PRINT: ISSN 0975-1122 ONLINE: ISSN 2456-6322

Int J Edu Sci, 35(1-3): 29-39 (2021)
DOI: 10.31901/24566322.2021/35.1-3.1197

Connectivism Learning Theory to Enhance Higher Education in the Context of COVID-19 Pandemic

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KEYWORDS Distributed Knowledge. Fourth Industrial Revolution. Siemens Connectivism Learning Theory. Social Networks. Zone of Proximal Development

ABSTRACT The global pandemic of the COVID-19 has posed a significant challenge to educational organizations, necessitating obligatory changes in practically education. In a short period of time, educational organizations have been compelled to adapt to distance learning approaches and platforms. The primary goal of this research is to examine to present Connectivism Theory as an effective motivated theory to help the higher education learners to learn more successfully. Connectivism Learning Theory offers the best learning environment by establishing an explicit connection between social interaction and knowledge sharing. A review of literature has been done. The findings of the literature review highlight the fundamental theoretical assumptions that underpin their evolution. It also illustrates that connectivism learning theory improve higher education student's engagement in the learning process. The researchers conclude that connectivism learning theory has the potential to disclose new insights into the use of the social network in education leading to successful outcomes.

INTRODUCTION

Connectivism is a learning theory that equips the learners with the opportunity to effectively connect to each other via social networks or the collaboration tools. In other words, it is a theory that articulates the distribution of knowledge across connections. According to Siemens (2004a), Connectivism provides a learning paradigm that identifies social tectonic changes where learning is no longer an internal, individualistic pursuit, when new technologies are used, how individuals' function and operate is altered. The educational sector has been slow to understand both the effect of modern learning instruments and the changes in the world of what learning entails. Connectivism offers insight into learning skills and tasks required in a digital age for learners to flourish (Siemens 2004a; Tschofen and Mackness 2012).

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Siemens's theory seeks to provide a paradigm in which it is possible to better understand and manage teaching and learning using emerging technologies. Connectivism is still a relatively recent philosophy of learning, however, and not without criticism. This theory must also be more thoroughly explored before it can be fully embraced as a learning theory for the modern age (Garcia et al. 2013).

As an alternative learning paradigm, connectivism acknowledges societal shifts and the inevitability of technology's impact on learning processes. Knowledge is generated externally of the individual through a process of linking nodes and pattern recognition, according to this new paradigm for understanding learning. These skills are particularly crucial in preparing design learners for their future careers (Petrova 2021).

The forced lockdown of many companies owing to COVID-19 has expedited digital transformation, which is commonly used in 21st century literature related with Industry 4.0- Fourth Industrial Revolution (4IR), and many educational institutions have begun adopting various distant education methods and tools. This demonstrates how the usage of digital technol-

ogy in education has significantly increased in importance (Korkmaz and Toraman 2020).

This global pandemic has demanded a significant paradigm shift in our interactions with one another (Schneider and Council 2021). Educational organizations were suddenly forced to use distant learning tactics while having little or no experience with the subject (Ferraro et al. 2020).

Higher education institutions are endeavoring to complete the academic semester remotely while maintaining academic integrity in these unique lockdown contexts. Because online pedagogy is seen as a strategy to contain the spread of the contagious COVID-19 disease (Murgatrotd 2020), large-scale, nationwide programs to interact with digital tools to assist online pedagogy during the school year are being developed (Naidoo 2020).

Since the Covid-19 pandemic caused physical separation between people and pushed changes in all aspects of the community and its organizations, including education, educational organizations across the world were completely forced to adapt digitalization in education to meet the needs of learners (Boyraz and Ocak 2021).

According to connectionism, online learning should focus on socializing between learners with ideas and experiences. Indeed, e-learning serves as an alternative to connecting learners in cyberspace, but this does not necessarily mean that learners benefit from the socializing aspects of online learning (Kitada et al. 2021).

Hence, it would be critical to investigate the impact of important digital learning theories such as connectivism, which is a relatively new learning paradigm in higher education in this digital age. As a result, the purpose of this research is to determine the utilization of digital learning sources during Covid-19 pandemic, analyze connectivism learning theory in frequency of digital learning usage and learning motivation, by investigating the literature of connectivism learning theory.

Objectives

The aim of this paper is to review the literature of connectivism learning theory and its applications in higher education, and to emphasize the application of that theory in distance education, with concentration on higher education.

MATERIAL AND METHODS

Searching

Up until July 2021, researchers examined Google Scholar, ERIC, Web of Science, Social Sciences Citation Index, ProQuest, Scopus, and PubMed in English. To search the publications on connectivism learning theory, many keywords were defined. Higher education and connectivism learning theory, university learners and connectivism learning theory, Covid 19 and connectivism learning theory were used as the keywords.

Selection of Research

Higher education and connectivism learning theory combined the results of the various searches and conducted a preliminary screening of the 130 papers that were discovered, based on title, abstract, and keywords. This screening was based on removing papers that were clearly unrelated or duplicates using the following exclusion and inclusion criteria: there was a complete document (not a PowerPoint presentation nor extended abstract). The paper contained a literature review, with papers chosen based on a predetermined search procedure. The topic of the paper was related to higher education and connectivism learning theory. Each manuscript was checked to see if there were any that may be rejected based on the abstract and title because they didn't include literature reviews.

A second, more thorough screening was conducted on the complete copies of the remaining 35 publications using the criteria for inclusion and exclusion.

RESULTS

The Search Results

One hundred fifty papers were retrieved in this search using abstract and citations. Twenty-eight articles did not meet study objectives, were duplicate, data were insufficient or there was an overlap among them, which were deleted, leaving 122 papers. Of this number, 64 abstracts were excluded on the basis of the abstract review, 23 articles were non-English. Leaving 35 articles peer reviewed articles correspond-

ing to the subject under analysis. Figure 1 illustrates the data selection process.

Theoretical Framework

The Next Section Provides a High-level Review of the Study's Theoretical Implications

Theory and Philosophy of Connectivism Learning Theory

As new technologies emerge in the fields of teaching and learning, several educationalists have presented a variety of theories to contribute to the administration of the new learning digital environment.

One of such theories is the theory of connectivism. Connectivism can, alternatively, be defined as a networked method of social learning (Subedi and Subedi 2020). Connectivism is a term used to describe the idea of learning as a network impacted by technology and socialization (Prasad et al. 2020). The concept frames learning as learners connecting to nodes in a network, implying that knowledge is a confluence of information arising from several individuals seeking inquiry related to a common interest and providing feedback to one another, rather than a specific location (Kop and Hil 2008).

Connectivism, according to Sahin (2012), is more of an idea than a theory. It first originated in the 1970s, when Ivan Illich presented his thoughts on "deschooling" education and promoting student-centered, socialized learning chances (Sahin in Du Toit 2020; Sahin 2012).

Siemens introduced connectivism as a holistic philosophy in 2004. It can be described as a knowledge and learning network theory with a focus on the use of digital technologies to enhance and extend online engagement (Downes 2019).

As stated by Siemens (2004a), "A community is the clustering of similar areas of interest that allows for interaction, sharing, dialoguing, and thinking together" illustrated his idea of connective theory. It is evident, then, that connectivism is a theoretical framework for inter-

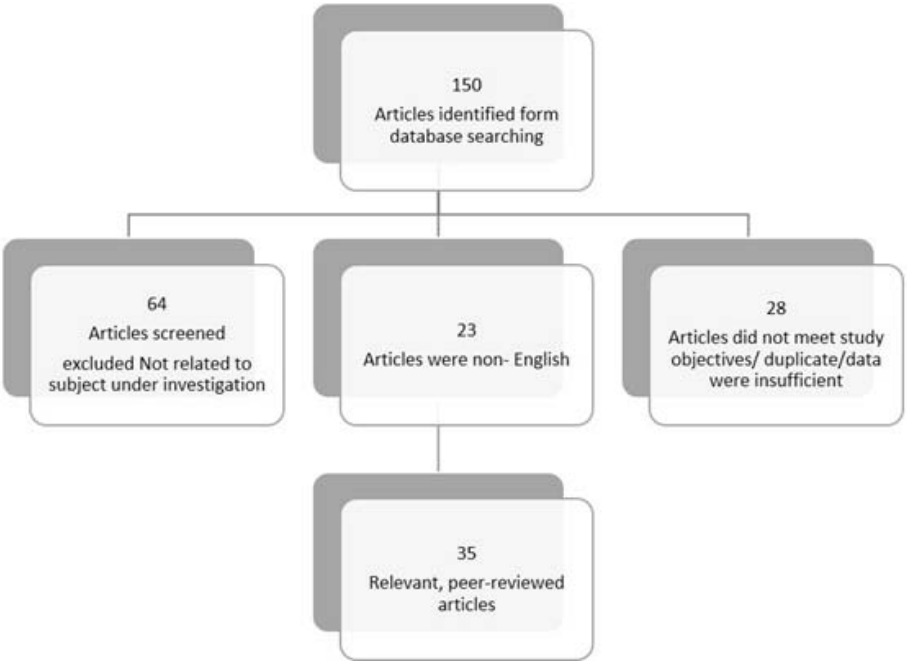

Fig. 1. Flow chart diagram of the search and selection of studies
Source: Authors

preting learning. When knowledge is acted upon through the process of a learner communicating and feeding information into a learning community, connectivism is the beginning point for learning. Connectivism is primarily concerned with cognitive development and does not address how network connections can be seen in relation to physical maturation or changes that occur over time as a result of an individual's exposure to and contact with the social environment. This is particularly the case where it involves the interpretation of behavioral success and moral growth in specific contexts (Kop and Hill 2008).

As stated by Siemens (2017), a significant component of organizational success is knowledge flow within an organization. The flow of information in a knowledge economy is the equivalent of the oil pipe in an industrial economy. A main organizational task should be generating, preserving, and using knowledge flow. Information flow can be compared to a river that meanders through an organization's ecosystem. The river pools in some areas and it ebbs in other areas. The health of the organization's learning environment depends on the successful nurturing of the flow of knowledge. Connectivism, also, explores the difficulties in information management practices encountered by many companies. To be categorized as learning, information in a database needs to be associated with the right people in the right context. The problems of organizational knowledge and transference are not answered by behaviorism, cognitivism, and constructivism. Connectivism, also, explores the difficulties in information management practices encountered by many companies. For information in a database to be classified as learning, it must be linked to the appropriate individuals in the proper context. The problems of organizational knowledge and transference are not answered by behaviorism, cognitivism, and constructivism. This make connectivism prominent theory especially on digital era.

Connectivism offers insight into the mechanisms that enable a continuous learning process of networks, environments, and ecologies. Connectivism, in this sense, implies the process of network creation and relies on the theoretical level to combine concepts discussed by "chaos, network, complexity and self-organization theories" (Sahin 2012).

The influence of the digital age has increased rapidly in the sense of learning and social interaction. The digital age and computer-mediated communication realm involves reconsideration of instruction based on a shared immersive learning process and learning socio-contextual experience. Social networking sites such as Facebook may help create a community space to inform digital discussion, challenge in a group within a context of connectivism environment depends on the successful nurturing of the flow of knowledge (Aksal et al. 2013).

A bold research agenda is set by Siemens on the sharing of cognitive activities between people and technology; dealing with rapid changes in "information ecology"; and the effect of network theories, complexity, and disorder. He describes a network as entity links, which he calls nodes. These nodes might be individuals, groups, systems, fields, ideas, or communities (Bell 2011).

Siemens (2017) sets some principles of connectivism. They are the plurality of views depends on learning and awareness, learning is a process where specialized nodes or sources of knowledge are associated, in non-human appliances, learning will reside. More important than what is understood is the desire to learn more; to promote continual learning, and supporting. Also, sustaining relationships is important. A core skill is the ability to see similarities between fields, ideas, and concepts. The purpose of all connectivist learning activities is currency (accurate, up-to-date knowledge) and decision-making is a learning process in itself. It is seen through the prism of a changing reality to choose what to learn and the sense of incoming knowledge. While today's decision is correct, tomorrow's response may be inappropriate due to changes in the knowledge environment affecting the decision.

For knowledge-based workers, chaos is a new reality. Chaos (distributed information) is the predictability collapse, demonstrated in complex arrangements that initially defy order. Significant activities are meaning making and establishing links between specialized groups. As a science, chaos accepts the relation of everything to everything (Siemens 2004a).

Connectivism is the incorporation of concepts that are discussed by the theories of chaos, network, and uncertainty and self-organiza-

tion. Learning is a process of changing core elements within nebulous contexts, not completely under the individual's control. Learning (defined as actionable knowledge) may exist outside of us (within an organization or a database), focuses on linking specialized sets of information, and the links that allow us to learn more are more relevant than our current state of knowledge. Connectivism is driven by the understanding that decisions are based on foundations that change rapidly. New data is continuously being acquired. It is necessary to be able to draw distinctions between important and unimportant details. The ability to identify when new data shifts the environment based on yesterday's decisions is also important (Siemens 2004a).

Siemens (2004a) and Downes (2012) offer a network topology with nodes (for example, ideas and communities) and linkages between them. Learning is described as a process of connecting specialized nodes or knowledge sources in this network structure (cited in Ozturk 2015).

Connectivism makes it possible for various networks of links to distribute information, thereby allowing learning the ability to be spread across these networks. Connectivism, preferably, is a representation of a rapidly evolving society. It is a perfect example that society is dynamic, socially integrated, and mediated by growing technological advances. Thus, people have small influence over the theory; rather, it is a collaboration of the present ideas that have been experienced from the present truth. The main approach is to interconnect new knowledge, incorporate it into the system and store it as an information source in an appropriate database that is specialized. Hence, by using the database, he/she must be linked to the system for others to be connected to this information source. This strategy helps to encourage the overall cycle of connectivism and the system's development (Siemens 2017).

Connectivism has largely rallied around its utility, clear assumptions, and values to be called a learning philosophy. The detailed, consistent and internally coherent collection of ideas about how the knowledge loop takes place within a network structure is original and novel. Connectivism has demonstrated how individuals learn by building personal networks. It has also provided an action guide on how interactions between sources of knowledge promote always-on learning while building a new learning and thought environment. Connectivism borrowed key concepts from other theories (that is, network theory) and thus enriched the study of learning with new languages that have not historically been applied to the theory of learning (Corbett and Spinello 2020).

Learning in terms of connectivism is a network phenomenon that is affected, assisted and strengthened by socialization, technology, diversity, connection intensity and meaning of occurrence. As a new learning philosophy for the modern age, connectivism has been offered, with four main concepts for learning: autonomy, connectedness, diversity, and transparency (Tschofen and Mackness 2012).

To sum up, connectivism is an effective instrument that encourages the gathering of the most important learning data and offers the best forum for learners' overall access and involvement. The learners can analyze the information inside the social network; that's help in their educational growth. Connectivism, as a philosophy, is a great instrument for developing relationships among group members and providing the ideal platform for knowledge advancement. This approach promotes collaborative and consultative learning among the adult learners.

Epistemological Frameworks of Connectivism Learning Theory

Connectivism, on the other hand, provides a valuable perspective since it integrates ideas discussed by chaos, network, complexity, and self-organization theories that are often missed by major learning theories (Strong and Hutchins 2009).

Connectivism has been at the foundation of online learning, which aims to break barriers and provide equitable chances for lifelong learners. Connectivism, as defined by Siemens and Downes, is a learning philosophy for the digital era, incorporating principles such as globalization, technology, lifelong learning, and digital information. Connectivism, according to Siemens (2004a), is the integration of ideas investigated by chaos, network, complexity, and self-organization theories (Korkmaz and Toraman 2020).

Connective knowledge adds to this domain a third significant category, knowledge that could be described as distributed because it is distributed through more than one person (Downes 2005). Connectivists believe that learning power can be shared between three different places: the teachers, the learners, and the network that forms between all participants. Since power is a dynamic element of society that changes and moves, courses should not be seen as just one dynamic of power that is set from the beginning. Courses may have one dominant power structure on which much of the course is based (for example, "student-centered learning"). But for various aspects of learning or at different points in the learning sequence, other power structures may also exist at the same time (Crosslin 2016).

Siemens' Epistemological Learning Frameworks (2008) builds on Driscoll's work to categorize learning into three broad epistemological frameworks, namely objectivism, pragmatism, and interpretivism. Truth is external to the mind, according to objectivism, and awareness and interpretation are experientially gained. Pragmatism assumes that knowledge is a negotiation between reflection and experience, examination and intervention, and that knowledge is an internal creation and is informed by socialization and cultural signals by interpretivism. "A fourth framework is also introduced, namely the distributed knowledge theory of Downes (2006), which is supported by Siemens (2008), who sees." the idea of evolving, interconnected, and adaptive knowledge provides the epistemological basis for connectivism as a philosophy of learning. The view of knowledge as composed of relations and networked entities.

Connectivism Theory and Education Technology

The fourth industrial revolution (4IR) requires the use of the Internet and ICT to facilitate teaching and learning (Naidoo 2020). The emphasis on communication and participation. The 'Read/Write Web' (aka 'Web 2.0'), which is about information production, collaboration, and sharing, more properly reflects the reality of the present day, as evidenced by the emphasis on connection-making and participation in the 'Read/Write Web' (aka 'Web 2.0'). Connectivism is based on the idea that learning is a networked phenomenon molded and facilitated by technological and social forces (Strong and Hutchins 2009).

Garcia et al. (2013) agreed that education has reshaped the form of classroom confinement to more liberal information-gaining approaches due to such technologies.

The sociotechnical setting for learning and education is dynamic, placing high demands on those attempting to capitalize on developing technology prospects (Bell 2011).

One of the most well-known of the network learning theories established for e-learning environments is connectivism (Goldie 2016). Connectivism is based on the idea that learning is a networked phenomenon molded and facilitated by technological and social forces (Strong and Hutchins 2009).

Thus, a sense of connectedness to other learners can be established by employing social software such as blogs, wikis, social networking sites, and other Web-based applications in ways that allow self-directed, problem-based learning processes while promoting collaboration and community development (Strong and Hutchins 2009).

There is more and more experience in the 21st century. This makes the process of receipt and processing for users increasingly more complicated. Nevertheless, the information becomes very easily outdated, so the regeneration time of the information is less and less. In less time, we want more and more to know. In a particular area of "up-to-date" knowledge, however, many-to-know knowledge has been extended in a nuanced way, indicating that the length of time in learning has increased dramatically. A modern approach to distance education is the theory and practice of networked learning (connectivity). This latest distance learning paradigm will change the basic method of teaching in e-learning. In learning the fourth model of teaching (over behaviorism, constructivism and cognitivism), some scholars call this groundbreaking new approach and profess that it would, radically, alter our entire pedagogical practices. In learning the fourth model of teaching (over behaviorism, constructivism and cognitivism), some scholars call this groundbreaking new approach and profess that it would radically alter our en-

tire pedagogical practices. The chords between them are the relationships we connect the nodes to. Learning can mean two things in this sense: - new nodes to be linked to the fabric -reordering net connections. The chords between them are the relationships we connect the nodes to. Learning can mean two things in this sense: - new nodes to be linked to the fabric -reordering net connections. Thus, our awareness is constantly improving through the network connections that have been developed. The research on the network deals with the study of this new model, which is both a tool and an approach. The network analysis explores the relationships between micro-level items and macro-level samples drawn by the ties (cited in Ildikó 2010).

Connectivism forms a basic shared learning platform for the internet to be transformed. The internet manages to host a variety of social networks and virtual communities via electronic reservoirs that are designed to build, replicate, and deliver information. Most importantly, the internet has become a focal point that allows people interested in learning to be linked. It provides the flow of knowledge through its online portal and acquits learners from engaging with the new world (Siemens 2007).

Connectivism or "distributed learning" is further regarded by Mattar (2018) presented as a better theory for the digital age, where action is required without personal learning, and information from sources other than our own knowledge is required. One of the most prominent outcomes of connectivism is massive open online courses (MOOCs). Connectivism merits a more thorough examination. Despite the fact that Siemens (2004a) claims that it is a modern learning theory (more adequate then behaviorism, cognitivism, and constructivism for a digital age), Anderson and Don (2011, 2012) define it as a distance education pedagogy that combines behaviorism/ cognitivism and social-constructivism, or an updated form of a philosophy of education. However, there is one special element that helps to distinguish these two general approaches. Vygotsky's (1978) concept of zone of proximal development (ZPD) indicates the distance between the difference between a learner's present developmental level as determined by independent problem solving and their potential developmental level as determined by problem solving under adult supervision or in collaboration with more capable peers or between: what a learner can know/do work and (what a learner can learn/do work, there is a virtual space.

Principles of Connectivism

1. The plurality of views depends on learning and awareness.
2. Learning is a process of linking specialized nodes or sources of information.
3. In non-human appliances, learning can reside.
4. The ability to understand more is more important than what is currently known.
5. To facilitate continuous learning, nurturing and maintaining connections is necessary.
6. A core skill is the ability to see links between fields, ideas, and concepts.
7. The intent of all connectivist learning activities is currency (accurate, up-to-date knowledge).
8. Decision-making is a process of learning itself. It is seen through the lens of a shifting reality to choose what to learn and the meaning of incoming information. While the solution is correct now, it may be inaccurate tomorrow owing to changes in the information climate that influence decision - making. (Siemens 2004 a,b).

The Advantages of Connectivism in High Education

Higher education institutions have made various steps to improve learners' collaboration skills to create new opportunities for knowledge development (Yousef et al. 2020).

Universities have gotten more active with their surroundings as technology, particularly information and communication technology, has advanced. As a result, higher education must be approached from a challenge-based perspective (Jahani et al. 2020).

Instructors in increasingly online higher education environments must create pleasant, community-oriented learning environments that are comparable to, if not identical to, face-to-face learning experiences. Connectivism and communities of inquiry are complementary theories that

aid in the design and development of online learning while also allowing online students to connect with one another (Cleary 2021).

Traditional teaching and learning activities in higher education have been undergoing a radical transition as technology continues to advance, thanks to the integration of Information and Communication Technology (ICT) technologies (cited in Lemy 2020).

Implications of Connectivism in Higher Education

a. Educators becoming critical experimenters with new tools and services: One of the advantages of increasingly widespread social media experimentation is that pragmatic, critical users can identify effective and sound academic uses rather than using technology for its value as a novelty.

b. Extending the range of media in which learners submit (and even publish) their work: learners can not only search for sources in various media, but they can also submit work in various formats. We could use blogs or photo workbooks to record processes for reflective reports or journals, even if we are not ready to replace essays with videos.

c. Making educational resources more openly available: The connectivist approach also implies that we expect to find resources that are open and accessible to use, often with Creative Commons Licenses that allow us to legally share, create and remix media.

d. Encouraging and supporting learners to move beyond institutional boundaries: One consequence of learners being linked learners is that within the institutional Virtual Learning Environment, learning would not be restricted to the physical classroom or the virtual classroom. Learners, whether we like it or not, will absorb and create 'in the wild' social media. Rather than seeing this as a problem, when they acquire the 21st Century, we should engage with learners (Bell 2009).

Opposition to Connectivism Learning Theory

One of the inherent problems of connectivism as a learning paradigm has been its lack of boundary. While connectivism has contributed many clear explanations for learning as a phenomenon and strategies to stimulate development in cognitive skills, it has integrated principles from a variety of previous learning theories, finding it challenging to distinguish its specific contributions (Oommen 2020).

DISCUSSION

The current circumstances of the Coronavirus (COVID-19) epidemic and social isolation pose a new distance education challenge (Prasad et al. 2020). COVID-19 has made e-learning more accessible.

Learners may have had a unique yet beneficial experience with synchronous distance learning. Participants' ability to relate their experiences may have been aided by technology and distant learning.

Research findings revealed that connectivism, the pedagogical learning 'social learning"; or 'knowledge and learning network theory- as described by Siemens (2004a) and Downes (2019); combining the knowledge and the network. Connectivism theory states that knowledge is spread everywhere; and could be accessed through the network like wikies. The learner can access those networks and organize the information. During this process, the learner can create connections and network. As mentioned by Siemens (2004a), network has both nodes and connections. The learners will evaluate the information. Due to connecting and sharing the information; 'chaos' occurs.

Educators have a great responsibility to support and facilitate to learners in creating and using knowledge to make choices and decisions with awareness to effectively impact their values creation, ethical behavior, and vision in whatever working field they will be involved in in the future with their decision-making.

This research aided in the understanding of information formation in the social network. Connecting specialized nodes or information sources begins with observing, listening, and then connecting to personally meaningful sources or nodes, according to a connectivist perspective.

Siemens (2004a) set the principle of connectivism, which integrated as: variety of viewpoints, network, nodes, the ability to learning, to support continuous learning, it is necessary to nurture and preserve connections, a core skill is the ability to see connections between do-

mains, ideas, and concepts, the goal of all connectivist learning activities is currency (correct, up-to-date knowledge), making decisions is a learning process in and of itself. The significance of incoming information and the decision of what to learn are viewed through the lens of a dynamic reality. While there may be a correct solution right now, it may be incorrect tomorrow and to support continuous learning, it is necessary to nurture and preserve connections.

Within a connectivist-learning model, the role of both academic staff and learners is major (Garcia et al. 2013). Tham et al. (2021) explain that learners work together to co-create knowledge and respond to unique situations; and may from different countries. Consequently, connectivism is a strategic philosophy that makes use of the distributed knowledge. In a summary, connectivism is a theory of network learning based on the idea that learning is a process by which new information is constantly acquired (Naidoo 2020). There are some challenges such as interruption like family problems, Internet connection, sometimes inaudible, less commitment and local time zone of the learners (Kitada et al. 2021).

To improve the learning experience of international students, improvement is needed in various aspects, including ICT infrastructure with increased capacity and bandwidth, as well as training for stakeholders – like earners, instructors and technical support staff -to familiarize them with the power and peculiarities of the digital applications used. Another issue of concern is that timely planning is essential to fully exploit collaborative online learning, facilitate effective learning outcomes, and enhance the learner experience when it comes to learning, involvement of digital distribution mediums (Kitada et al. 2021).

CONCLUSION

Technology in education enables learners and instructors to participate in a social constructivist learning environment in which they can experience a community of practice while maintaining their distinct networked identity. Connectivism theory represents a substantial shift in how social network learning is conceived. It showed that learners, like other learners, were engaged in the learning process. The learner will read the online material and create his own knowledge that he will share. These are two types of patterns recognition; are called "connecting nodes" and "pattern recognition." According to his understanding, the learner will share this knowledge with others, such as his peers. This is referred to as the "connections" procedure. The information will be discussed, shared, and evaluated by the learners. This will enhance the learner's interest in what they're learning, as well as their passion and ability to apply what they've learned. As a result, adopting a connectivism-based pedagogy can contribute in the transformation of teaching methods by emphasizing active learners who are increasingly connected and willing to share their knowledge.

Consequences in Practice

The framework act as a reference for strategic planning. It aids in the analysis of connectivism in higher education. As a result, it aims to raise awareness of potentially missed other variables such as learners' motivations, worries anxiety or achievement. In addition, some other related factors such as self- confidence, sociability and life satisfaction.

RECOMMENDATIONS

Connectivism that is investigated in this study is discussed in higher education. The study does not specify any pedagogical practice or evaluation and hence its limitations. This type of pedagogical practice or evaluation requires further research based upon observations or interviews. Further research will also be required in other education levels.

RESEARCH LIMITATIONS

The analysis focuses on the concepts of connectivism learning theory in higher education. Thus, results do not include findings regarding related concepts such as distance learning environment management or learning design.

ACKNOWLEDGMENT

The authors thank the Deanship of Scientific Research and RSSU at King Saud University for their technical support.

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Paper received for publication in August, 2021
Paper accepted for publication in September, 2021