GREEN PUBLICATION

International Journal For Research In Educational Studies

GREEN PUBLICATION

ISSN: 2208-2115
Volume 06 Issue 04 December 2020
Available on-line at:https://ijfres.com/index.php/es/about

DOI:*https://doi.org/10.53555/es.v6i4.1403* *Received: 09-Sep-2020 Accepted: 20-Nov-2020*

Constructivist Teaching Pedagogy: A Strategy for Innovation, Industrialization and Sustainable Development

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Abstract

Knowledge and skills for socio-economic transformations are developed from learners' experience and interests rather than treating them as empty vessels to be filled with knowledge. All learning is filtered through pre-existing strategies. Hence, learning is more effective when learners are actively engaged. Based on this stand point, in this paper, we discuss the practice of constructivist pedagogy as a strategy for cultivating innovative minds and promoting skills that are needed for the realization of industrialization and sustainable development. In this paper, we highlight some factors hindering the practice of constructivist teaching pedagogy and suggest strategies that schools could adopt to encourage the practice constructivist teaching pedagogy. We also discuss the contribution of constructivist pedagogy in equipping learners with workable knowledge and skills. Based on our analysis of various empirical studies, we conclude with suggestions on how to practice constructivists teaching pedagogy as an indispensable approach to cultivate and promote innovative minds among learners. Throughout this paper, we underline and recommend pedagogical shift and adoption of new pedagogies that encourage and promote independent and critical thinking. In our view, this is the best approach through which learners can eventually become innovative producers of relevant knowledge which is required for industrialization and sustainable development.

Keywords: Constructivist, teaching pedagogy, innovation, critical thinking, industrialization.

1.0 Introduction and Background

This paper is based on a critical analysis and synthesis of current literature related to constructivist teaching pedagogy. Driven by Tanzania's national agenda of innovation and industrialization as a means to ensure sustainable development, this analytical paper, seeks to understand how the practice of constructivists teaching pedagogy can cultivate and promote innovative minds among learners. In reality, knowledge and skills for socio-economic transformations are developed from learners' experience and interests. In this way, human beings learn better through practice, past experiences, prior knowledge, and perceptions within the physical interpersonal environment to construct knowledge and meaning. Based on this standpoint, learning pedagogies should be relevant to the given environment and should emphasize social interactions among learners to illuminate the bits of intelligence, innate and capacities bestowed to learners. Hence, to begin with, we trace the understanding and the ineffectiveness of traditional teaching pedagogy and the effectiveness of constructivist teaching pedagogy in delivering content in the classroom setting. Constructivist pedagogy is understood as a method of teaching which emphasizes student-centeredness and self-directed learning. Constructivist pedagogy is generally characterized by social interaction among learners and their instructor; self-regulated, reflective; and it involves learning by performing various activities rather than passive reception of contents (Simons, 2000). On the contrary, traditional pedagogy is understood as examination-oriented teaching approach. The priority in this approach is not so much about what learners can do with the knowledge acquired. It is rather on academic success as measured by high-stake examinations through knowledge transmission, informative teaching, and content mastery (Tan, 2016). Keeping in mind the two different teaching pedagogies which we have just underlined, it is important to note that teaching techniques that may either be teacher-centered or student-centered play active roles in the teaching and learning process. However, they diverge in their effectiveness in satisfying learners' interests.

I hear and I forget. I see and I believe. I do and I understand (Confucius)

Under traditional teaching pedagogy, students simply obtain information from the teacher without building their engagement level with the subject being taught (Boud & Feletti, 1999 as cited in Ganyaupfu, 2013). The approach is characterized by the least practical, more theoretical and memorizing of knowledge and skills that do not influence learners' interests to realize the purpose of life (Teo & Wong, 2000). Furthermore, the traditional approach emphasizes test score, merits, knowledge memorization and teacher-centered approach that has less to do with learners' bits of intelligence and capacities in the realization of socio-economic demands. According to Zakaria, Chin and Daud (2010) traditional pedagogy focuses merely on bestowing rules, definitions and procedures for the students to memorize. This method is also known as a lecture method or a banking approach of teaching in which the teacher deposits some information in the mind of the learner which the same teacher will withdraw at the time of examination, thus leaving the learner empty. Hence, it is fair to argue that traditional pedagogy limits the effectiveness of teaching and learning processes because it fails to meet leaning needs and expectations of various learners in the classroom (Damodharan & Rengarajan, 2013). As found out by Adunola (2011), some of the

disheartening regular poor academic performance by the majority of students is fundamentally linked to the application traditional pedagogy due to its ineffectiveness in imparting knowledge. Adunola's finding and conclusion is a clear indication that how one teaches, what is being taught, and how one learns determines the level of understanding. To overcome this setback, some scholars recommend the importance to applying teaching methods which are aligned with learners needs (Bharadwaj & Pal, 2011). In other words, these authors are recommending constructivist pedagogy which is student-centered. Although it can be somewhat challenging to take into consideration all learners needs when planning the teaching approach, there is a need to strive towards this direction because learners are unique in many ways including how they perceive, understand, interpret and respond to what is being taught. Hence, as argued by Tebabal and Kahssay (2011), the primary purpose of teaching at any level of education should aim at facilitating fundamental changes in the learner's sphere of life. To achieve this purpose, adopting constructivist pedagogy is indispensable. As long term classroom teachers, we have learned from experience that active teaching pedagogy creates useful knowledge, skills, attitudes, values, and behavior for learners to improve productivity, innovativeness, and creativity that can contributes to sustainable development. Hence, given the current socioeconomic changes in Tanzania and strive towards promoting innovation which will steer up industrialization as a pathway to sustainable development, teaching pedagogy must change.

It is evident that despite the many years of formal education in Tanzania, traditional educational approaches which were developed in the beginning of formal education as we know it today has hardly changed. As a result, there is a mismatch between what students learn, how they are taught and what the industry needs or expects of them. As a matter of fact, traditional teaching pedagogy focuses on knowledge memorization, test scores and merits, while socio-economic development requires constructive knowledge and skills that help learners to become innovative, creative and problem-solvers. To match learning with the socio-economic requirements education institutions should produce creative graduates who can think critically, analytically and be able to solve problems in a unique way (Namitha, 2018). While we acknowledge the commendable efforts being made by the government of Tanzania to improve both accessibility and the quality of education in Tanzania, there is still much to be done in relation to pedagogical approaches. It is undeniable that traditional teaching pedagogy is still utilized at different levels of learning. As a result, schools are continuously producing graduates with lower-level skilled personnel, low creativity and with lack of problem-solving skills that lead to expansion of neo-colonialism through expatriates and transfer of technology. This situation is unacceptable and it should be discouraged because it contributes to accelerating the tragedy of unemployment rate. It is probably from this background that Richardson (2003) insists that learning should emphasize on paying attention to the individual students' background, facilitate group dialogue among learners, allow planned and unplanned formal domain of knowledge into the conversation, provide opportunities for students to challenge for change, and develop students' meta-awareness of their understandings (p.1627).

> *Education is the practice of freedom by which women and men deal critically and creatively with reality and discovers how to participate in the transformation of the world (Freire, 1993, p.1).*

Under constructivist teaching pedagogy, learning emphasizes student-centered and self-directed approach through which learning constructs independent thinking and creativity among learners (Baeten et al., 2010; Tan, Chua & Goh, 2015). This perspective is in line with Paul Freire's problem-posing views which suggest that education should empower learners with a kind of knowledge and skills which lead to emancipation of learners' minds. Hence, traditional pedagogy which views learners as empty buckets which should be filled with knowledge which is in the possession of instructors should be discouraged and eventually demolished (Riasati & Mollaei, 2012). In order to transition from traditional to constructivist pedagogy, intentional efforts to find new approaches that favour constructivist pedagogy should be adopted. According to Paul Freire, as noted in Shih (2018), teachers should treat learners as co-creators of knowledge. In this way, learners will be mentored to develop critical thinking and innovative mind-set which is instrumental for their wellbeing and the wellbeing of the society. Likewise, based, on Freire's views, educators should keep in mind that learners, no matter at what age or level of education they are at, they should never be regarded as empty minds that have come to school to be filled with knowledge and skills. Instead, educators/ teachers should regard their role as that of lilting the fire on the existing knowledge that their learners possess. It is very likely that starting ones teaching from what learners already possess, will make teaching more interesting and motivating in such a way that learners will easily get interested and so choose to engage more actively since what they are learning is an issue of concern to them and easy relate with since they already have prior knowledge on which to build on. In their empirical analysis, Foley, Morris, Gounari, and Wilson (2016) emphasized the role of teachers suggesting that they should act as transformative intellectuals by implementing educational practices that seek to shape learners to be active citizens. Not far from that, Fuller et al. (2012) assert that in the knowledge-based economy, social constructivism is regarded as essential teaching pedagogy for generating useful knowledge for economic growth, democratization, and the emancipation of learners' minds. This is to say that, constructivists approach promotes effective learning through active engagement of student in the learning process while discouraging the treatment of learners as passive receivers of knowledge.

Strategically, learning instructions should create social human capital among learners in the sense that individuals could be able in the future to build relational networks that improve mutual understandings among employees in the organizations. Grundmeyer (2012) is of the same view as Fuller and colleagues especially in the argument that education should help learners to develop a strong background in science, technology, global studies and diversity of so-called 21st-century skills including; critical thinking, initiative and ability to analyze information. What is more, constructivist teaching pedagogy facilitates the learners to adopt the socially prescribed requirements and help learners to discover the purpose of life. Hence, education should as well engender learners with the ability to construct new understanding through the interaction of what they already believe and activities which they come into

contact with. Montessori (2013) joined the path of constructivist scholars insists that a good curriculum should be based on learners' talents, personal interests, and their physical and social needs. In line with Montessori views, teaching and learning processes should be guided by passion and principle that help learners to develop consciousness of freedom to emancipate them for self-conscious, self-directed and free from technology discrimination. Bhattacharjee (2015) provides the rationale of constructivist learning and instruction as an alternative to the objectivist model based on platonic views, which is implicit in all behaviorists and some cognitive approaches to education. At this point, we must highlight some characteristics of both constructivists' teaching pedagogy as it is advocated by constructivists' philosophers and traditional teaching pedagogy as it is advocated by platonic views and behaviorists' philosophers. For simplification, we adopt the table proposed by Bhattacharjee in the study conducted in India in the year 2015. Bhattacharjee table digests the relationship between Dewey, Piaget, and Vygotsky's views with that of Platonic as it is applied in the education arena.

1.1 Constructivist Learning vs. Traditional Learning Approaches

Traditional Classroom (Platonic Views)	**Constructivist Classroom (Dewey Views)**
Begins with parts of the whole emphasizes basic skills.	It begins with the whole expanding to parts.
Strict adherence to a fixed curriculum.	Pursuits of student questions/ interests.
Textbooks and workbooks are used.	Primary sources/ manipulative materials are used.
The instructor gives/ students receive.	Learning is interaction-building on what students already know.
The instructor assumes an authoritative role.	The instructor interacts with students.
Assessment via testing/ correct answers.	Assessment via student works, observations, points of view, tests.
Knowledge is inactive.	Knowledge is dynamic.
Students work individually.	Students work in groups.

***Source**: Bhattacharjee (2015, p. 69).*

Both constructivists' and platonic insights aimed at changing the behaviors of learners from unknown to known, more importantly, constructivist insights emphasizes on developing the bits of intelligence bestowed in learners through social interaction and reflective activities while platonic views believed that knowledge and skills have its nature and it dictates that on bestowing rules.

1.3 Significance of the Study

Leaning is not a passive acceptance of the knowledge that exists but rather an active process that involves the learners engaging with the world realities. As a result, teaching and learning processes should give chance to learners to interact with educators and learning

material as an exposure to construct knowledge and meaning interactively and cooperatively. Based on this standpoint, this paper provides potential challenges to various educational stakeholders to carefully reflect on how to facilitate the transformation of teaching pedagogy in a manner that students can understand their ultimate responsibility in the learning process. Likewise, this paper promotes a learning atmosphere that encourages student-to-student interaction, initiating lessons that foster cooperative learning, and providing opportunities for students to be exposed to the interdisciplinary curriculum where applicable, particularly where this kind of learning context does not exist.

Likewise, this paper underlines potential skills and knowledge which teachers should strive to develop as a means to ensure active and effective student involvement in the learning proves. On the same note, what is being discussed in this paper should be considered as eye-opening to education systems where the constructivist approach has been neglected or not yet being practiced. The paper appeals to such systems and educators to consider teachers workloads as well as teacher/student ratio to allow more creativity and active student involvement as a means of allowing students to play an active part in knowledge construction. Equally significant, this paper provides a chance for teachers to showcase their work to the community by applying constructed knowledge and skills in socio-economic activities.

Moreover, the analytical view presented in this work is expected to challenge learners to strive toward the acquisition of pragmatic understanding by adopting learning by constructing knowledge and skills from experience and social interactions. Similarly, it is in our view that based on the criticality of this work, learning by doing which is generally lacking in most developing countries will find its way. That is, we expect this work to inspire various education systems in such countries to consider this work as a wakeup call to promote and enforce knowledge construction by learners as a necessary means for human emancipation. Furthermore, this paper is important in that it challenges learners particularly those who regard themselves solely as recipients of knowledge rather than knowledge producers to seek more opportunities to produce knowledge by being more innovative, instead of depending on spoon-feeding from their teachers/instructors.

Likewise, it is our hope that this analysis challenges education planners, school leaders, education quality assurance officers, policymakers, curriculum developers to name but a few, to critically reflect on how to plan for teaching and learning pedagogies more rationally for the sake of learners and community needs. Still, we envision this analysis as a piece of useful information with the potential of inspiring education policymakers to think on how practical pedagogies could help learners to reach higher indifference curve to fully harvest learners innate talents, capacity, and skills for the wellbeing of their immediate society and the global community. Finally, we hope that the views which we have shared in this paper act as a means to inculcate to all our readers the values of practical pedagogy and relevant curriculum in imparting knowledge and skills that can promote innovation for industrialization and sustainable development.

1.4 The Concept of Constructivism in Education

The concept of constructivism in education is not new and yet it is riddled with intricacies that make it challenging to easily define. As a result, various scholars have defined it based on their particular milieu. For example, Ekponyog and Edokpolor (2016) conceptualize constructivism as a set of epistemological theories that are grounded in the belief that knowledge and meaning are constructed in the minds of individuals through the cognitive processing of interactions. Contrary to this conceptualization, Bhattacharjee (2015) describes the term constructivism as a mind-set which is used to explain how people know what they know. Bhattacharjee further maintains that learning process incorporates new knowledge and skills into already existing experience through the process of accommodation and assimilation. Although, the aforementioned scholars perceive constructivism slightly different, they tend to underline some key ideas from the gurus of constructivism including; Dewey, Vygotsky, and Piaget who argue that knowledge and skills are constructed through social interactions, natural environment and mental process in influencing pre-existing experience. They both believed in the intuition that learners are not empty containers to be filled with knowledge and skills. Instead, from the constructivist point of view, learners construct knowledge out of their pre-existing experiences with an adjustment through assimilation and accommodation of new knowledge and skills to fit the already existing experience. However, there is a slight variation in their views. Ekponyog and Edokpolor maintain that learning is a mental cognitive activity while Bhattacharjee insists that learning is a social process developed through interaction and experience of the learners. More specifically Ekponyog and Edokpolor ideas tend to lean on Piagetian ideas while, Bhattacharjee is closely linked to Vygotskian views.

Fundamentally, constructivist views are categorized into two groups: cognitive constructivism and social constructivism. Both categories emphasize that knowledge is created, or constructed, individually and collectively (Bhattacharjee, 2015). Cognitive constructivism originates from Piagetian cognitive development theory of learning, which advocates how individuals make sense of their world, based on their knowledge, beliefs, self-concept, or identity. In contrast, social constructivism develops from Vygotskian sociocultural theory of learning which suggests that, social juncture of people, interactions that involve sharing, comparing and debating among learners and mentors shape individuals learning and development (Ekpenyog & Edokpolor, 2016). Vygotsky regarded school classrooms as the most significant setting for literacy instruction (van Rijk et al., 2017). Epistemologically Vygotskyan views and John Dewey`s support the implementation of the constructionist teaching approach toward school systems within which students should be equipped with useful knowledge and skills to be able to practically implement that knowledge in real-life situations (Sawyer, 2014). While Dewy and Vygotsky share similar views on many aspects, the most crucial peculiarity between their ideologies, is the observed roles of teachers and other stakeholders' in the provision of education. For Vygotsky, teachers plays an indispensable role in ensuring students successfully acquire the expected knowledge. On the contrary, for John Dewey, teachers are not necessarily the key aspect in students' learning. For him, teachers, peers, and parents play equal role and are responsible for ensuring productive learning (Shabani, 2016; McLeod, 2018). As well, Dewey was of

the same idea that effective education can be primarily through social interactions for this schools should be regarded as social institution (Flinders & Thornton, 2013). According to Dewey, education should be considered as a way of life which has to be lived now rather than training for a future life (Flinders & Thornton, 2013; Gutek, 2014). Best of all, constructive learning helps learners to awaken their own critical awareness and take a more critical view in constructing and participating more fully in determining their own destinies (Ooiwa-Yoshizawa, 2018). What is more, in line with the Vygotskian idea classroom instructions must consider learning as a tool for reducing discrimination and emancipating learners. However, Vygotsky's theory is very similar to Piaget's assumptions about how knowledge is created as well as how people learn, but Vygotsky places more importance on the social context of learning while Piaget emphasized biological adaptation in which learning can be achieved through observation and experimentation. In Piagetian theory, the teacher plays a limited role, whereas, in Vygotsky's theory, the teacher plays an important role in learning. Therefore, learning activities in constructivist settings are branded by active engagement, experiential learning, inquiry-based, problem–based learning, and collaboration with others. In order to realize that, the teacher is required to provide learning tools and activities that encourage experience-based learning, problem-based learning, and inquiry-based learning activities with which students formulate and test their ideas.

If you tell me, I will listen. If you show me, I will see it. But if you let me experience, I will learn (Philosopher Lao-Tse 5th century B.C.)

Tell me, and I may forget. Teach me, and I may remember. Involve me, and I will learn (Benjamin Franklin)

1.5 Principles of Effective Implementation of Constructivist Approach

In order to adopt constructivist approach in the classroom more effectively, various scholars have suggested principles to guide educators. To begin with, Alesandrini and Larson (2002) as cited in Ekpenyog and Edokpolor (2016) suggest six principles to guide educators in following the path of constructivists' ideas in the education arena. The principles are based on the social interactions, past experiences and metacognitive processes as the source of knowledge in teaching and learning processes. The principles are:

1. Learning results from exploration and discovery, that is, actively exploring new information and constructing meaning from it by linking it to previous knowledge and experience.
2. Learning is a community activity facilitated by shared inquiry. It requires learners to reflect on and share their insights with the group.
3. Learners play an on-going, active, and critical role in assessment. It is through the self-assessment activities of reflection and verbalization that learners legalize the meaning of what they have experienced.
4. Learning results from participation in authentic activities, that is, it should be based on activities and problems that students might encounter in the real world.
5. Learners create knowledge from new information in the light of their previous experiences.
6. Teachers should function as facilitators who coach learners as they create their paths towards personally meaningful goals.

(Ekpenyog & Edokpolor, 2016, pp. 7-8).

Hein (1991) proposed nine (9) principles to guide the teaching and learning process in constructivist classroom. The nine principles are not far from those identified in Alesandrini and Larson (2002). The principles include how learning should be perceived and it is as follows:

1. Learning is an active process in which learning uses sensory input to construct meaning out of it (Learn by doing)
2. People learn to learn as they learn (Practice make it perfect). This means that each meaning we construct makes better able to give meaning to other sensations.
3. The crucial action of constructing meaning is mental. Learning need action that involves mind activities (Reflective activities)
4. Learning involves language. As advocated by Vygotsky, language is inseparably intertwined hence influences learning.
5. Leaning is a social activity. As advocated by Dewey, that learning is not a one to one relationship between learners and the subjective materials to be learned.
6. Learning is contextual. We learn in relationship to what we previously know, what we believe such as theories and facts.
7. One needs the knowledge to learn. It is not possible to assimilate new knowledge without having a background structure developed from previous to build on.
8. Learn to take time. Moment of profound insights can be traced back to longer periods of preparation.
9. Motivation is a key component of learning.
   (Hein, 1991, p. 3).

A critical analysis and synthesis of Hein's nine principles are comparatively different from the six principles developed by Alesandrini and Larson. What is common among them however is that they all adhere to teaching and learning approach recommended by the three gurus of constructivist pedagogy, that is; John Dewey, Piaget, and Vygotsky. The central idea which is highlighted in the suggested principles for implementing constructivist teaching and learning approach is social construction of knowledge and meaning. The principles encourage learning by doing and reflective activities. Notwithstanding, Hein (1991) envision language and motivation as the influencing factor that accelerates the learning process in the classroom. The principle of language and motivation has less importance to the views of Alesandrini and Larson who emphasize the discovery and reflection of knowledge independently and then shared it with the group. In summary, the idea of both scholars opposes the Platonic idea that advocates learning as an understanding of the true nature of things. Noteworthy, learning behind constructivism school focuses on the development of learners' background as a means to realize the purpose of life in their environment through activating pre-existing knowledge, skills, intelligence and capacities. Viewed in this way, it is; therefore, right to conclude that education is the manifestation of perfection already existing in humanity. In the same manner, as argued in Namitha (2018), it is right to regard education as the tool responsible for building human capital which breeds, drives and sets technological innovation and economic growth. It is probably from this same perspective that Dewey

came to view teaching and learning as something which is firmly grounded in naturalism. On that same note, Greenwait (2016) the promoter of Dewey, suggests that the true aim of education is to stimulate growth and development of learners. Accordingly, Greenwait stipulates that for naturalistic background learners, learning should develop their intelligence naturally to increase innovation and add value in it for the realization of industrialization. Among learners, the endowment of multiple intelligence capacities, talents, and innate abilities requires learning to develop it for the sake of improving innovation that gives rise to industrialization. Gardiner (2006) in his work provided evidence on the existence of eight (8) intelligences in the human beings of which if learning aimed to develop it then the question of innovation and industrialization could be reached and solved. Remarkably, as identified by Gardiner the intelligences to be developed includes; verbal-linguistic intelligence, logical-mathematical intelligence, intrapersonal intelligence, interpersonal intelligence, bodily-kinaesthetic intelligence, visual-spatial intelligence, musical-rhythmic intelligence and naturalist intelligence.

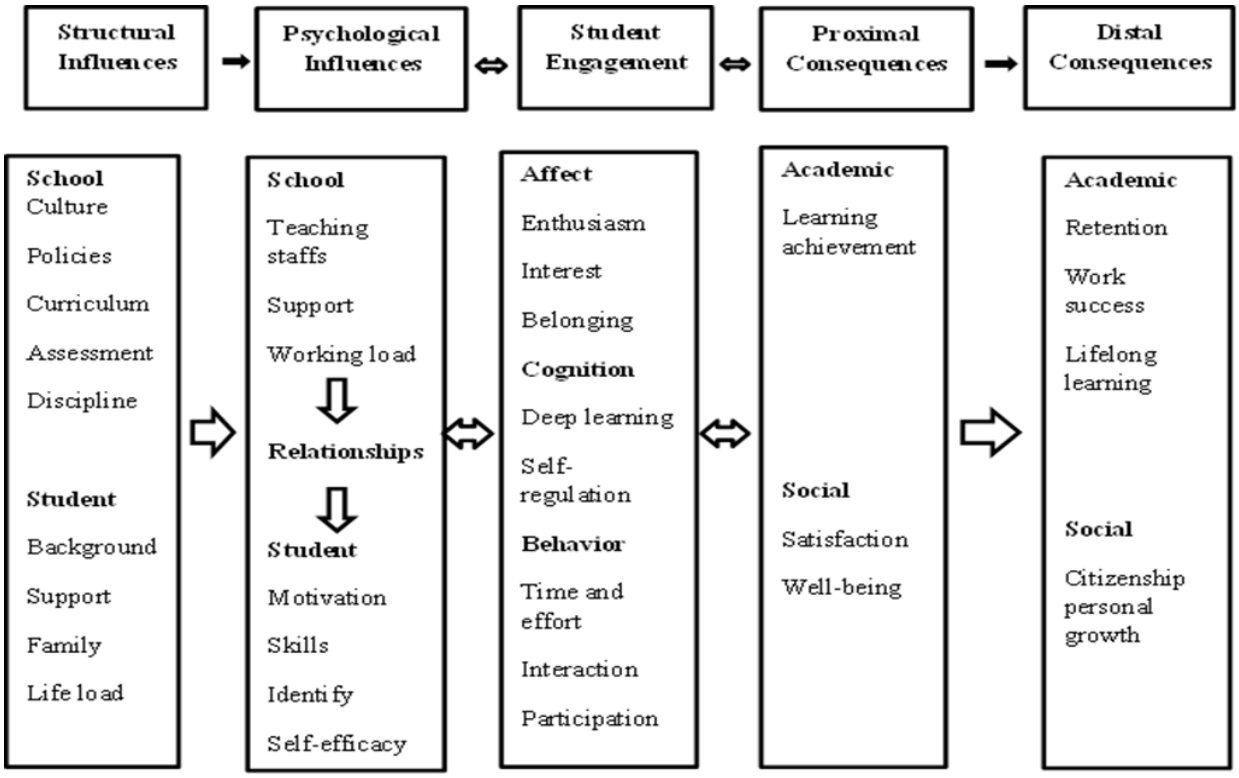
Understandably, developing countries that have a dream to shift from agricultural-based economy to the middle industrialized-based economy, education contents and modes of instruction should be revisited to match with the socio-economic requirements. To achieve this kind of economic transformation which such countries are longing for, the issue of what learners learn and how they learn should be revisited to focus on developing learners' background, intelligence and capacities. Fugar, et al. (2013) delineate that what learners learn and how learners learn determine the quality of human capital in the country. There is the African proverb that says "Utavuna ulichopanda" meaning (you will reap what you saw" the proverb reveals the reality that the outcome of learning depends on what learners leant and how they leant it. From that understanding, Bloom et al. (2014) insists for the establishment of appropriate teaching pedagogy to build useful knowledge, skills, attitudes, and values for effective human capital. It is against this standpoint that we call upon educational policymakers and curriculum developers to consider learners' experiences, intelligence and capacities in laying out the content to be learned and the model of delivery to accommodate all learners' interests. Moreover, if what learners learn and how they learn is not revisited, then expansion of the chances for high level of neo-colonialism in the country through the transfer of technology and expatriates will eventually lead to massive unemployment among the citizens. The tragedy of mass unemployment results into what one would call chaotic life which may be characterized by; social unrest, abject poverty, and perpetuation of low quality education services which contributes to the vicious cycle of poverty.

> *The thing needful is the perfection of education, not simply by turning out teachers who can do better the things are not necessary to do, but rather by changing the outset of what disbands education (Dewey, 1904, p. 18).*

According to Kahu (2013) student engagement in active learning improves higher level of learning, experience and improved well-being of the learners. Active learning can be described as an instructional activity that involves students in doing tasks and thinking

about what they are doing (Bonwell & Eison, 1991). Active learning classroom, students participate in the process of learning rather than passively listening and absorbing knowledge and skills. Kahu's insights are in line with that of gurus of constructivists' including, Dewy, Piaget, and Vygotsky in the sense that, they all insist that social interactive and collaborative learning through co-creation of knowledge and skills between instructors and learners. Nonetheless, the Kahu's insights maintained that student active learning has both proximal and distal repercussion to learners. According to Kahu, proximal learning outcomes include academic performance, learners' satisfaction, and learners' social wellbeing while distal outcomes include work success, lifelong learning and personal growth. In line with Kahu's active learning increase chances for social network among learners that open up creativity and innovation for both informal and formal employment. Both Kahu's insights and Constructivists gurus viewed learning as the tool for creating knowledge and skills for self-sustainability to solve socio-economic problems. The prominent socio-economic problems include poverty, unemployment, and poor social services. Kahu's model which is presented on the figure 1 below captures the whole idea of how active learning leads to social wellbeing, higher performance and excellent academic achievement.

Figure 1: Kahu's Conceptual Framework of Student Engagement in Active Learning



Source: Modified from Kahu (2013, p. 769).

Active teaching strategies as it appears in Kahu's model are not far from constructivist views of psychosocial influences within the teaching field. A good example is that of John Dewey (1916) who saw education intuitions as social entities. Dewey also believed in learning as a social process that requires active learning through engagement with groups of people coming together to solve societal problems quietly through "a process of discussion, debate, and decision making" (Gutek, 2014, p. 78). Similarly, Vygotskian views believed that learning is the product of social interaction that shapes individuals' learning and development. Truly, learning is a social and interactive process that involves metacognitive activities to assimilate and accommodate new experience to adjust pre-existing experience of learners.

> *Education is a regulation of the process of coming to share in the social consciousness; and that the adjustment of individual activity based on this social consciousness is the only sure method of social reconstruction" Dewey (1897) cited in Telebi (2015, p. 5).*

Hence, for learners to realize their full potentials, the model of delivery in schools should be revisited and adjusted to constructivist pedagogy which will allow learners to acquire emancipatory education. In our view, it is through this kind of education that encourages critical thinking and innovation that learners can contribute to facilitating the needed change in society. It is probably from this kind of mind-set that John Dewey saw education and schooling as the instruments for creating social change and reforms (Telebi, 2015). Hence, if learners in developing countries like Tanzania are to benefit from education and in turn the nation to benefit from such learners, adopting constructivist pedagogy is indispensable. For it is through this approach that we nurture a community and a nation of people with an innovative mind who are capable of applying the knowledge which they developed for the wellbeing of their immediate society, the nation and eventually the global community.

2.0 Empirical Literature

2.1Factors Hindering the Practicing Constructivist Teaching Pedagogy

Since the adoption of constructivist teaching pedagogy in education, discipline to react against discriminative educational practices, yet its implementation has not been achieved as expected. The challenges of constructivist teaching pedagogy are more problematic than its application to classroom practices. Employing constructivist teaching practice is problematic at two levels; absence of experimental evidence on its effectiveness and lack of evidential support of its application in the classroom. In its essence, constructivism opposes that there is no critical truth stated either explicitly or implicitly on how learners establish and evaluate knowledge (Matthews, 2003). Inadequate teaching and learning facilities have been evidenced to challenge the practices of the constructivist approach in the classroom (Montessori, 2013). Truly, a constructivist teaching approach is greatly supported by authentic teaching and learning materials in its practices. More specifically, the reviewed work of literature identified several challenges as discussed in the following paragraphs;

2.1.1Contextual challenge

The contextual situation has a greater influence on the practices and establishment of a program or approach in which context, input, and the process should be considered very potential (Shufflebeam, 2003). Based on this standpoint, the available threats and weaknesses in the context can hinder the practice of constructivist teaching pedagogy to its full potentials. According to Bell, Mitchell, and Mlingo (2016), constructivist teaching pedagogy is not effective for all learning environments rather it's situational. In her studies, Montessori (2013) suggested that constructivist teaching pedagogy work best in a supportive teaching and learning environment. Additionally, well-supplied teaching and learning materials are the critical factors that help in improving the practices of constructivist teaching pedagogy in achieving teaching and learning goals. The notable learning environment that satisfies and effectively invites constructivist teaching pedagogy should be well supplied with authentic teaching materials and a democratic learning environment (Montessori, 2013). Tanzania educational system has been experienced hardship in practicing constructivist pedagogy because of the poor learning environment and inadequate democracy in a learning environment (Komba & Kira, 2013). As a result, inadequate democracy and poor learning environments impacted to lack of critical thinking skills and social interaction skills among learners in the context. Drawing attention from the aforementioned scholars' views, the achievement for the implementation of constructivist teaching pedagogy in the education arena stays as the storytelling for long now. It is from this background that we chose to review factors in the work of literature and the observable real-world situation.

2.1.2 Traditional teaching method

Traditional teaching methods involve situations where the material is delivered to students using a teacher-centered format (Sharma, 2018). More specifically, the lecture method evidenced to be dominant in the traditional teaching approach (Alsop, 2006). The approach uses merits and test scores in assessing the outcome of teaching and learning that limit creativity and problem-solving skills among learners. The learning environment in the traditional approach limits the roles of learners in the process of learning in which the teaching and learning process is dominated by teachers. As noted by gurus of constructivist teaching pedagogy; learning is a social process that involves the co-creation of knowledge and skills between learners and teachers of which traditional teaching pedagogy ignored the notion. In their views Long and Liu (2014) provided that the traditional teaching approach creates limited thinking spaces for students that lead to passive learners in the classroom. They continued to maintain that the approach uses banking system that limits knowledge creation among learners. Besides, traditional teaching creates learning which is passive with a lack of subjective experiences among learners in the classroom.

2.1.3 Poor teaching and learning environments

The work of Montessori (2013) affirmed that conducive teaching and learning environment is a cornerstone of quality education. Favorable teaching and learning environment means any internal or external factors that make teaching and learning impressive and interesting to both teachers and learners. The notable facilities and behaviors that contribute to favorable teaching and learning environment include; physical facilities, material facilities, financial

facilities, and goodwill behaviors. However, inadequate of the aforementioned facilities and behaviors could limit the ability of learners to construct knowledge and skills through social interaction and pre-existing experience (Ossai, 2004; MoEVT, 2009). The other challenge found to be critical is overpopulated classes that result in poor class managements that restrict/limit interactive learning. As noted by Vygotsky, learners create new knowledge and skills through sharing, comparing, and discussion among learners, and mentors shape individuals learning and development (Ekponyog and Edokpolor, 2016). Furthermore, an inadequate percentage of qualified teachers limits the practices of a constructivist teaching approach because it requires manageable class-size and well-equipped teaching staff (Omoifo, 2012; Owolabi, 2012). They maintained that unfavorable class size limits exercising discussion, debate, sharing experiences in the classroom, and managing to teach difficult concepts.

2.1.4 ***Technological challenges***

The integration of technology in education has improved interaction and collaboration in teaching and learning processes to students, teachers, and materials. In views of Nawaz et al. (2011) integration of technology in education facilitates active learning through encouraging group-learning via social-mediated techniques under the guidance of teachers. More precisely, technology can be described as the collection of techniques, knowledge of how to combine resources to produce desired products and to solve problems through technical methods, skills, processes, and tools (Chhabra, 2014). The potentiality of technology in the teaching and learning process is to simplify the model of delivery and interaction between learners, materials, and instructors. Additionally, through technology learners and teachers can access materials on the internet and share it through social media connectivity. However, in most developing countries teaching and learning technological infrastructures are not well established. For instance, schools and universities failed to implements socially mediated instructions in this time of COVID-19 tragedy because of inadequate and poor technology infrastructures. Notably, most schools and Universities have insufficient computer devices, poor connectivity, inadequate experts in computer programs, and workers with poor computer knowledge and skills. Johnson, Jacovina, Russell, and Soto (2016) provided that technological challenges are categorized into two groups; external challenges and internal challenges. On the first hand, external challenges include; insufficient equipment, inadequate training, and inadequate support from administration and peer groups. On the other hand, internal challenges sourced from teachers' experiences and the ability to apply technology in the classroom setting. A large group of teachers lacks accessibility to computer technology and connectivity that challenge them in applying it in the classroom setting. Likewise, students in most schools grew up without access to computer technology due to insufficient computer devices and poor connectivity (Warschauer, et al. 2014). In reality accessibility of technology in schools provides chances for learners to learn by doing and accelerates innovation and creativity that give birth to the industrial sector in the economy. In their view, Ertmer et al. (2012) speak out that inadequate computer devices and insufficient professional training of computer science in schools enlarge the gap of technology.

2.2 Strategies for the Effective Practice of Constructivist Teaching Pedagogy

For any nation to redeem her economy education in the sense of what learners learn and how learners learn is a vital weapon. Current researchers, educators, and policymakers should plan for content and instruction that focus on providing learners with the opportunity to construct knowledge and skills that brings usefulness for socio-economic growth and development. The revolutions proposed to begin with the establishment of the relevant curriculum, the uses of authentic tasks, and encouragements of professional development. Also, incorporate vocational training and technical education in the formal curriculum as well as the encouraging application of technology in teaching and learning processes in the classroom.

2.2.1 Establishment of relevant curriculum and interactive learning

The integration of local aspects to curriculum like local history, local geography, and botany makes the curriculum more relevant to local people's activities. As stated by Hamilton et al. (2010), Tanzania should engage in education reform that will develop students' lifelong learning, critical thinking skills, problem- solving skills, and teamwork skills. The educators in schools and universities should encourage students' interaction through initiating lessons that foster cooperative learning (Akpan and Beard, 2016). Besides, teaching instructions in schools should provide opportunities for learners to learn independently and effectively using local aspects as integration to the official curriculum. Duke, Harper, and Johnston (2013), Tracey, and Morrow (2012) make clear that school administrators should let students understand that they are eventually responsible for their learning within a learning atmosphere. Bhattecharjee (2015) opined that a constructivist teaching approach attracts learners construct new knowledge and skills from the ground of experience. In reality, education that cannot unfold learners' minds to explore the richness of the world is crippled. Remarkably; learners construct their meaning from experience, builds new knowledge from the base of prior knowledge, social interaction enhances learning, and lastly insists that meaningful learning develops through using authentic tasks. Under instruction, teachers in classrooms should be exposed to modern teaching techniques that emphasizing students as a center of learning. As a final point, the constructivist paradigm calls for a change in the classroom culture that emphasizes learning by doing to make learning more active and interesting.

*2.2.2**Encouraging uses of authentic tasks, experiences setting, and assessment***

Learn by doing as the liberatory pedagogy emphasizes the use of real materials in the process of teaching and learning to promote critical scientific thinking. As noted by Kim (2005), that educator's school setting must invite students to experience the world's richness. He maintained that learners must be encouraged to ask questions and seek their answers from past experiences and social interactions. In his view, Ultanir (2012) argues that the best teaching practices must promote learner's thinking capacities to be able to demonstrate knowledge, and meaning by himself/herself. Therefore, teachers in the constructivist classroom should avoid expository teaching practices that viewed learners as blank slates to be filled with knowledge. More importantly, mentors should view knowledge as the social phenomena that can be constructed by individual learners through social interaction and past experiences. From that standing point, teaching and learning pedagogy should provide

enough chances for learners to construct knowledge from pre-existing experience and social interactions (Baeten et al. 2010). As noted by Akpan and Beard (2016), that, local aspects should be integrated into the official curriculum to provide opportunities for learners to construct knowledge and skills independently and effectively from social interaction and pre-existing experience. The work of literature appoints that the uses of authentic materials and tasks provide greater opportunities for learners to construct knowledge and skills from social interactions and pre-existing experience (Akpan & Beard, 2016; Ultanir, 2012; Kim, 2005). Also, teaching instructions in schools should provide opportunities for learners to learn independently and effectively using local aspects as integration to the official curriculum

> *If knowledge comes from the impressions made upon us by natural objects, it is impossible to procure knowledge without the use of objects which impress the mind (Dewey, 1916, p. 217-218)*

2.2.3 Encourages professional development

Teachers are second to none in the school organizations. Based on that understanding, updating teachers through training and professional development become crucial for the survival of school organizations. On-going programs for updating teachers' knowledge and skills about teaching and learning should be encouraged and developed for the sake of teachers' professional development. Desimone et al. (2002) described professional development as an essential mechanism for enhancing teachers' knowledge and skills for instructional practices. Tan and Dimmock (2014) noted that teachers' professional development involves many processes, actions, and mechanism which must be shaped by cultural, social, political, and economic features of each particular context. From that understanding, effective professional development should involve training, practice, feedback, adequate time, and follow-up. In Tanzania, the strategies for pre-serve and in-service training have been launched under MoEVT as the policy to ensure quality education. The strategies aimed at improving and updating teachers' professional and career to avoid teacher burnout in the field (URT, 2010). Various strategies including; compulsory in-service training, the establishment of seminars for teachers, subject workshops, and conferences are among the efforts commanded by the government to ensure professional development. Additionally, teachers improved accountability and performance through performance appraisal system teachers improved which is part of professional development. The most remarkable method for performance appraisal in school is an open performance appraisal system (OPRAS). More specifically, an open performance appraisal system assesses the extent each achieved the pre-determined goals in a given period. Broadly speaking, an open appraisal system helps teachers to improve accountability, effectiveness, efficiency, and self-determination which are part and parcel of professional development.

2.2.4 Incorporate VETA and TVET in the formal curriculum

Most countries in the world adopted constructivist teaching pedagogy insights in different ways. To begin, Tanzania government opts to incorporate TVET and VETA in the formal education system as the way forwards to equip learners with constructive skills and knowledge (URT, 2015). More specifically the government established VETA in the year

1994, for organizing, regulating, funding, and providing vocational education and training in the country (VETA, 2003). The establishment of VETA had the intention of promoting and developing human resources for medium enterprises and entrepreneurship skills (Shein, 2010). From this understanding, VETA aimed to provide entrepreneurship skills to learners which help them to organize small industries and conduct business activities for socio-economic development (Thomas, 2011). Also, through vocational training, learners can get knowledge and skills for the development and better management techniques of organizing small industries and business activities in the community (Moshi, 2010). Moreover, in 2009, 213 TVET was physically recorded and registered under NACTE which is approximated to be 96% of the required (URT, 2015). The establishment and incorporation of this institution in the formal education system by the government are to widen the chances of the applicability of constructivist teaching pedagogy in which learners learn by doing. Greenwalt (2016) maintained that Dewey's views in education advocate that all teaching and learning processes should aim at promoting an individual's growth and development holistically. Thus, teaching and learning processes should create learners' ability in creating, guiding, and make the best use of the available resources in developing life experiences.

2.2.5Encourages technology and innovation in teaching and learning curriculum

The effective practice of technology in education has improved the provision of education and creates more learning chances (Roy, 2019). Both teachers and students are the direct beneficiaries of the integration of ICT in education. Teachers' benefits through the accessibility of teaching materials and simplification of teaching methods like social-mediated methods. On the other hand, students benefit from accessing learning materials. Best of all, technology in education has improved collaborative and interactive learning between students and teachers through social-mediated teaching and learning approaches. Based on this standpoint, Akyol (2010) suggested that teachers at schools and other learning institutions need to improve technology skills and integrate it in the teaching and learning process to increase learners' attention and interest in learning. Just as, simultaneously application of technology in teaching and learning processes in the classrooms improves input of information explicitly and quickens and increases the efficiency teaching and learning (Long & Liu, 2014). The utilization of technological equipment in the teaching and learning process gives learners freedom, motivation, and makes lessons more efficient (Akyol, 2010 & Genc- Ilter, 2009 cited in Roy, 2019). More precisely the use of ICT in teaching and learning process contributes much in pedagogical aspects like students' abilities in active and effective learning (Jamieson-Procter et al., 2013). Also, the application of ICT in the teaching and learning process provides a dynamic and proactive teaching-learning environment (Arnseth & Hatlevik, 2012). As a final point, it's the duty of policymakers and curriculum developers in various countries to integrate ICT skills in schools and higher learning institutions' curriculums.

2.3 The Contribution of Constructivist Teaching Pedagogy

The gurus of constructivist pedagogy including; Jean Piaget, John Dewy, and Lev Semionovich Vygotsky maintained that constructivist teaching pedagogy contributes greatly to individual learners and society at large. They hold that it creates learners with high

effective reasoning capacity in an unfamiliar situation. Also, it constructs knowledge and skills that empower women to overcome all forms of discrimination and oppression as well it acts as the cornerstone in building human capital development. In reality, education that cannot unfold learners' minds to explore the richness of the world is crippled. Just as, education that failed to provide key to challenges and complexities in the ordinary life of the societies is the life prison to victims and its consequences creates grave of long term generations. Therefore scholars put forwards the following contribution of constructivist teaching pedagogy to learners;

a) Promotes problem-solving and understandings

Problem-solving abilities can be described as the individual's creative processes based on cognitive and behavioral aspects that people use to create and assign solutions to daily problems (Sarkhosh & Taghi Pour, 2016). The work of literature shows that constructivist teaching and learning pedagogy prepares students to reason effectively in unfamiliar situations by observing, exploring, and interacting with unknown systems through creative problem solving to tackle real-life problems (OECD, 2014). More specifically, teaching and learning under constructivist pedagogy insists on problem-solving skills, higher-order thinking skills, and deep understanding among learners for improving self-sustainability, constructive actions, and critically-minded individuals (Bhattacharjee, 2015). Drawing attention from the argument, constructivist pedagogy help learners to construct knowledge and skills that promote creative skills, design thinking, collaboration skills, and problem-solving skills which is important for individuals' self-sustainability (Feldman, 2015). More importantly, curriculum contents and its modes of instructions should aim to equip learners with knowledge and skills which can promote creativity and problem-solving actions for self-direction and self-sustainability to learners (Marimuthu et al. 2009). Throughout, educators, policymakers, and curriculum developers must think critically in designing the content and modes of instructions that can equip learners with a critical mind to deal with challenges constructively.

b) Improves communication skills among learners

Communication skills are viewed as the important employability skills needed for the 21st-century workforce and it should be a part of the pedagogy to prepare school levers for employment (Shukla & Singh, 2018). Also, it improves interpersonal skills among the learners which is important to improve the quality of life. Employers insist that the communication skills of employees have greater value as compared to technical skills in all occupational fields (McPherson, 1998). More precisely, communication skills can be described as the ways through which thoughts, ideas, questions, and solutions are shared (Gerald, 2015). Broadly speaking, constructivist teaching and learning pedagogy increases the ability of learners to communicate, interact with others, listen to new ideas, synthesize ideas, and develop new collective ideas (EU, 2012). Additionally, the work of literature shows that constructivist teaching and learning pedagogy insists on learning experiences that have relevance to real-world situations, not just the context of formal education (Lahn, 2011). Based on this understanding, constructivist teaching and learning insist on social activities

that help learners to cooperate to build ideas through reactions and feedback to encourage deep learning, critical thinking, and problem-solving behavior among learners (Fouser, 2010).

c) ***Builds human capital initiatives and reduce poverty***

Human capital commonly means the set of skills, knowledge, and abilities acquired by individuals through training or experiences which has the potentials in carrying out duties and responsibilities in the community. Human capital is not static it can be developed through training, socializing, and exposure to the external environment. Human capital explains the ability of people, their performance, and their potential in the organization that can be developed over time (Thomas et al. 2013, p. 3). More specifically, the qualities involved in human capital are like knowledge, skills, and abilities of the people that can be employed in an organization to produce goods and services (Han et al. 2014). The constructive knowledge and skills acquired by individuals becomes the cornerstone in building human capital initiatives for effectiveness in the socio-economic development of the country (UNCTAD, 2014). Broadly speaking, employees with higher levels of school in an organization or firm are advantageous in innovation that allows firms to exploit new technologies (Baptist & Teal, 2014). The reviewed work of literature shows that constructive skills and knowledge can help people to reduce poverty by increasing people's income through innovation and the creation of informal jobs (WB, 2015; UNESCO, 2015). Also, constructive knowledge and skills create the ability of individuals to think differently and take constructive action towards socio-economic challenges such as unemployment, the climatic change that sometimes affects the economic life of them.

d) Encourage gender equality and equity

Gender equity means the process of being fairs to women and men and challenging policies that unfairly bias men or women (UNESCO, 2009) while gender equality means the situation in which women and men have an equal opportunity of accessing resources in their home, community and their societies at large (UNESCO, 2003). Both concepts aim at creating gender balance between males and females of which women and men have equal conditions for realizing their full human rights and benefiting from, economic, social, cultural, and political development. UNFIPA (2014) and UNDP (2010) opined that constructive learning empowers women with the courage to overcome all forms of discrimination and oppression. Constructivist learning raises women's bargaining power to claim their rights including; fair share in social and economic matters, social status, increases power within marriage, entitlement to assets, access financial services, and participation in local organizations. ILO (2014) provided that constructive learning increases workers' productivity, efficiency, effectiveness, and capabilities that raise production as a result of economic growth and development realized.

4. Final Thoughts

Despite the commendable efforts made in Tanzania to ensure quality education for all, there remains an observable gap between efforts made and achievement. For instance policies including; free basic education, education for all, inclusive education and education as a human right are eager to ensure access and accessibility rather than equipping learners with

knowledge and skills required for socio-economic changes for the 21st century. In his views, Honebein (1996) insists that teaching and learning should provide; experience with the knowledge construction process, appreciation for multiple perspectives, learning in realistic and relevant contexts, ownership and voice in the learning process, learning in social experience, multiple modes of representation, and self-awareness in the knowledge construction process (p.72). From this standpoint, the real aim of education is to transform learners for socio-economic development which remained untouched since the date of independence. The situation triggers for the current demands for a total change of content and model of delivery to meet the knowledge and skills for 21st-century requirements. In due course, in this paper, we recommend that the policy for the 21st century should consider content and model of instructions that give priorities on the development of learners' bits of intelligence and manpower required for socio-economic development. Nevertheless, the contents to be taught and how to be taught should shift from theoretical curricular into practical curricular that constructs knowledge for self-direction, self-employment, and self-sustainability. More importantly, for the nation to achieve the goal of innovation and industrialization, educator and researchers must invest more in the central engine of education, which is the content to be taught in schools and model of instruction. Typically education system of developing countries is currently facing the challenge of the traditional instruction which is characterized by test scores, merits rather than student self-concept and self-constructions of learning strategies. In this case, developing nations should revisit what learners learn and how learners learn as the central and the backbone of the curriculum to quench the thirsty of innovation and industrialization to quicken the rate of economy development.

The curriculum for the 21st century should consider the principle of multiple intelligences developed by Gardner in his book "Frames of Mind" including; verbal-linguistic intelligence logical-mathematical, intelligence, intrapersonal intelligence, interpersonal intelligence, bodily-kinaesthetic, intelligence, visual-spatial intelligence, musical-rhythmic intelligence, and naturalist intelligence. For the matter of fact the content, model of instruction and co-curricular that develops bits of intelligence bestowed to learners accelerates the development of innovation and industrialization in the country. Constructivism theory advocates that learning always builds upon the knowledge that a student knows (schema). In another way round, education should geminate the bits of intelligence bestowed in learners to meet the dreams of the national agenda of innovation and industrialization. The notable current mushrooming industries include; music industry, drama industry, sports and games industry, and farming industry all of them are rooted in bits of intelligence bequeathed to individuals naturally.

Based on what we have discussed so far, we recommend education stakeholders to adhere to the improvement of education especially content and model of delivery. In our review of the literature and from our past experiences as educators, we know very well that traditional teaching techniques are oppressive and it does not in any way serve either the learners or the nation. For this reason, we recommend strategic efforts to be taken to adopt constructivist pedagogy. This pedagogical approach will by far allow learners to actively participate in the

teaching and learning process. In addition to that, we also propose a think-pair-share, video-mediated, social-mediated, tiered assignment and community contact lessons as the giant instructions to be used in the teaching and learning process as it ensures learners to construct knowledge and skills (Oyetoro, Ajibade and Obadiora, 2016). Likewise, we would like to adopt Bhattacharjee (2015) recommendation that teaching instruction should use teaching methods and activities that encourage active learning in the classroom setting including; experimentation, research projects, field trips, films, and class discussions. Moreover, as argued in Bimbola and Daniel (2010), who emphasized on governments to establish technical institutions that offered constructive skills such as computer skills, electrical skills, building skills, wood skills, hospitality skills, textile skills, printing skills, beauty culture skills, business skills, and mechanical skills, we, in turn, recommend developing countries to pay more attention to innovative and critical thinking minds that have the power to facilitate change in the society. The aforementioned skills engendered learners with creativity and innovation that give solutions to socio-economic challenges like unemployment through accelerating small industries.

Drawing from Tan's insights in a study conducted in China in the year 2016, which proposed reforms in curriculum, system, structure, and contents to shift from exams-oriented, knowledge transmission and content mastery into practical curricular that construct knowledge for self-direction, self-employment, and self-sustainability (p. 3), we are of the view that, the same should be adopted by all developing countries wishing to develop a nation with innovative minds that are urgently needed to spearhead industrialization and sustainable development. Therefore, this paper recommends further reviews of what learners learn and how learners learn as the central idea and backbone of the curriculum in the most developing countries as the strategy to quench the thirsty of achieving innovation and industrialization goals. Equally, current researchers, educators, and policy-makers should plan for content and instruction that focuses on providing learners with the opportunity to construct knowledge and skills that brings usefulness for socio-economic growth and development.

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