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**Abstract**

George Siemens and Stephen Downes established a concept for our technological landscape, called connectivism, challenging the traditional schools of thought including but not limited to behaviorism, cognitivism, and constructivism. This newly established learning theory has created disagreements over its legitimacy as a learning theory or instructional theory. Bearing in mind, connectivism has several valid points to its overall rationale, is it basically deemed as a tool that is useful in the learning process for instruction or curriculum rather than a separate learning theory. As a result, educators have been forced to reexamine what is being done in technology education and reconsider, examination, and theorize how everything comes together. Frequently assessing how the technical learning process with regard to instruction and curriculum upholds the educational process to a higher expectation or standard.

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**What are the essential criteria for something to be a learning theory?**

Typically, a theory applies to the fusion of a large group of data. The measure of a theory is not whether it is founded or unfounded, but instead if it is meaningful or not in the task of clarifying or forecasting performance. In most cases, theories are meaningful in spite of the critical origins of the occurrence it contains are unidentified. As with most scenarios, a theory can be redeveloped, or with the aid of updated data, can be revised and used in other initiatives.

If meticulously examined, a theory has a great chance of being commonly acknowledged for extended periods of time only to be challenged or even disproved (Dorin, Demmin, & Gabel, 1990). Therefore, a legitimate theory of learning must have stemmed from extensive analysis and scrutiny. In the valuation of the significance of a particular theory, a great deal of variables must be taken into account. According to Sir Karl Popper, the criterion of “falsiability” encourages the researcher to prudently scrutinize any adverse evidence that may prove their conclusions false. In addition to this, the rule of parsimony is the preference of simple theories over highly complex ones (Johnson & Christensen, 2004).

**What are the essential criteria for something to be an instructional theory?**

An instructional theory must propose measures to allow learning resourcefully and effectively. In the words of Jerome Bruner (1966) an instructional theory should deal with four major elements:

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(1) the learning predisposition, 2) the design of concepts to be presented and its structure for ease of understanding, (3) the most successful progression of ideas in which to present a body of knowledge, and (4) the administration of rewards and punishments. As a result, the instructional theory is geared towards the complete configuration of learning information with the goal of maximizing the entire learning experience.

Dating as far back as the late 1970s, the instructional theory has been comprised of two categories: behaviorism and cognitivism. Due to the fact B.F.Skinner’s Behaviorist theory could be assessed by way of utilizing newer labelling procedures, it was deemed as very popular means during this timeframe. Conversely, Paulo Freire’s Pedagogy of the Oppressed condemned the

notion of an educational model being “banked”. Influenced by Bruner’s characterization of instructional theory, Schott and Driscoll (1997) crafted a suggestion for a collective instructional theory. This collective instructional theory consisted of four components for an instructor and designer to take into consideration: (1) the learner, (2) the learning task, which includes learning outcome goals, (3) the conditions and instructional methods for learning, the overall environment, and (4) a frame of reference for specific learning. To this account, Driscoll added, “Therefore, the purpose of instructional theory is to be prescriptive, to provide principles by which teachers and instructional designers can assure learning” (Driscoll, p. 353).

Further in this study, Robert M Gagne instilled some clarity when he defined the instructional theory in the midst of World War II with the intent of training Air force pilots. Over time, he later established a series of requirements that categorize what educators are encouraged to access

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for instruction. With this being said, Gagne is the chief researcher and contributor to the overall approach to instructional theory. His key input to the theory of instruction was his framework for "Nine Events of Instruction" from the book, The Conditions of Learning: Training Applications in 1996.

1. Gaining attention

2. Informing learners of the objective

3. Stimulating recall of prior learning

4. Presenting the content

5. Providing learning guidance

6. Eliciting performance

7. Providing feedback

8. Assessing performance

9. Enhancing retention and transfer

To this day, Robert Gagne is viewed as the principal researcher to a methodical approach to instructional design and teaching. Since the focus is on behaviors as the outcomes that result from specific training, his followers are regarded as behaviorists (Gagne & Medsker, 1996).

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**What are the differences between a learning theory and an instructional theory?**

In a nutshell, the learning theory differs from instructional theory in that learning theories define how learning takes place, while on the other hand; instructional theories describe how to obtain the ideal learning outcomes**.** As a result, instructional design has the ability to be observed from a behaviorist or cognitivist methodology instead of the constructivist method. The task of designing instruction by means of a behaviorist or cognitive method requires the educator to examine the circumstances and then establish detailed goals. From this point, these goals are fragmented down into learning objectives and are further broken down into separate tasks. Subsequent assessment is constructed on the basis of precise criteria for each objective has been satisfied. Finally, the Instructional designer will take on the task of documenting what the learner should know.

On the other hand, the constructivist approach entails that the instructional designer yield results that are specific. Facts obtained are more subjective and are not pre-specified for the learner due to the fact it does not rely on quantitative criteria. Therefore, self-evaluation is the method used to obtain results. Keep in mind, evaluation can also be based on such artifacts as notes, projects, or journals. Since the learner can recognize numerous actualities, the learner now becomes better suited to take on the challenges of real life. If a learner possesses the ability to problem solve, he or she will have the skillset to apply existing information to a different condition. Learning theories offer a theoretical structure and vocabulary to permit observations to be understood and agreed. By implementing this cohesion, all involved in the process of learning can successfully

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expound on what is observed and form or cultivate innovative methods to offer additional significance. Next, a solid learning theory delivers a resource for the educator to solve a practical problem with a practical solution. (Merriam & Caffarella, 1991)

**What is connectivism?**

Simply put, connectivism is social learning that is networked. Stephen Downes described it as, “… the thesis that knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks” (Downes, 2007). Connectivism is characterized as a reflection of our society that is changing rapidly, complex, connected socially, global, and mediated by increasing advancements in technology. It is the orchestration of a complex disarray of ideas, networked to form specific information sets. Ways of knowing are derived from a diversity of opinions. The individual does not have control; rather

it is a collaboration of current ideas as seen from a present reality. The core skill is the ability to see connections between information sources and to maintain that connection to facilitate continual learning. Decisions are supported by rapidly altering fundamentals as new information is quickly integrated to create a new climate of thinking. This constant update and shift of knowledge also can be contained outside the learner, such as in a database or other specialized information source. For the learner to be connected to this outside knowledge is more important than his or her existing state of knowing. The first point of connectivism is the individual.

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Personal knowledge consists of a system of networks, which supplies an organization, which in turn gives back to the system. The individual continues the cycle of knowledge growth by his or her access back into the system. The advantage is that the learner can remain current on any topic through the connection they have created. Within any defined social network, there is a focus for groups of people with a common goal. They can promote and sustain a well-organized flow of knowledge (Siemens, 2004).

**Why does Siemens believe connectivism is a new learning theory for a digital age?**

According to Siemens, “Exponentially developing knowledge and complexification of society requires nonlinear models of learning (process) and knowing (state). We cannot sustain ourselves as learning/knowing beings in the current climate with our current approaches” (Siemens, 2009). This simple statement alludes to fact that our society is changing and to that end, our ways of learning must follow suit. As social media and the scope of the internet expands in various ways, or reliance and ability to network (locally and globally) have grown in so many dimensions. This occurrence opens the doors to a wide variety of topics and thus the development of collective networks that link communities all over the world. This drastic shift and creation of social networks have caused educators to embrace this new possibility for data use in the classroom.

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Bearing this in mind, Siemens (2006) explains that knowledge has transformed from “categories and hierarchies” to networks and various “ecologies”. The foundation of knowledge is based on two ideas that explain some part of our existence, and is deemed relevant for some kind of act. “Viewing learning and knowledge as network phenomena alters much of how we have experienced knowledge in the last century” (Siemens, p. vii). Siemens also explains that this networking is closely related to how an individual accepts learning. As a result, a change of this magnitude is constantly evolving through technology, and forever being stressed by change.

Thus the statement, “New epistemological and ontological theories are being formed…” (Siemens, p. 3).

Technology is instrumental in expanding our society and most importantly the way we do things on a day to day basis. Therefore, all innovations or ideas must be examined and tested to truly see if they impact our students and society in a positive/relevant fashion all the times. Connectivism highlights this range through an assortment of networks, aiding our youngest learners’ pool resources to find answers to an ever growing number of demands. According to Chris Dede (2007) the nature of collaboration has transformed. Over time, educators and technical specialist have had to adapt and implement these modifications in order to capitalize on learning. Active or engaged learning is dependent on collaborative efforts amongst the members of the learning community (Conrad & Donaldson, 2004). These connectivist experiences with socialization assist the learner creates (cognitivism) and generates meaning from what is observed (constructivism), therefore launching identifiable patterns to use in future

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circumstances (connectivism). Although Siemens (2006) has his reservations in reference to the issues with existing learning theories, the fast-paced progress of new technologies and related concepts will persistently alter the instructional methods and opportunities for acquiring information.

After extensive research and practice, it is not totally out of the realm of reality that Connectivism could take on the role a learning theory. First of all, connectivism is considered to be, “the amplification of learning, knowledge, and understanding through the extension of a personal network” (Siemens, 2004). Therefore, due to these personal networks, learners are able to obtain a wide range of knowledge and perspectives to assist them in making crucial decisions. This allows participants to share experiences and learn through collaboration. Next, having the ability to tap into enormous databases of knowledge instantaneously permits a learner to seek additional knowledge. These sorts of capabilities can expedite research and assist in interpreting patterns. Third, clarifying learning by way of traditional learning theories is harshly limited by the swift transformation conveyed by technology. In a nutshell, Connectivism is refereed as actionable knowledge, where an understanding of where to find knowledge takes precedence over responding to how or what that knowledge encompasses.

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**Provide three sound reasons why connectivism might not be a learning theory.**

There is a myriad of justifications as to why connectivism has not been clearly adopted as a legitimate learning theory. First and foremost, while connectivism is interesting and has its merits that stir up debate, it is not a completely deemed as a new educational approach to learning. When examined to recognized learning theories, there exists a crossover if ideology. B.F. Skinner considered having a specific boundary as crucial for unique learning theory. Mark McMahon (1997) stated that learning can be defined within the boundaries of the three broad theoretical approaches: behaviorism, cognitivism, or constructivism (McMahon, para. 6-7). As a result, Gyri asserts that the internet functions in a manner similar to the way person thinks (Gygi, 1990), which can be seen as a basis to link information vital for processing within a cognitive context. To be more specific, Piaget (1977) referred to Cognitive Constructionism as learning with a process of accommodation, assimilation, and equilibration. Cognitive Constructionism is a "dialectic process in which the subject resolves perturbations in the coherence of his or her structuring activities by coordinating and constructing new, more adequate cognitive structures" (Saxe, 1991). In addition to what we have already examined, the Cognitive Flexibility Theory (Spiro, 1995), as characterized by Archee & Duin, 1995, is added analogous theory. What this particular theory does is draw numerous elements of content, where information is unified and intricate (Archee & Duin, 1995). Second, connectivism “misrepresents the current state of established alternative learning theories such as constructivism, behaviorism and cognitivism, so this basis for a new theory is also dubious" (Kerr, 2006, para. 5-7). Additionally, Pløn Verhagen (2006) stated that connectivism is an instructional view instead. What he is stating is that

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learning theories have the responsibility to confront the concern of how to facilitate the learner at the instructional level. On the other mind, connectivism is focused on the examination of what is learned and the reasons why at the curriculum level. In concurrence with this perspective, Bill Kerr (2006) debated that the idea of connectivism as a theory is not valid. His disagreement with Stephen Downes is still a hot topic on several on-line forums. Kerr deems connectivism to be in concert with learning theories, in which various technologies only affect procedures of teaching in many forms (Downes, 2006). Finally, while connectivism might be connected to select areas of knowledge, it will not work the same for all subjects. Learning and knowledge is not limited to only be acquired on a technological system that we always have access to around the clock. Learning also takes place through, instruction, connection, teaching and mentoring which allows a learner to internalize concepts and apply them to their real world situations. In a nutshell, there is no substitute for experience and personal knowledge from a professional.

Rather than a new learning theory, connectivism offers an educator a model

**Closing statement**

Based on my research and years of experience in the educational realm, I’m confident that Connectivism is not a learning theory but instead a very useful method of giving meaning on how people learn in our new age of technology. Currently, I seemingly agree with B.F. Skinner in with his assertions towards the Behaviorist theory. With this being said, technology is great and its influence is phenomenal, but we must keep in mind it is a tool that should be wisely used

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to enhance our experiences. While the theory, research and reasoning presented by George Siemens and Stephen Downes is truly significant and effective, it is merely a vehicle to be utilized in the learning method for instruction or curriculum rather than an independent learning theory. It has also encouraged educators to examine what measures are being done to restructure, deliberate, and construct how each part plays their respective role(s). References

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