Epistemological Implications of Constructivism to Adult Learning

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Contemporary innovations in learning have brought about paradigm shift in adult learning from emphasis on knowledge acquisition to knowledge creation. Therefore, this paper examined the concept, principles and epistemological implications of constructivism theory to facilitation of knowledge creation in adult learningbefore recommendations were made. Recommendations put forward included the need for facilitators to align instructional methodologies with the philosophical and methodological principles of constructivism theory to create learner-centred and collaborative learning environments that foster critical reflection and knowledge creation among adult learners.

Keywords: Constructivism, Adult learning, Knowledge creation

Introduction

Learning in its diverse forms is an essential nutrient for meeting the needs of individuals and society. It is a process which bridges generations, enabling them to pass accumulated values while creating new ones; integrates an individual into the society enabling him or her to become self-actualized for socio-economic, political, cultural, scientific, and technological advancement. It is this belief that galvanised people and governments of different countries to direct efforts to promotion of learning and combat illiteracy, a monster that does not only inhibit individual and national development but also endanger advancement of peace, good health, poverty eradication and participatory democracy. This accounted for why promotion of learning has remained a constant theme in global discourse and prioritised in development strategies of many countries. In relation to this, Omolewa (2006) submits that for us to conquer poverty, ignorance, and disease, we must first eradicate illiteracy and promote learning.

Although learning opportunities for adults exist in a variety of settings ranging from a formal institution to a place of employment, the uniqueness of adult learner's demand that efforts must be made to accommodate their peculiarities, interests and needs during learning processes (Egunyomi, 1999; Aderinoye, 2004; Imhabekhai 2009). This is because adult learners enter learning programmes to meet specific needs; making a commitment to enrol involves an expectation of what they tend to achieve. The possibility of adult learners achieving their aims of enrolment is influenced by many factors. Such factors include adequacy and effectiveness of the learning materials used and efficiency of the facilitators. Efficiency of facilitators encompasses their ability to identify the learners' needs for enrolment, their varied individual differences and apply relevant learning theories to maximize learning. One of such learning theories is constructivism.

Concept of Constructivism

Constructivism theory has roots in both philosophy and psychology. The philosophical root of constructivism is based on the premise that, by reflecting on our experiences, we construct our own understanding of the world we live in. The psychological root of constructivism on the hand is based on the adaptive function of cognition. Constructivism learning theory was proposed as an alternative to the objectivist model, which is implicit in behaviourist approaches to education. While objectivism sees knowledge as a passive reflection of the external and objective reality, constructivism sees learning as a process of constructing meaning; it is how people make sense of their experience. According to Joseph (2013) constructivism proposes that learners construct their knowledge through their personal experiences gained from the environment and social interactions, reflecting on those experiences, and reconciling against prior knowledge. The theory asserts that learning is an active activity which involves individuals making sense from all information received. Bhattacharjee (2015) also submit that constructivism as a theory asserts that learning

is an activity that is individual to the learner. This is based on assumption that individuals will try to make sense of all information that they perceive, and that everyone will, therefore, "construct" their own meaning from that information. Liu and Matthews (2005) observe that constructivists consensually hold that knowledge is not mechanically acquired, but actively constructed within the constraints and offerings of the learning environment. Driscoll (2000) cited in Bhattacharjee (2015) explains that constructivists believe knowledge can only exist within the human mind, and that it does not have to match any real-world reality. Learners will be constantly trying to derive their own personal mental model of the real world from their perceptions of that world. As they perceive each new experience, learners will continually update their own mental models to reflect the new information, and will, therefore, construct their own interpretation of reality. The basic idea is that problem solving is the core of learning, thinking, and development. As people solve problems and discover the consequences of their actions through reflecting on past and immediate experiences - they construct their own understanding and deeply understand what they have constructed. Constructivism does not perceive learning as a passive process but experiential in which interaction and adaptive skills are prioritized for more meaningful acquisition of knowledge to promote creative thinking, managerial skills and problem solving through discovery, inquiry, experimental and reflection in an authentic setting, and refines it. Learning is therefore an active process that requires a change in the learner. This is achieved through the activities that the learner engages in, including the consequences of those activities, and through reflection.

The essential core of constructivism is that learners actively construct their own knowledge and meaning from the experiences gotten from the environment and social interactions. It focuses on how humans make meaning in relation to the interaction between their experiences and their ideas. According to Huang (2002) constructivists believe that learners could learn actively and construct new knowledge based on their prior experience and knowledge through interaction. The significance of interaction between the learner and his or her environment means a challenge to the facilitators in shaping the learners' real experience from the environment and in promoting surroundings that tend to promote experiences that lead to growth and development. This means recognising the importance of the social context in which learning takes place and how the context has an impact on what is learned (Vygotsky, 1978). Learning environments are often established in ways that permit facilitator to provide guidance and assistance when necessary. Von Glasersfeld (1984) proposed four essential epistemological tenets of constructivism.

1. Knowledge is not passively accumulated, but rather, it is the result of active cognizing by the individual.
2. Cognition is an adaptive process that functions to make an individual's behaviour more viable given a particular environment.
3. Cognition organizes and makes sense of one's experience, it is not a process to render an accurate representation of reality; and
4. Knowing has roots in both biological/neurological construction, and social, cultural, and language-based interactions.

Thus, constructivism acknowledges the learner's active role in the personal creation of knowledge, the importance of experience (both individual and social) in the knowledge creation process, and the realization that the knowledge created will vary in its degree of validity as an accurate representation of reality. Although, the four fundamental tenets provide the foundation for basic principles of the teaching, learning, and knowing process as described by constructivism, the tenets may be emphasized differently, resulting in different perspectives of constructivism (Ruey, 2010; Doolittle, 2013; Popovic, 2014). Constructivism is not a unitary theoretical position; rather, it is a continuum. The assumptions that underlie this continuum vary along several dimensions and have resulted in the definition and support for multiple types of constructivism.

Suffice to say that continuums of constructivism are pointers to the directions in constructivism theory and these can be broadly grouped into two based on their approach to the construction of knowledge: the individual constructivism and the social constructivism.

Individual Constructivism

Individual constructivism is mostly attributed to Jean Piaget who articulated mechanisms by which knowledge is internalized by learners (Bhattacharjee, 2015; Keller, 2011; Hein, 1991). Piaget, according to Bhattacharjee (2015), suggested that through processes of accommodation and assimilation, individuals construct new knowledge from their experiences. When individuals assimilate, they incorporate the new experience into an already existing framework without changing that framework. This may occur when individuals' experiences are aligned with their internal representations of the world but may also occur as a failure to change a faulty understanding; for example, they may not notice events, may misunderstand input from others, or may decide that an event is a fluke and is therefore unimportant as information about the world. In contrast, when individuals' experiences contradict their internal representations, they may change their perceptions of the experiences to fit their internal representations. According to the theory, accommodation is the process of reframing one's mental representation of the external world to fit new experiences. Accommodation can be understood as the mechanism by which failure leads to learning: when individuals act on the expectation that the world operates in one way and it violates our expectations, we often fail, but by accommodating this new experience and reframing our model of the way the world works, individuals learn from the experience of failure, or others' failure. Thus, learning becomes the process of adjusting our mental models to accommodate new experiences.

Within the individual constructivism, emphasis is on intra-psychic cognitive processes that are the source of the structure of reality and learning is perceived as a construction of the subject's cognitive structures. In relation to the individual constructivism, Keller (2011) argues that knowledge is individually constructed, and therefore learner-centred approach to learning is emphasized. This is based on the believe that knowledge is not limited to the ability to memorize teacher directed facts only, but instead knowledge encompasses the ability to transcend what one knows into a broader or improved understanding of material and the experiences in which the material is presented. The life experiences everyone brings to the learning are springboard which will help determine how new learning materials are processed. Believing this, Piaget (1957) cited in Keller (2011) asserts that people glean knowledge either through accommodation or through assimilation and ultimately that how individuals perceive reality affect how they perceive new information. Consequently, learner-centred, and discovery-oriented learning processes should be emphasized, and the content should leave room for expansion on what is being learned.

Elements of Individual Constructivism Theory

- **Schema:** Schemas are mental frameworks that represent the world around us as we understand them. These could be objects, actions, or abstract concepts. We keep these representations in our memory and later retrieve them to be used as basis for our response to new information or situation confronting us.
- **Assimilation:** Incorporating new information into existing knowledge structures without changing the old ones.
- **Accommodation:** The construction of new knowledge that requires restructuring of the existing knowledge structure to fit in the new one.
- **Equilibration:** It is what drives the learning process. When there is an imbalance between what is previously known and what is previously learnt, the individual reconstructs understanding to re-establish equilibrium.

Equilibrium is attained when an individual's schema is always "matched up" with real world experience. Sometimes this creates disparity and to resolve this, the individual goes into the process of assimilation and accommodation. When the individual's

mental structure equates with real experience, balance is re-established thus, equilibrium is attained. When the individual's schema does not coincide with reality, it creates disequilibrium which will drive the individual to seek an explanation and find an answer through adaptation. Thus, adaptation is a process of assimilation and accommodation, where external events are assimilated into existing understanding while unfamiliar events which do not fit with existing knowledge are restructured in the mind to accommodate and learn from the unfamiliar events.

Social Constructivism

Social constructivism is most often associated with Vygotsky's socio-cultural theory which focuses on inter-psychic processes and on the role of social processes in knowledge creation (Keller, 2011; Mitchel, 2011; Liu and Matthews, 2005; Hein, 1991). Mitchel (2011) defines social constructivism as the processes through which the material world shapes and is shaped by human actions and interaction dependent on dynamic normative and epistemic interpretation of the material world. Social constructivism also stresses the importance of environment and context in the understanding of knowledge construction. This emphasises the central roles of community and social interaction in the development of cognition and process of understanding things. The basic premise of social constructivism is that culture and social communities shape the ways in which individuals perceive, interpret, and ascribe meaning to their experience and therefore the role of social interaction in the learning process is emphasized (Vygotsk, 1978; Merriam, Caffarell and Baumgartner, 2007; Popovic, 2014).

Unlike Piaget who believed that development precedes learning, Vygotsky believed social learning precedes development. In Piaget's cognitive constructivism, the learner discovers for himself through the process of equilibration. In social constructivism, the learner learns through social interaction, social activities, and collaboration. Simply put, the learner's knowledge and understanding are shaped by the influence of environment. Social contribution plays a role in the learner's development. It is through a skilful interaction with peers who can be more knowledgeable that the learner experience information which he or she may learn and internalize from.

Elements of Social Constructivism Theory

- **Social Interaction:** Social interaction is integral to the development of a learner. Somebody who is more knowledgeable than the learners demonstrate or instructs them. They try to understand and internalize this and later use to guide their own action. This is called co-operative or collaborative dialogue.
- **More Knowledgeable Other (MKO)**: Anyone or thing that can provide the learners with knowledge that they do not have can be an MKO. This is not only limited to humans, instructional media either real or improvised materials can also be considered as MKO.
- **The Zone of Proximal Development (ZPD):** This is the distance between the learner acting with guidance and the learner acting independently. It is within this ZPD that the giving of instruction and guidance is crucial for the learners to develop their skills.

Principles of Constructivist Learning Theory

Constructivism as a theory describes how learning happens by suggesting that learners construct knowledge out of their experiences is guided by the following principles:

- **Learning should take place in authentic and real-world environments:** Whether building accurate representations of reality, consensual meanings in social activities, or personally coherent models of reality, experience is paramount. Experience, both socially oriented and object oriented, is a primary catalyst for knowledge construction. Experience provides the activity upon which the mind operates. In addition, knowledge construction is enhanced when the experience is authentic.
- **Learning should involve social negotiation and mediation:** While only social constructivism emphasizes social interaction as a basis for knowledge construction, cognitive and radical constructivism does assign social interaction a role. Social interaction provides for the development of socially relevant skills and knowledge, as well as providing a mechanism for perturbations that may require individual

adaptation. In some cases, such as cultural mores and culturally arbitrary rituals (e.g., greetings, gender relations, dress), knowledge can only be attained through social contact. In addition, as an individual gains experience in a social situation, this experience may verify an individual's knowledge structures or it may contradict those structures. If there is contradiction or confusion, then the individual must accommodate this contradiction to maintain either an accurate model of reality or a coherent personal or social model of reality. Finally, an integral component of social mediation is the use of language. Language is the medium through which knowledge and understanding are constructed in social situations (Spivey, 1997).

- **Content and skills should be based on learners needs** Constructivism emphasizes that knowledge serves an adaptive function. If knowledge is to enhance one's adaptation and functioning, then the knowledge attained (i.e., content and skills) must be relevant to the individual's current situation, understanding, and goal. This relevancy is likely to lead to an increase in motivation, as the individual comes to understand the need for certain knowledge. Ultimately, experience with relevant tasks will provide the individual with the mental processes, social information, and personal experiences necessary for enhanced functioning within one's practical environment.
- **Prior knowledge of the learners is important:** All learning begins with an individual's prior knowledge, regardless of constructivist affiliation. Understanding a learner's behaviour requires an understanding of the learner's mental structures and socio-cultural background, that is, an understanding of the learner's understanding. Only by attempting to understand a learner's prior knowledge will the facilitator be able to create effective experiences, resulting in maximal learning.
- **Regular assessment to inform future learning experiences:** Constructivism asserts that the acquisition of knowledge and understanding is an on-going process that is heavily influenced by a learner's prior knowledge. Although, knowledge and understanding are not directly visible, rather they can be inferred from action. Thus, to consider an individual's current level of understanding in the on-going teaching and learning process, a facilitator must continually assess the individual's knowledge. This regular assessment is necessary to accurately create the next series of experiences and activities for learners.
- **Active participation of learners should be encouraged:** The underlying tenet of constructivism, and the main thread that holds together this array of theoretical positions, is the claim that learners are active in the construction of knowledge and meaning. This activity involves mental manipulation and self-organization of experience, and requires that learners regulate their own cognitive functions, mediate new meanings from existing knowledge, and form an awareness of current knowledge structures.
- **Teachers as guides and facilitators of learning:** In constructivism, the role of the teacher is to create experiences in which the learners will participate and that will lead to appropriate processing and knowledge acquisition by serving as a guide or facilitator to the extent that the guiding or facilitating process guide learners to an awareness of their experiences and socially agreed-upon meanings.
- **Encouragement of multiple perspectives and representations of content:** The relationship of multiple perspectives and multiple representations is one of cause and effect within constructivism. Experiencing multiple perspectives of a particular event provides the learner with the raw materials necessary to develop multiple representations. These multiple representations provide learners with various routes from which to retrieve knowledge and the ability to develop more complex schemas relevant to the experience. This being the case, a learner's understanding and adaptability is increased when the individual can examine an experience from multiple perspectives. These perspectives provide the learner with a greater opportunity to develop a more viable model of their experiences and social interactions.
- **Problem-solving, higher-order thinking skills and deep understanding are emphasized:** This provides the opportunity for exploration and encourage learners to seek knowledge independently and to manage the pursuit of their goals.

Suffice to say that some criticisms are levelled against constructivism especially by the cognitive psychologists and educators who have

questioned the central claims of constructivism. It is argued that constructivist theories are misleading or contradict known findings. The effectiveness of this approach toward instructional design, especially as it applies to the development of instruction for novices have been questioned (Meyer, 2009; Kirschner, Sweller, and Clark, 2006). While some constructivists argue that "learning by doing" enhances learning, critics of this instructional strategy argue that little empirical evidence exists to support this statement given novice learners (Meyer, 2009; Kirschner, Sweller, and Clark, 2006). It was argued that novices do not possess the underlying mental models, or "schemas" necessary for "learning by doing". Meyer (2009) argues that not all teaching techniques based on constructivism are efficient or effective for all learners, suggesting many educators misapply constructivism to use teaching techniques that require learners to be behaviourally active. He describes this inappropriate use of constructivism as the "constructivist teaching fallacy". In contrast, Kirschneret al. (2006) describe constructivist teaching methods as "unguided methods of instruction." They suggest more structured learning activities for learners with little to no prior knowledge. It is believed that constructivism is an example of fashionable but thoroughly problematic doctrines that can have little benefit for practical pedagogy. However, it is significant to note that of constructivism has led to a change in instructional strategies from teacher-centred to learner-centred as well as a change from knowledge acquisition to knowledge creation.

Epistemological Implications of Constructivism Theory to Adult Learning

The implications of the constructivism theory to adult learning are rooted in its emphasis on the identification and recognition of the learners' background in terms of their socio-cultural and economic background as well as prior knowledge and experiences. Such understanding will serve as guide to formulation, implementation, and evaluation of basic learning contents. This is because if the curriculum contents of the programme cannot translate to realization of the learners' needs and interest, regular attendance, commitment, and good learning outcomes are at jeopardy. Also, knowledge of the learners' background is a crucial factor in the choices of the instructional methodologies and materials employed to facilitate attainment of regular attendance, arousal of learners' interest, perseverance, commitment, good learning outcomes and programme's objectives.

It is a known fact that prior experiences and knowledge impact on learning process. In trying to solve novel problems, perceptual or conceptual similarities between existing knowledge and a new problem should be established; facilitator should remind the learners of what they already know. This is an important step towards solving novel problems. The significance of learning materials in broadening learners' experience, engendering concretization of abstract concepts and ideas, in addition to making knowledge acquired by the learners to be permanent cannot be overemphasized. A careful explanation of a topic may not absolutely lead to a better understanding of that topic by the learners, whereas the use of learning materials can help to provide clarity on issues that are of learning interest to the learners. Information not connected with a learner's prior experiences will be quickly forgotten. This is one of the points of convergence and consonance between the constructivism theory and andragogical principle of adult learning which states that the accumulated growing reservoir of experiences of an adult learner is a rich source of learning (Merriam, Caffarell and Baumgartner, 2007). Therefore, facilitator must ensure that learning environment and materials enable learners in adult education programme to actively construct new information into his or her existing mental framework for meaningful learning to occur.

The desire to stimulate and inculcate skills of critical thinking and problem-solving is connected to the emphasis of the constructivism theory for active participation of adult learners in the provision of real and authentic problems-based learning opportunities. This means realistic problem-based or project-based learning contexts should be provided not only to provide relevant information for solving the

problem, but also to create a realistic context. This can be done by using real objects in real life situations for instruction. Where real life situation is not possible, the alternative is for the instructor to improvise by using representations of real-life situations. Improvised learning materials are substitute made from local materials found within the environment when the real or original materials are not available. These representations are materials, devices and techniques that help the facilitator to make realistic approach to his job. Whether real or substitutes, learning materials have a common goal. They help the facilitator to convey the intended message effectively and meaningfully to the learners so that the learners receive, understand, retain, and apply the experience gained to achieve skills of critical thinking, problem-solving and rational decision making. Hence, the curriculum and instructional methodologies should present an emerging agenda based on what learners know, what they are puzzled by, and encouragement of multiple perspectives and representations of content which they supposed to learn.

The need to ensure social negotiation and mediation in learning is associated with the constructivism advocacy for proper facilitation. Facilitators' role in adult learning is to guide learners into adopting cognitive strategies such as self-testing, articulate understanding, asking probing questions, and reflection. The role of the facilitator in the learning environment is to organize information around big ideas that engage the learners' interest, to assist learners in developing new insights, and to connect them with their previous learning. The activities are learners-centred, and learners are encouraged to ask their own questions, carry out their own experiments, make their own analogies, and come to their own conclusions to facilitate self-regulatory, self-mediated and self-awareness. Hence, the selection of materials for learning and instructional strategies should be done based on careful analysis of the objectives of the programme and the suitability of the media to promote individualized instruction and guided interactions among learners in adult education programmes.

Recommendations

- **Promotion of friendly learning environment:** Since learners' knowledge and understanding are shaped by the environment, facilitators should ensure the learning environment is friendly and free of tension to promote positive social interaction and collaboration among learners and others in the learning environment.
- **Creation of collaborative learning:** Since collaborative learning has potentiality of overcoming some of the barriers to learners' interaction, foster reflective response, improve learners' interpersonal skills and support; adult facilitators should foster collaborative learning through teamwork, group discussion, field trip and demonstration.
- **Learner-centred approaches:** The learning methodologies should be learner-centred approaches such as discovery, brainstorming, discussion, etc. This will promote adjustment of the mental model to accommodate new experiences and the new experiences will also serve as springboard for further learning.
- **Recognition of individual differences:** Adult facilitators must understand the biological and socio-cultural uniqueness of each learner to serve as guide for the planning, implementation, and evaluation of adult learning. The understanding will ultimately facilitate adaptation of the learning contents and skills to achievement of the learner's needs.

Conclusion

Contemporary innovations learning has brought bring about paradigm shift in adult learning from emphasis on knowledge acquisition to knowledge creation. Therefore, facilitators must align instructional methodologies with the philosophical and methodological principles of constructivism theory to create learner-centred and collaborative environments that foster critical reflection and knowledge creation among adult learners.

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