Connectivism as a Learning Theory For The Digital Age

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ABSTRACT

As digital technologies continue their impact across the social fabric, they are prompting us to relook at the theoretical foundations of the learning paradigm, to meet the aspirations of the connected digital age learners. The cognitive learning theories that have served the previous generation are replaced for greater relevance to the needs of the extant generation. Connectivism views learning as a network creation process and focusses on how the learning transpires in the 21st century. In this paper, the notions related to connectivism have been examined to help content designers and academicians to smoothen learning ecologies and to create engaging learning resources according to the prevailing archetypes. This study also throws the light on how to haul out outdated postulates in the learning environment. The books, articles and research papers have been referred to dive deep into the analysis of modern learning theory that is popularly known as "Connectivism".

Keywords : *eLearning, behaviorism, cognitivism, constructivism, connectivism, network, knowledge, technology, online learning, internet, MOOC, learning theory.*

1 INTRODUCTION

Learners as little as three to four decades ago would complete their edification and take entry into the work-life that would often last a lifetime. On those days, the speed of knowledge generation was considerably slow. Therefore, the life of the knowledge was measured in terms of decades and centuries. However, In the fast-paced world, the speed of knowledge generation is increasing exponentially. Due to the reason at present, the life of the knowledge is measured in terms of months and years.

According to the survey conducted by the American Society of Training and Documentation (ASTD) the knowledge is doubling in every 18 months (Siemens 2004).

The research conducted by IBM (2006) shows that increasing computer speed and storage capacities blended with internet connectivity, knowledge will eventually double in every 11 hours by 2020. It indicates, the knowledge gained by a learner in the morning will become obsolete at night (Gonzalez 2004). Figure 1.1 exhibits how quickly the knowledge is doubling in the digital world.
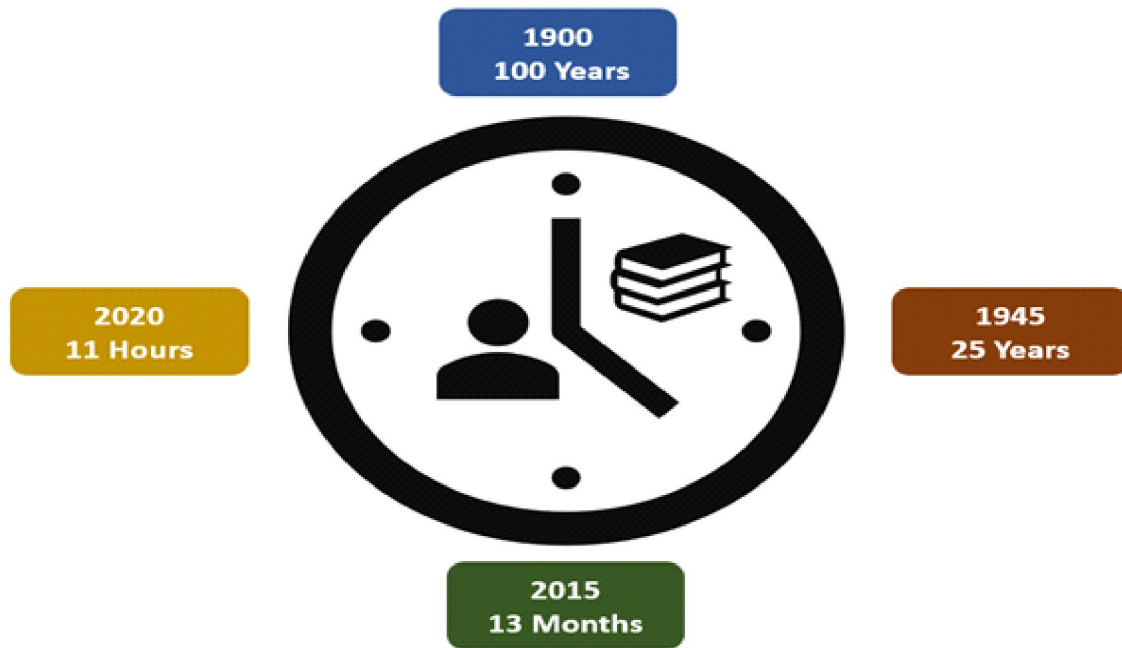
Figure 1.1: Knowledge Doubling Curve, Source: Author Research

The above figure shows that someday soon we all will be loaded with too much of knowledge and the rapid growth of knowledge will question the currency of traditional learning theories such as behaviourism, cognitivism and constructivism. The academic world is consuming these learning theories extensively for decades. These learning theories are considered as reference points in designing and redesigning the learning environment for various categories of learners. The sceptics mention that the learning theories are developed when learning was not affected by technology. Over the last two to three decades, technology has changed drastically and redefined the way learner read, write, understand, interpret and learn the things. Under such settings, the validity of traditional theories has been questioned in the academic domain.

The traditional learning theories, for example, behaviourism, cognitivism, and constructivism hold on the notion that knowledge is attainable through reasoning and experiences (Peggy 2013). The discussions held in these theories revolve around whether we gain knowledge through birth or through reasoning and conditioning?

2..REVIEW OF LITERATURE

Behaviourism is a learning theory familiarized in the first half of the 20th century. The theory was supported by 'Dog Salivation Experiment' (Pavlov 1890) and 'Skinner Box experiment' (Skinner 1948). Skinner explains that behaviourism focuses on objectively observable behaviours and discounts any independent activities of the mind. The theory measures observable behaviours that are produced by the learner to respond to the stimuli. The response to the stimuli can be conditioned using positive or negative feedback mechanism (Ashby 2007). Behaviorism states that every behaviour will have its own consequences. The reward and recognition may strengthen the behaviour, while the punishment may decrease the undesired behaviour (Ayesha 2014). This theory focuses on the role of environmental aspects in influencing behaviour. Overall, the

behaviourism theory states that the behaviour of a human being is largely unknown, and hence we cannot predict or identify exactly what goes inside the human brain (Black box theory). The following are some of the important enforcement of behaviourism (Jay Moore 1999).

- The behaviour of a human being is a function of the environment, which is largely unknown.

- A strong relationship exists between stimuli and response.

- Conditioning is a process of stimulus substitution.

- Behaviourism is based on the epistemological idea that persons are born with built-in mental content (popularly known as tabula rasa).

- Reinforcement is key to successful transfer through behavioristic learning.

Cognitivism stretches the wings beyond behaviourism (Peggy, ý2013) and states that a human being is not just a programmed animal who respond to the environmental stimuli rather they are rational individuals who require an active participation to learn and actions are significances of thinking. The theory stresses on the mental activities such as memory, thinking, problem solving, understanding and other essential aspects.

According to cognitivism(1950), the "black box" of the mind should be unlocked and understood to draw the deductions about the learning process. This theory views learning as an 'information meting-outsystem' within the computers (Input, processing and Output). That means the learning is viewed as inputs managed in the context of short-term memory

and coded for long-term recognition (H.L. Roediger 2008).

Cindy Buell explains this course: "In cognitive theories, knowledge is viewed as symbolic mental constructs in the learner's mind, and the learning process is how these symbolic representations are committed to memory."

The theory of *constructivism (John Dewey 1960)* views a learner as an information constructor. An individual is attempt to create own subjective representation of objective reality by using his prior experience. Constructivism argues that a human being constructs their own understanding of the world through experiencing things and reflecting on those experiences. When we encounter something new, we must reconcile it with previous knowledge and experiences ((Driscoll, 2000, p. 376).

3. CONFINES OF COGNITIVE LEARNING THEORIES

The central tenet of most of all cognitive learning theories is that learning occurs inside a person and do not emphasise on how an individual learns from external elements such as people, networks and electrical storage devices. Furthermore, these theories have failed to answer the question that how learning cycle works within an organization. The theories are concerned only about the actual process of learning and not emphasize the value of what is being learned. In a schmoozed world, the very manner of information that we obtain is worth examining. The need to assess the worthiness of learning something is a meta-skill (Liz Ryan, 2016) that is applied before learning begins. Besides, when knowledge is subject to meagerness, the course of measuring worthiness is presumed to be central to learning. When

knowledge is copious, the swift evaluation of knowledge is imperative. Other apprehensions ascend from the speedy upsurge in information. In today's milieu, the action is often desired without personal learning (i.e. we need to act by drawing information outside of our primary knowledge). The ability to create and recognize networks and designs is a valuable skill that a learner can acquire.

Nonetheless, the traditional learning theories have been revised and the principles as and when the learning environment has changed. Despite that, the underlying conditions have been changed to the extent of existing learning theories became no longer be able to define the learning path for a diverse segment of learners in the digital learning environment. Below is a decent list of questions in relation to cognitive learning theories and the impact of technology on learning environment.

- What is the impact of networks and technology on learning?

- What are the tunings we can do for learning philosophies when technology accomplishes most of the cognitive manoeuvres that are previously done by learners?

- How and why learning theories are wedged when the knowledge is no longer acquired through linear manner?

- How the traditional theories stay relevant in rapidly changing the digital world?

Therefore, in the changed learning environment, there was a need for an entirely different approach towards learning system. The figure 1.2 show sthe evolution of learning theories.

Unquestionably, the above-mentioned theories are the pillars of the learning environment. However, the relevance of these theories has been blurred when we see cognitive learning theories through the lenses of technology. Because, these theories have not emphasized on how the learning occurs outside the human brain and how the information are recorded, stored, processed and manipulated by digital technologies.

4. OBJECTIVES OF THE STUDY

This study has been undertaken with three important objectives.

- To analyse the notion of cognitive learning theories and critically analyse the connectivism within a context of its precursor to establish if it has anything new to offer as a learning theory.

- To scrutinizes the likely attributes and values of scheming learning activities stranded in connectivism.

- To analyse the theoretical postulates of connectivism to identify the epistemological and psychological challenges in learning paradox.
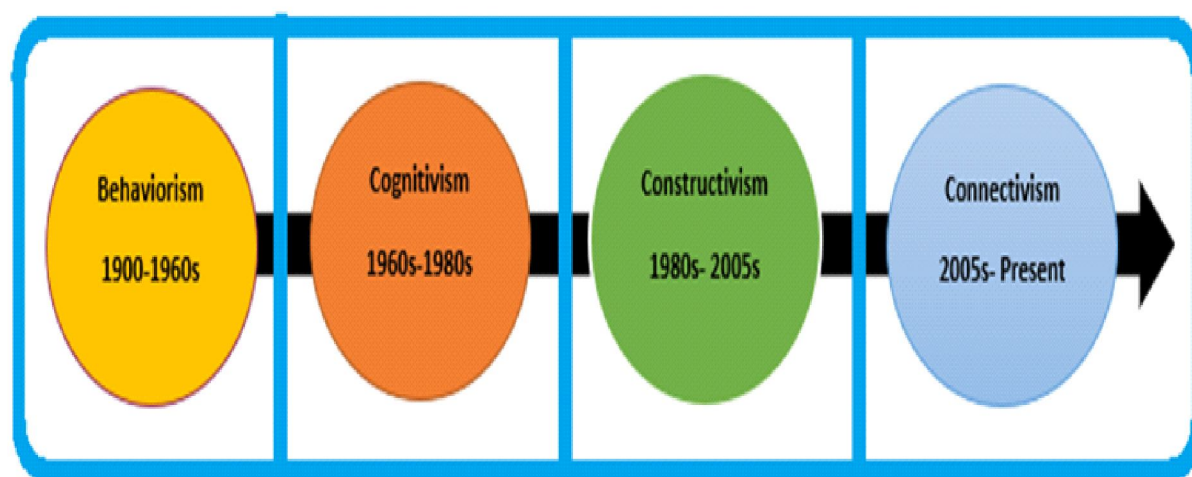
Figure 1.2: Evolution of Learning Theories

Source: Author Research

5. RELEVANCE OF NETWORK IN THE LEARNING ENVIRONMENT

As discussed in the previous sections, the very foundation of learning environment has been shaken due to the dwindling life of knowledge and advancements in digital technologies. The technology is altering mindsets and reshaping the way an individual think about the learning process.

Furthermore, today we have reached an extent that the knowledge may no longer be accessed in a linear fashion. Learners are moving towards different learning platforms and trying to learn something which is unrelated to their interest. The formal education system becoming incapable of serving the needs of learners. Thanks to the digital advancements and improvements in communication networks. Due to the advent of technology, the powerful digital networks are growing and shrinking the gap between the theory been thought in the classroom environment and the actual skill requirements in the industry.These days, the learners can learn what is practically required to execute their duties at their jobs which has been missingfor decades.

6.THE NETWORK

The relevance of the concept 'network' in the learning environment has been ignored for decades. Nevertheless, the importance of networks is now widely acknowledged. A network is a group of interconnected people or things. It can be as small as the relationship between two individuals or as complex as the connection between billions of electronic devices. Any modifications in the connected network will have a greater impact on the whole system. This strength is largely lacking in the personal learning environment, especially in the classroom environment. Furthermore, the volume of knowledge is growing substantially, the level of complexity is also growing along with the growth of knowledge. In addition to that since we cannot learn and experience everything within an institution, we can rely on the knowledge and experiences exists in other individuals. That means we can store our knowledge and experiences in other individuals and retrieve it according to our requirements.

The knowledge resides in the large database of an institution is of no use until and unless it is put for use. It should relate to the

7. CONNECTIVISM AS A LEARNING THEORY

Learning in the 21st century has been drastically altered owing to internet and communication technologies Nicholas (2011).Equally, the way we acquire knowledge has changed too. Internet and communication have redefined the means of the learning process and created new prospects for people to study and share the information. The learning experience of everyone is different because each one will bring their own previous learning and experiences with them.

Connectivism is claimed to be a new learning theory for the digital age. The theory was introduced by George Siemens and Stephen Downes in 2004. It is a collaborative learning environment and as the name suggests, it links people and things from different geographical locations and from different walks of life.

Connectivism discusses how the internet, digital technologies and networks have created a learning environment and sharing learning opportunities. These technologies include web browsers, social networks, wikipedia, emails, twitters, online discussion forums or any other platforms, which enable learners to share information with other learners.

According to Siemens (2004):

"Connectivism is driven by the understanding that decisions are based on rapidly altering foundations. New information is continually being acquired. The ability to draw distinctions between important and unimportant information is vital. The ability to recognize when new information alters the landscape based on decisions made yesterday is also critical."

He advocates that the cognitive learning theories are no longer able to cater the learning needs of the generations from the digital age. Hence, a new learning theory was required due to the exponential growth and complexity of information available on the internet. Further, he states that, knowledge does not only be inherent in the mind of an individual, knowledge resides in a distributed manner across a network. These networks are internal, as neural networks, and external, as networks in which we adapt to the world around us.

8.RINCIPLES OF CONNECTIVISM

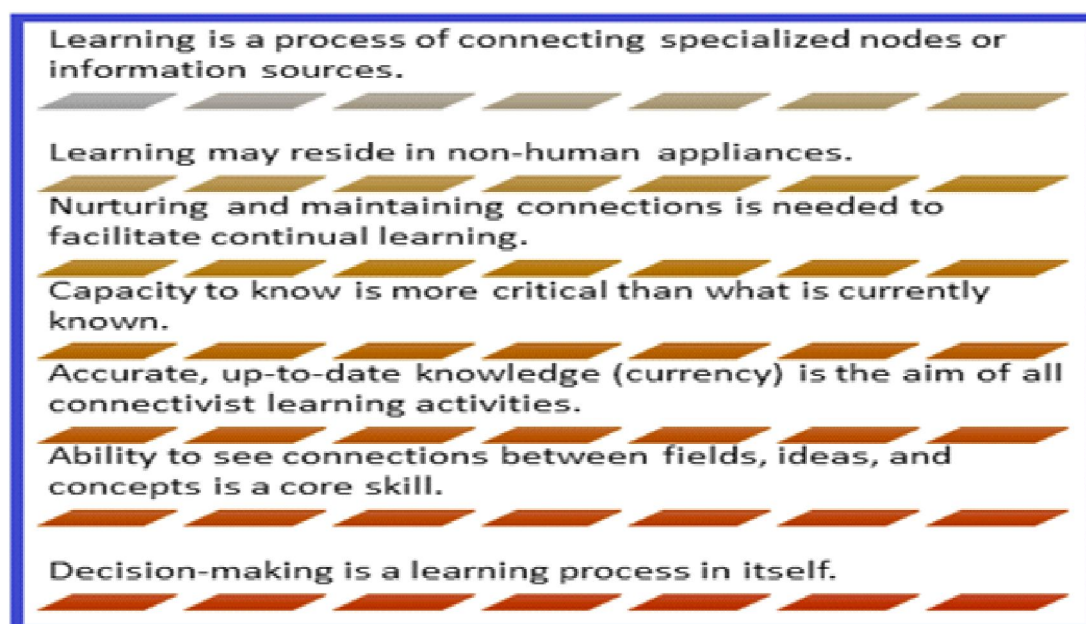Following are the principles of connectivism(Siemens 2004)

Figure 1.3: Evolution of Learning Theories

Source Source: Author Research

According to Siemens (2005), networks form through a development of natural association and no deliberate exertion is being made to form those connections. The theory argues that we learn by growing and developing both ourselves and society around us in an interconnected way. Consequently, an ideal learning environment possesses assortment, openness, autonomy and connectivity. This is because learning is no more an internal activity of an individual. Further, our classrooms will no more have walls or set hierarchy due to an ever-changing technology. Thus, the ability to pick up and finding relevant information to turn into knowledge is itself will become a skill. The networks in which people communicate can be small or vast, but the main characteristics for networks to support knowledge development will be that they are diverse, open, autonomous, and connected (Downes, 2007). Successful networks are considered to have diversity, Autonomy, Connectivity and openness (Downes, 2006, 2012):

In a traditional learning environment, the learning was considered as a process in which teacher teaches, the learner learns. The story ends over there. However, over a period of decades and centuries we have realized that it is not just a process, it is a two-way street in which journey is as important as the destination. Today, the learning is a shared experience in which the learning and sharing happen side by side. Thanks to the technology, which made it possible. In this process educators to learn from students as students learn from their educators. The figure 1.4 displays the style of learning followed in the traditional learning environment.

Knowledge Base   Instructor   Students
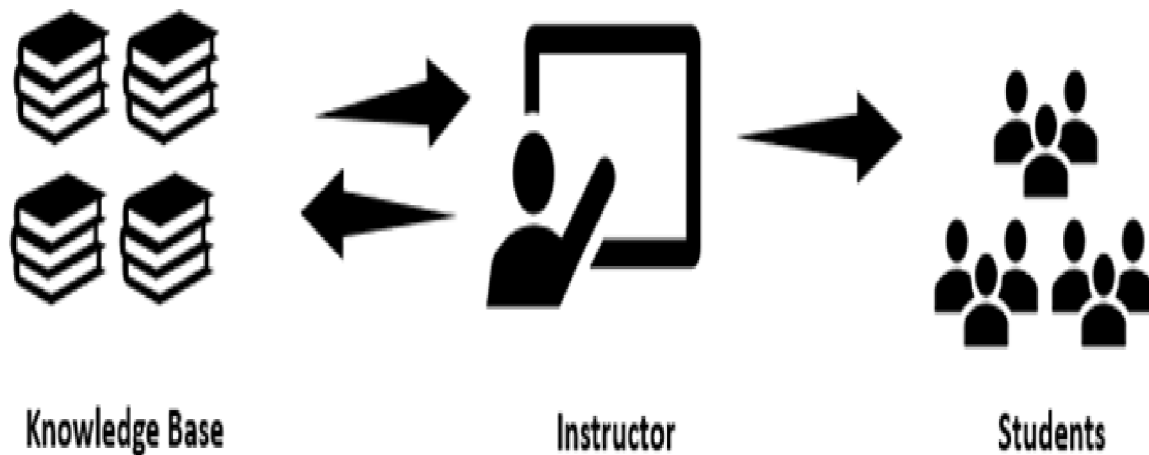
The figure 1.4 Learning in a traditional environment.

Source: Author Research

However, in the dynamic society, the learning is no more restricted to the learners, teachers and classroom. It is becoming a universal activity in which an individual will have access to several learning platforms. These platforms and participants are connected through digital networks. The figure 1.5 exhibits how learning takes place in the 21st century.
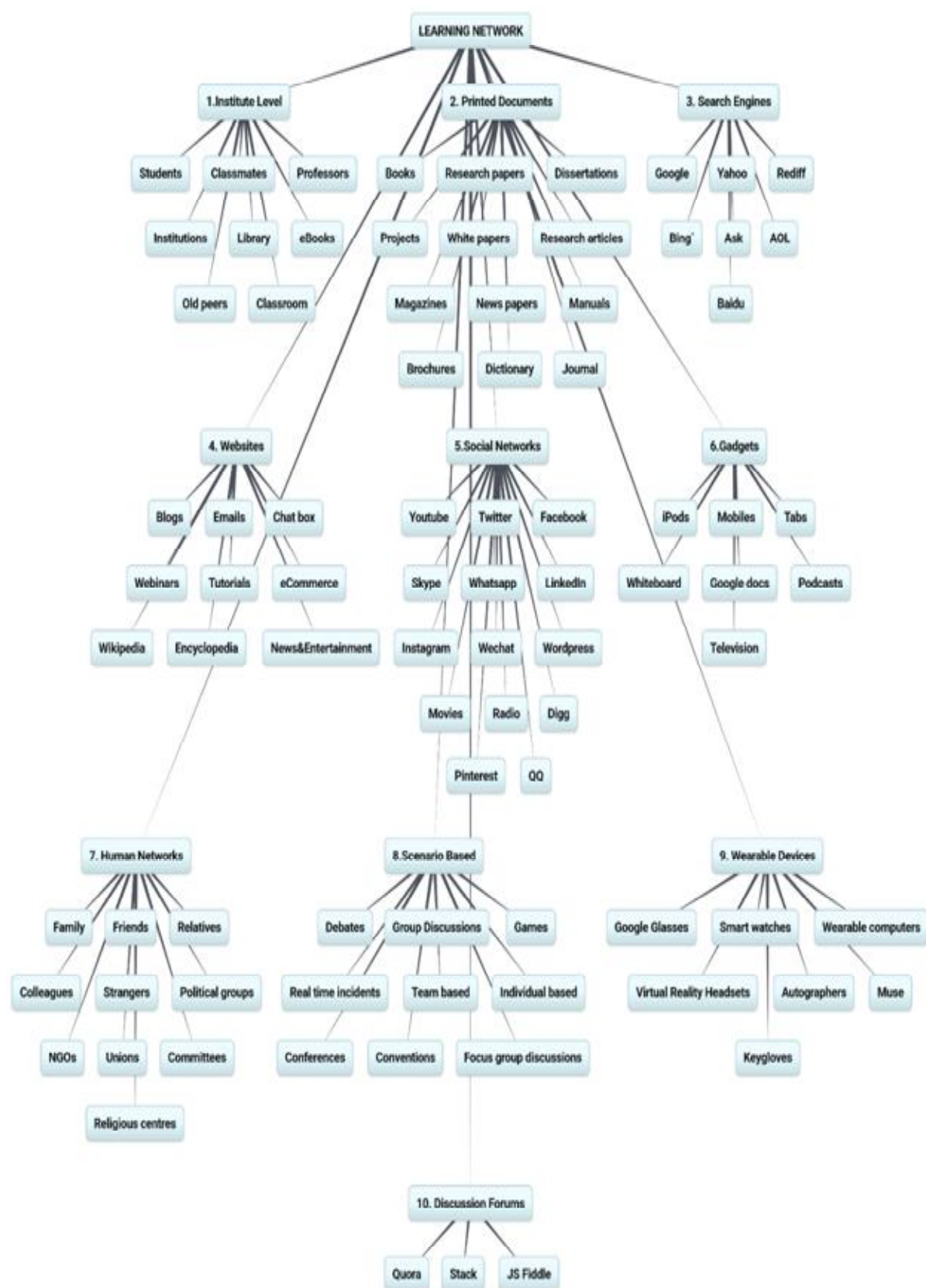
Siemens be certain of that learning today is too complex to be processed at individual or classroom levels. He viewed as multi-faceted and tasks define which approach to learning is most suitable to the learner (Siemens, 2003). One of the major features of connectivism is that learning takes place through the network of many elements. For example, Institutions, search engines, websites, gadgets, social networks, human networks and many more. Online learning is another example of connectivism. In online learning, a teacher will be more like a facilitator rather being a spoon feeder.

The Massive Open Online Theory(MOOC) stems from connectivist theory. In this model (also known as (MOOC), the learning platform is open to anyone who wants to enrol, it

routines open software and systems across the Web to ease learning and sharing, it takes place largely online, and it occurs according to a stated curriculum for a chosen period. While facilitators guide the MOOC, its participants are largely responsible for what they learn ? and what and the means? through which they share it with other learners. This allied behaviour basically supports create the course content

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Source: Author Research

Figure 1.5 : Learning Network in the digital age

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9.CONCLUSION

The number of learners who have been engrossed in networks all their lives will raise, as the young individuals are more inclined to use the up-to-the-minute technologies (National Statistics, 2007) and will shift the learners who have grown up with pen, paper and book as a resource for learning. This will cause resistance in institutes and classrooms, predominantly by senior educators aged above 50. Most of them may not be happy with the changed learning environment since they have not been explored or probably not developed an interest in a digital learning environment which requires decent basic knowledge about the digital tools. In addition, the school systems have not developed a connectivism model within which to deliver programs, partially because educational staff and institutions have not caught on to the odds that digital technology have to offer, and partly because not all people are self-governing learners. Moreover, school systems tend to value edification that is stranded in traditions of the past, soaked in values that have developed over decades and centuries.

The new learners who are accustomed to the prospects for learning on the internet will be able to find their connoisseurs in a different place. Therefore, there is a need for educationalists to meticulously track and influence the developments andinitiate research about how their institutions can progress using the emergent

knowhow to their and their learners' advantage. In doing so, they would ensure that education can shelter its role of crucial engager, and at the same time make the best use of technology in making connections with information networks.

Finally, like the debate on the relevance of cognitive learning theories, the consideration of connectivism as a learning theory is also a frenzied academic dispute. Many academicians have attempted to show that connectivism is not a learning theory, rather it is just an extension of constructivism. The sceptics state that the connectivism is like *"reinvent the wheel."* However, George Siemens and Simon Downes have shown that the learners need not reinvent the wheel, but rather they shouldattempt to understand how it turns, how it functions.

10. REFERENCES

- Downes, S (2007a, February 6). Msg. 30, Re: What Connectivism Is. Connectivism Conference: University of Manitoba. Message posted to http://ltc.umanitoba.ca/moodle/mod/forum/discuss.php?d=12

- Downes, S. (2005, December 22). An introduction to connective knowledge. Stephen's Web. http://www.downes. ca/cgi-bin/page.cgi?post=33034

- Downes, S. (2006, October 16). Learning networks and connective knowledge. Instructional Technology Forum: Paper 92.

- Downes, S. (2012). Connectivism and connective knowledge. Essays on meaning and learning networks. National Research Council Canada.

- Downes, S. (2012, May 19). Connectivism and Connective knowledge. Retrieved May 8, 2018, from http://online.upaep.mx/campusvirtual/ebooks/conective knowledge.pdf

- Egelhoff, T. (2018). How Fast Is Knowledge Doubling? [online] AM 1450 KMMS. Available at: http://kmmsam.com/how-fast-is-knowledge-doubling/ [Accessed 9 May 2018].

- Ertmer, P. (2018). 2013. International Society for performance improvement, 26(2), pp.43-71.

- Gonzalez, A. (2004). The social dimensions of Philippine English. World Englishes, [online] 23(1), pp.7-16. Available at:https://onlinelibrary. wiley.com/doi/pdf/10.1111/j.1467-971X.2004.00331.x[Accessed 9 May 2018].

- http://it.coe.uga.edu/itforum/paper92/paper92.html

- https://www.theatlantic.com/technology/archive/2011/08/infographic-how-the-internet-is-changing-the-way-we-learn/243708/

- J. (2008). Learning and Memory. Retrieved May 8, 2018, from https://www.sciencedirect.com/science/referenceworks/9780123705099

- Jackson, N. (2011, August 18). Infographic: How the Internet is changing the Way We Learn. Retrieved from

- Kop, R., & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past? The International Review of Research in Open and Distributed Learning, 9(3)

- Mcleod, S. (2018). B.F. Skinner | Operant Conditioning | Simply Psychology. Retrieved from https://www.simplypsychology.org/operant-conditioning.html

- Safiullah, A. (2018). Impact of Rewards on Employee Motivation of the Telecommunication Industry of Bangladesh: An Empirical Study. Journal Of Business And Management (IOSR-JBM), 16(12), 22-30. Retrieved from https://pdfs.semanticscholar.org/6e0e/d556b69a1dfad5360c41c9f04b036265e2c3.pdf

- Siemens, G. (2004, December 12). Connectivism. Retrieved May 8, 2018, from http://devrijeruimte.org/content/artikelen/Connectivism.pdf