Chapter 8 - Social Constructivist Learning Principles for Designing Online Learning Environment

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Chapter Highlights

- There are several challenges confronting educational institutions, including the COVID-19 pandemic, the transition from in-class teaching and learning to an online learning environment, and supporting, engaging, and motivating distant, remote, and isolated students in an online learning environment.
- Online learning systems may identify and collect students' real context of learning situations and interactions with the learning environment.
- The online learning environment can be supported using social constructivist learning for an active online learning engagement.
- There is a scarcity of a well-defined methodology for deriving social constructivist learning principles that can guide the design of an online learning environment for authentic learning experiences.
- This chapter explored the goal, principles, and framework of constructivist theory. After that, compared with the attributes of social constructivist learning to develop the learning principles.
- These thematic learning principles are multi-perspectives, collaborative, contextual, and reflective and can support active and authentic learning experiences in an online learning environment.
- These learning principles are useful for learning designers and those supporting students' active learning process in an online environment for personalized and inclusive learning experiences.

Introduction

Educational institutions face diverse challenges, including cost, the COVID-19 pandemic, and moving in-class teaching and learning to an online environment. Besides, the need to support, engage and motivate distance, remote and isolated students in an online learning environment to achieve learning goals (Egielewa *et al*., 2021; Sarkar *et al*., 2021; Temdee, 2020). However, an online learning environment is a complex process. It is changing the role of teachers from the source of knowledge to the facilitator of knowledge, requiring students to be active in their learning process to achieve their learning goals.

The increasing advancements in smart and mobile technologies are speeding up the development of an online learning environment. Through these technologies, an online learning system can detect and collect real learning contexts of students and their interactions with a learning environment (Egielewa *et al*., 2021; Temdee, 2020). Similarly, there is increasing use of online devices among students, which can support anywhere at any time learning process without restrictions on space and time (Egielewa et al., 2021; Menon *et al*., 2020). An online learning environment can be developed using smart technologies supported by a learning theory to take advantage of the characteristics of devices among students to enhance learning processes. One of the challenges facing the online learning environment is how to pedagogical design it using the existing learning theories to provide meaningful interactions and authentic learning experiences. Gros (2016) noted that "researchers and educators need to develop new thoughts about pedagogy based on existing theories, such as constructivism, cognitive load theory and new ones such as connectivism and networked learning".

Several learning theories have been used to support the design of a learning environment, including social constructivist learning, constructive learning, cognitive, socio-cognitive, etc. (Egielewa et al., 2021; Zhuang *et al*., 2017). However, educational institutions' current challenges require online learning environments that can provide support and interactions and motivate students to succeed in the learning process (Ranjbaran et al., 2023). Thus, there is a need to develop innovative pedagogies in online learning environments to support learning (see Noroozi & Sahin, 2022a, 2022b). It can support the knowledge content and provide opportunities for developing skills for authentic and meaningful learning experiences (Secore, 2017; Korkmaz & Toraman, 2020).

Human beings learn meaning through social and cultural interaction. Through this process, authentic and meaningful interactions can occur. Thus, social constructivist learning has been identified as having the characteristics needed to support students' active learning process and help them achieve meaningful learning interactions (Lave & Wenger, 1991; Mbati, 2012; McMahon, 1997; Secore, 2017). It can provide social learning and interactions for active learning engagement (Amineh & Asl, 2015; Smith & Berge, 2009). Several social constructivist learning principles were used in literature to support the design of learning environments, such as collaborative, contextual, reflective etc. However, there is a scarcity of well-defined work that derived these learning principles based on the theories underpinning social constructivist learning to support authentic and meaningful interaction in a learning environment. Thus, how can a social constructivist learning principle be derived and applied to design an online learning environment**?** This paper explored the goal, principles, and framework of constructivist theory and the attributes of social constructivists to develop social constructivist learning principles that can support the learning process in an online learning environment. These learning principles can support students' active and meaningful learning interactions for engagement and motivation in an online learning environment.

Theoretical Background and Related Works

(i) Constructivist Learning Theory

Constructivist learning theory claims that mental skills and actions build knowledge (Bada & Olusegun, 2015). Constructivism refers to how people use knowledge, resources, and other people's help to enhance their mental models and problem-solving techniques (Woolfolk, 2007). The constructivist education paradigm allows students to build objective reality and sharpens cognitive growth for higher-level intellectual development in social interaction with individual mediation.

Constructivist learning and teaching view students as "active in creating their knowledge" and that "social interactions are crucial in knowledge construction" (Bruning *et al*., 2012). Constructivists believe knowledge is gained via direct experience and reflection (Tam, 2000). Constructivists' core tenet is that learners create new information on top of existing knowledge (Oliver, 2000). Education becomes more about applying concepts and making connections than absorbing material. The teaching and learning processes have increasingly focused on using knowledge (Amineh & Asl, 2015; Arends, 1998). Students examine their

own experiences; therefore, evaluation is a part of the learning process (Bruning *et al*., 2012; Adams, 2006). Constructivist learning is classified into different sub-theories: trivial, socially constructive, radical, critical constructivism, etc. (Amineh & Asl, 2015; Adams, 2006, Tam, 2000). These sub-theories are used in various studies to explore how teaching and learning support students' active learning experiences (Baharom, 2013; Jonassen, 1999; Knuth & Cunningham, 1993).

The pedagogical goals of a constructive learning environment are to allow students to determine how they will learn. For example, Knuth & Cunningham (1993) summarized seven goals of a constructive learning environment, further explored and discussed by Honebein (1996) to support a learning process. Besides, Fosnot (1996) discussed and summarized the general principles of constructivist learning environments, which are useful in designing a learning process. Furthermore, Jonassen (1999) discussed and provided the framework of the constructivist learning environment, which is widely used in literature to support learning activities in a learning environment (Baharom, 2013). These goals, general principles, and frameworks are important foundations for developing learning activities among the sub-theories of the constructivist learning theory (Baharom, 2013; Duffy & Cunningham, 1996; Fox, 1997; Lefoe, 1998).

(ii) Social Constructivist Learning

Social constructivism is a sub-theory of constructivist learning theory and is a knowledge in sociology and communication theory that investigates how humans generate information and perceive their environments (Amineh & Asl, 2015; Adams, 2006). It is a subset of constructivist learning theory that stresses the collaborative character of much learning. It is heavily influenced by the works of Vygotsky (1896 - 1935), who noted that information is first created in a social setting and then internalized and utilized by people (Utami, 2016). Cultural and contextual understanding is important in comprehending what is occurring in society (Derry, 1999; McMahon, 1997). According to Kim (2001), the social constructivist approach is predicated on the simple assumptions of reality, knowledge, and understanding of the social environment. Palincsar (1998) noted that it "concentrates on the interconnectedness of societal and individual processes in the co-construction of knowledge". This concept implies that learning is understood as a process of socially created actions within a context when viewed through social constructivism.

Social constructivist scholars view learning as an active process in which learners should learn to discover principles, concepts, and facts for themselves, thus encouraging learners to think intuitively (Brown & Palincsar, 1986). According to Shunk (2000), social constructivist teaching techniques have stressed cooperative education, group communication, computational learning, problem-based training, online searches, grounded training, and other strategies that include learning with others. The social constructivist instructional models emphasize learner interaction and social professionals (Lave & Wenger, 1991; Mbati, 2012; McMahon, 1997; Secore, 2017; Utami, 2016).

Social constructive learning is a student-centered learning process; it generates knowledge and experiences through social interactions and collaborations within a learning environment and reflects upon experiences and progress using various digital learning devices (Adams, 2006; Shah, 2019; Mohammed & Romli, 2021; Morchid, 2020). Social constructivist learning is attributed to demonstration, lectures, social dialogue, interest, authentic problem solving, choice, collaboration, and reflection (Bonk & Cunningham, 1988). Thus, social constructive learning processes can support the active learning process. Social constructivists see motivation as extrinsic and intrinsic because learning is a social phenomenon. Learners are partially motivated by rewards provided by the knowledge community. However, because a learner actively constructs knowledge, learning also depends on the learner's internal drive to understand and promote the learning process (Morchid, 2020; Shah, 2019).

(iii) Social Constructivist and Online Learning Environment

Social constructivist learning is how students collaborate with other students, instructors, and peers to excel in the learning process. These processes mean students develop critical thinking, collaborative, communicative, and innovative learning strategies to support their active learning processes (Mohammed & Romli, 2021; Morchid, 2020; Shah, 2019). According to social cognitive theory, the learning environment and students' learning process are intertwined.

In addition to reading, writing, and computing skills, the global community thinks students should think critically, collaborate, communicate, and create knowledge (Lu & Jiang, 2016). Based on this concept, students' learning process will shift from passive acceptance and recall to active exploration and generation of information (see Banihashem et al., 2022a, 2022b).

The learning environment must be redesigned to support advanced cognition and skill acquisition, and an online learning environment is thought to help students learn actively (Lu & Jiang, 2016; Zhuang *et al.*, 2017).

Interaction is an essential element of effective teaching, and this is true regardless of the presence or absence of technology. Any learning environment requires interaction as a necessary component, whether in a traditional classroom setting, synchronous or asynchronous online education, or a hybrid of the two. The process of information acquisition, as well as the development of both cognitive and physical abilities, requires interaction as a crucial and basic step in the learning process (Barker, 1994; Zhuang *et al.*, 2017).

Therefore, providing interaction and improving its quality have been major study goals for instructional designers and researchers in Instructional Technology for a long time (Hannafin, 1989; Lu & Jiang, 2016; Noroozi & De Wever, 2023). We as humans are social beings who develop as a result of our social interactions with members of the communities in which we live. In recent years, an increasing number of teachers and other education professionals have come to recognize social constructivism's importance as a basis for building more efficient learning environments (Morchid, 2020; Shah, 2019). Individuals and society as a whole are seen by social constructivists as inextricably linked to one another. Social constructivists contend that students acquire their knowledge primarily through participation in the social practices of a learning environment, such as joint endeavours and group projects, as well as in the social practices of their immediate communities, such as daily life with their families and attendance at religious gatherings (Stage *et al.*, 1998; Shah, 2019).

The social constructivist learning approach is a good fit for learning theory for designing an online learning environment. It provides an opportunity for a conversation among peers in a real-world setting; it creates a space for a dialectical process to occur in a learning process (Lu & Jiang, 2016). The social constructivist method is also concerned with learning, which occurs due to the learners' experiences. Knowledge is not static or external; understanding is gained via social interactions (Hannafin et al., 1997). As a result, a learning designer is responsible for creating learning activities that support the learner's learning process in an online learning environment that accommodates various learning tools and styles to ensure students have an inclusive learning experience (Temdee, 2020; Zhuang et al., 2017).

Methodology

Social constructivism is a theory of knowledge development that has a long history as a sub-theory of constructivism (Duffy & Cunningham, 1996; Fox, 1997; Lefoe, 1998). The development of social constructivist learning principles followed the approach of Lefoe (1998). Doolittle & Camp (1999) noted that a social constructivist learning environment should encourage "social negotiation and mediation; Content and skills relevant to the learners; teacher serves a facilitator; learning in authentic and real-world environments; encourage multiple perspectives; skills should be constructed around prior knowledge; formatively, serving to inform future learning experiences; learners are encouraged to be self-regulatory, aware and mediated". These eight characteristics might be considered when determining how an online social constructivist approach to learning might function. Online learning also naturally encompasses all of these (*Secore, 2017).*

This paper review and compare pedagogical goals (Knuth & Cunningham, 1993), general principles (Fosnot (1996), and framework (Jonassen, 1999) of constructivist learning theory and compares with the list of attributes (Bonk & Cunningham, 1998) of social constructivist theory. According to Conole et al. (2004), matching the learning theory features with the learning environment may influence both theory and practice in a learning environment. This concept can be used to develop learning activities to build an online learning environment through the lens of social constructivism.

Thus, the processes for deriving the social constructivist learning principles are divided into two stages as follows:

(i). Review and compare the pedagogical goals (Knuth & Cunningham, 1993), principles (Fosnot (1996), and framework (Jonassen, 1999) to obtain the general principles of a constructivist learning environment, as shown in Table 1.

(ii). Compare the general principles of a constructive learning environment with the list of attributes for social constructivists (Bonk & Cunningham, 1998) to obtain the general learning principles of social constructivists, as shown in Table 2.

These processes enabled the social constructivist learning principles to guide the design of learning activities in an online learning environment for students' active, authentic and meaningful learning experiences.

Table1. General Principles of Constructivist Learning Theory

Honebein (1996) Pedagogical Goals	Fosnot (1996) Principles	Jonassen (1999) Framework	General Principles
Provide hands-on experience with the process of knowledge building. Students decide what topics or subtopics to study, learn, and solve difficulties, and the teacher should assist.	Learning progresses toward creating structures: Encouraging students to build principles (self-organization) across various experiences.	Constructive articulation and reflection: Students must express their reflection to incorporate observations into current mental models.	Student-focused learning activity encourages them to take responsibility for their learning
Provide experience and appreciate multiple perspectives: Problems in the real context rarely have one correct solution. There are typically multiple ways to think about solving problems. Students must engage in activities that enable them to evaluate alternative solutions to problems to test and enrich their understanding.			Activity that gives numerous perspectives using various resources
Incorporate learning into realistic and	Learning is aided by disequilibrium:	Authenticity in a complex and	Contextualized learning activity

relevant contexts: Students must relate what they are learning to the context in which they are learning.	Students must investigate and develop ideas that confirm or contradict their research.	contextual situation: Learning tasks should be embedded in natural environments.	
Encourage student ownership and participation in the learning process: constructivist learning is focused on the learner. Rather than the instructor deciding what students will learn, individuals investigate their interests and aspirations.	Learning does not occur due to development; rather, learning occurs due to students asking questions and formulating their ideas.	Active manipulation and observation: Involving students in meaningful assignments and observing their results.	Engaging learning activities for students
Embed learning in social experience: Social connections greatly impact intellectual development. Thus, learning should be a collaborative effort between instructors and students.	Dialogue within the community supports further thinking: Student-led discussions about defending, verifying, justifying, and explaining ideas to create shared meaning.	Conversation and collaboration lead to cooperation: Task collaboration is another learning method. It is through dialogue amongst learners in a learning community that learner develops thinking skills	Collaborative learning activity

Encourage the use of multiple modes of representation. Oral and written communication are the two most frequent modes of communicating knowledge in educational contexts. However, learning using these modes of communication limits solely how students perceive the world. Curricula should embrace new media, such as video, computers, photos, and sound, to give deeper experiences.			Multimedia learning activity
Encourage self-awareness of the knowledge construction process: Knowing how we know is a crucial result of constructivism. Understanding why or how students addressed an issue;	The driving force behind learning is a reflective abstraction, which includes reflection, multi-symbolic representation, and strategy discussion.	Intentional reflection and regulation for learning: Achieving goals and reflecting on the process helps learners create new knowledge. .	Learning activity that acknowledges the learner's reflecting process

analyzing how students constructed knowledge and processes.			

Table 2. General Learning Principles of Social Constructivist Learning

Bonk & Cunningham (1998) Attributes of Social Constructivist	General Principles of Constructivist Learning	Social Constructivist Learning Principles
	Student-focused learning activity encourages students to take responsibility for their learning	Multiple-Perspective Learning Principle
▪ Lecturer support by demonstration and explanation ▪ Several viewpoints	Activity that gives numerous perspectives using various resources	
	Contextualized learning activity	Contextual Learning Principle
▪ Problems that are real	Engaging learning activities for students	
	Multimedia learning activity	
▪ Team selection and interest ▪ Discussion and elaboration in the social sphere ▪ Collaboration & negotiation	Collaborative learning activity	Collaborative Learning Principle
▪ Process & reflection	Learning activity that recognizes the reflection process of the learner	Reflective Learning Principle

Thus, four major social constructivist learning principles are aligned with the development of the online learning environment based on the methodological approach. The four types of

learning principles are contextual learning principles, reflective learning principles, collaborative learning principles, and multi-perspective learning principles. These four categories established a theoretical foundation for active, authentic and meaningful interaction activities that might guide the future design of an online learning environment. However, the precise implementation of these online learning activities depends on several factors, including students' app preferences, learning styles, learning requirements, etc. (Baharom, 2013: Mohamad & Romli, 2021).

Thus, the four themes of the social constructivist learning principles that can support the active learning process in an online learning environment to deliver meaningful learning interactions are discussed as follows:

(i) Multiple-Perspectives Learning Principle

Activities that enable students to explore knowledge from different perspectives and develop linkages and explanations can encourage high-order thinking (Dabbagh, 2005). Students can rearrange information to create new knowledge by exposing them to various experiences (Kim, 2001; Duffy & Cunningham, 1996). Spiro *et al*. (1991) emphasized the need for various circumstances and resources to develop knowledge due to exposure to various extra learning resources made available to students for meaningful interactions. From this standpoint, multi-perspective learning activities may be represented in various ways, including textual, visual, and auditory representations. Many learning contexts are intended to make learners aware that different views on issues are especially important in real-world situations (Dabbagh, 2005). It entails students considering multiple points of view to discover a meaningful solution to the issue, and it has the potential to provide new meaningful learning experiences.

(ii) Contextual Learning Principle

Contextual learning facilitates knowledge development and guarantees students access to resources to help them develop high-order knowledge (Kim, 2001; Palincsar, 1998). Activities might be developed for contextual learning, where real-world issues and tasks are within reach of their online device (Secore, 2017; Shah, 2019). According to Duffy & Jonassen (2013), learning activities "should help individuals make sense of their world as

they encounter it". Activities might be developed to utilize students' various settings. For example, undergraduate computer science students may be requested to take images and videos of their coding process and upload them to a virtual repository for a teaching aid bank. In other words, combining physical and digital artifacts can allow learners to experience phenomena, concepts, and relationships within a learning environment.

(iii) Collaborative Learning Principle

Working in groups can assist learners in enhancing their knowledge via argument, controlled conflict, and reciprocal learning, ultimately leading to a shared understanding of the subject matter (Wood & O'Malley, 1995; Dunlap & Grabinger, 1995). When learning occurs in a collaborative environment, students receive information from experts and fellow students. Peer interaction allows students to put their ideas to the test and assist one another in creating or refining knowledge systems (Dunlap & Grabinger, 1996). Collaboration efforts are required to report and present discoveries and negotiate and defend information obtained through learning settings (Oliver et al., 1996). Collaboration on problem-solving and knowledge-building appear to be common objectives when people cooperate or engage in social bargaining (Duffy & Cunningham, 1993). In addition to ensuring that learning activities are varied, a learning designer may facilitate peer teaching. Social interactions give mediated perceptions of events, but group communication facilitates learning about the world around you (Vygotsky, 1978). Learners must learn to maintain reciprocal relationships to succeed in their studies (Wenger, 1998). Besides, Dabbagh (2005) noted that social bargaining is necessary for every collaborative effort. Through discussion, learners may get insight into what it means to be in a social context. For example, using a discussion forum or other interactive tools, students may learn about taking turns in arguments, respecting opposing perspectives, and keeping a dialogue going in an online learning environment to support learning experiences.

(iv) Reflective Learning Principle

Reflective learning experiences encourage self-evaluation and insights into students' strengths and weaknesses. Duffy & Cunningham (1996) noted that when "one encounters or witnesses a circumstance in which previous beliefs are inadequate, the awareness of a current state of knowledge is enhanced," we are said to be in the process of reflecting. Furthermore, the

process of evaluating and interpreting what has transpired to offer new meaning to a situation or occurrence is known as the act of reflecting (Kim, 2001; Dabbagh, 2005). One type of activity, which might be adapted for use on an online device and created for reflection, allows learners to reflect on their knowledge and experiences and organize and reorganize information. Encourage students to evaluate their work, analyze their accomplishments, and draw comparisons with their peers to improve their learning (Shah, 2019; Wilson, 1996). Actions encouraging students to talk about their actions and understandings may result in real introspection. Online learning environments can be designed to facilitate inquiry-based activities through record-keeping and the promotion of reflective learning experiences.

Conclusion

Educational institutions face several challenges, including the COVID-19 pandemic, the transition of in-class teaching and learning to an online learning environment, and the need to support, engage and motivate distant, remote, and isolated students in an online learning environment to achieve learning objectives. On the other hand, an online learning environment is a complex process that presents problems for both students and teachers; it shifts instructors' roles from a source of knowledge to a facilitator of knowledge, forcing students to be active participants in their learning process to succeed and accomplish learning objectives.

Smart technology developments are hastening the development of an online learning environment. An online learning system may identify and gather the real-learning circumstances of students and their interactions with the learning environment using various technologies. Similarly, students increasingly use mobile devices, enabling an online learning experience not limited by place or time. An online learning environment may be created by combining online and mobile technology and a learning theory to capitalize on the growing number of online learning opportunities among students to improve learning processes. Several learning theories have been used to design a learning environment, such as social constructivist learning, constructive learning, cognitive, socio-cognitive, and so on. However, today's difficulties necessitate an online learning environment that can give students support, interactions, and motivation to succeed in an active learning process and minimize obstacles and future educational processes. The characteristics of social constructivist learning principles can enhance students' active learning processes and assist them in achieving their

learning goals. Active learning engagement enables social learning, interactions, and collaborative, multi-perspective, and reflective learning processes. However, there is a lack of a well-defined methodology for deriving these learning principles to guide the design of a learning process to support the active learning process in a learning environment.

This paper explored the goal, principles, and framework of constructivist theory and compared it with social constructivist learning attributes to derive the social constructivist learning principles. These learning principles are multi-perspectives, collaborative, contextual, and reflective, supporting the active learning process in an online learning environment. This process addressed how social constructivist learning theory can be derived and support an online learning environment that could encourage active learning experiences. These learning principles are useful for learning designers and thus support students' active learning process in an online environment for authentic and meaningful learning experiences.

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