its usefulness as an instructional medium.

Since a model for using second life does not currently exist, Story and Wolf based their lesson designs “on constructivist principles [and their] starting point was to identify and build upon students’ prior knowledge and to act as learning facilitators, rather than dispenser[s] of knowledge (Story & Wolf, 2010). By basing their ideas in constructivism, putting the learner at the center of the lesson, allowing students to explore the world beyond the confines of the lesson, the design that Story and Wolf implemented is eerily similar to the student centered learning environment model. Also, by creating tasks, and requiring feedback via *Blackboard*, the two designers exerted a measure of control over what their students learned and limited the technological tools available to students (*Blackboard* and *Second Life*). Again, we see that freedom and technological implementation continue to be issues that needs consideration in the SCLE model and, undoubtedly, in other teaching models as well.

### **Final Thoughts**

*To infinity and beyond...*

As we gaze towards a future of education we cannot help but be enthralled with the power that current technology affords us and be excited by the prospect of technology to come. However, while educators empower students through these new technologies we must always keep in mind that instructional models must guide us in our implementation and remember that the twin issues of control and implementation will always be there to give us pause. Challenges will always face those who dare to do what has never been done. Yet, as the SCLE and other related models are ushered into this brave new world, let us as educators go forth with confidence and resolute determinism as embodied in the spirit of our final quote as delivered by a toy that knew he could fly.

## Works Cited

- Collings, E. (1923). *An Experiment with Project Curriculum*. New York, New York: The Macmillan Company.
- Drexler, W. (2010). The networked student model for construction of personal learning environments: Balancing teacher control and student autonomy. *Australasian Journal of Educational Technology*, 26 (3), 369-385.
- Jochems, W., van Merriënboer, J., & Koper, R. (2004). *Integrated E-Learning: Implications for Pedagogy, Technology and Organization*. New York, NY: Falmer Press.
- Jonassen, D. H. (2000). Revisiting Activity Theory as a Framework for Designing Student-Centered Learning Environments. In D. H. Jonassen, & S. M. Land, *Theoretical Foundations of Learning Environments* (pp. 89-121). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Keengwe, J., Onchwari, G., & Wachira, P. (2008). The Use of Computer Tools to Support Meaningful Learning. *AACE Journal*, 16 (1), 77-92.
- Kop, R., & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past? *International Review of Research in Open and Distance Learning*, 9 (3), 1-13.
- Land, S. M., & Hannafin, M. J. (2000). Student Centered Learning Environments. In D. H. Jonassen, *Theoretical Foundations of Learning Environments* (pp. 1-19). Mahwah, NJ: Lawrence Erlbaum Associates.
- Phelps, D. R., Ruskin, D. R., & Thorsen, D. C. (2000). *Computers in the Classroom*. Boise State University: Consortium Research Fellows Program. Boise: U.S Army Research Institute.
- Smith, P. L., & Ragan, T. J. (2005). *Instructional Design*. Hoboken, NJ: John Wiley and Sons Inc.
- Storey, V. A., & Wolf, A. A. (2010). Utilizing the Platform of Second Life to Teach Future Educators. *International Journal of Technology in Teaching and Learning*, 6 (1), 78-70.
- Wankel, C., & Kingsley, J. (2009). *Higher education in virtual Worlds: Teaching and learning in second life*. Bingley, UK: Emerald Group Publishing Limited.

## Motion Picture Quote Attribution

- Bender, L., Mosier, S., Smith, K., Weinstein, B., Weinstein, H. (Producers), Affleck, B., Damon, M. (Writers), & Van Sant, G. (Director). (1997). *Good Will Hunting* [Motion Picture]. Miramax Films.
- Silver, J. (Producer), Wachowski, A., Wachowski, L. (Writers), Wachowski, A., & Wachowski, L. (Directors). (1999). *The Matrix* [Motion Picture].
- Whedon, J., Stanton, A., Cohen, J., Sokolow, A. (Writers), & Lasseter, J. (Director). (1995). *Toy Story* [Motion Picture].
- Zemeckis, R., Gale, B. (Writers), & Zemeckis, R. (Director). (1985). *Back to the Future* [Motion Picture].