# ANALYZING OUR CURRICULUM OPPONENTS SCHOOL IS A CENTRE OF INNOVATION: LACK OF PEDAGOGICAL ASPECT OF DEVELOPING SKILLS IN SCHOOLS

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**Abstract**

*This paper builds a case for an urgent need to reform the curriculum which implements the philosophy of school is a centre of innovation. 150 respondents were involved and data were collected using a questionnaire, interview, classroom observation, group discussion and document analysis. The findings revealed that schools have low effective acquiring knowledge and developing skills to learners because teachers using teacher-centred instead of learner-centered approach and lacking of pedagogical aspect of innovation centre in schools which favours learner-centred approach. It revealed that 79% participants responded that learners failed to make connections between the classroom learning and students' real lives. The pedagogical aspect which is feasible for construction of knowledge and developing skills by using constructivist approach is learning by doing which is facilitated if we have centre of innovation in schools. Innovation creates the desire to know, brainstorm and create opportunities to solve a novel problem and continue the thinking beyond the lesson or classroom, effective inquiry, problem-solving, creative thinking skills, mixed with curiosity and perseverance of seeking viable solutions to problem. The study concludes that lacking of a pedagogical aspect which advocates school is a centre of innovation and using teacher-centered approach schools prepared incompetent learners.*

**Keywords**: innovation and learner-centred.

## Introduction

Learning occurs when a learner is actively involved in the learning process. Learning outcomes do not only depend on teacher's presentations; instead they are interactive results of the learner's existing structure and newly encountered knowledge. Learning is the product of self organization and reorganization of existing ideas. Constructivist approach seems to be effective in providing meaningful learning and developing skills. According to this approach, this kind of learning can take place only when the learner relates the new information to his already existing knowledge. Knowledge cannot be transmitted to the learner's mind from a textbook or by the teacher. Instead, learners construct their knowledge by making links between their

ideas and new concepts through experience they a In practice, prior knowledge may be missing or may include wrong conceptions or the learner may fail to make the link between new knowledge and his/her existing structure (Selemani, 2014). Therefore, for effective teaching, the cognitive level of the learners and their conceptual development which means the extent of prior knowledge about the topic necessary for learning new knowledge should be considered. The theoretical underpinning in this study is constructivism as a theory of learning that offers an explanation of the nature of knowledge and how human beings learn. According to this theory, the person's mind is self-organized by a constant antagonism between internal subjective states and the external reality. Currently, Tanzania has two existing policy framework. They are the Tanzania Development Vision (TDV) 2025 and SIDP 2020. TDV accords high priority to the education sector, which considered being pivotal in bringing social and economic transformation as described as "education should be treated as strategic agent for mind-set transformation and for the creation of a well-educated nation, sufficiently equipped with the knowledge needed to competently and competitively solve the development challenges which face the nation. In this light, the education system should be restructured and transformed qualitatively with focus on promoting creativity and problems solving (URT, 2000: 19)". Education is a cornerstone of any socio-economic development of any countries.

**Statement of the research problem**

In Tanzania, after independence four major curriculum reforms were made in 1967, 1979, 1997 and 2005 (TIE, 2013). In 1967, the philosophy of Education for Self-Reliance (ESR) marked the first major education reform in Tanzania. According to Nyerere (1967), the ESR philosophy used education as a tool for liberating the society, focusing on the development of production skills and knowledge required for survival in Tanzania. In 1979, there was an attempt to introduce discipline bias such as Agriculture, Business and Technical skills, and that Science and Mathematics subjects were strengthened. This reform aimed at preparing middle cadre skilled workers in the learning areas of Agriculture, Technical skills, Business and Home Economics in order to raise the economic status of the community. In 1997, the curriculum reform focused on globalization demand such as science and technology changes and environmental education essentials. Information and Computer Studies subject started to be taught in secondary school education. In addition, the reform also integrated Science and Technology with such topics as electronics which was added into the secondary education. Furthermore, the reform established major and optional courses in teacher education at certificate level. In 2005, the curriculum reform focused on the shift of curriculum paradigm to constructivism (TIE, 2005). The rationale of the reform was a change of the curriculum from content to competency-based at all levels namely pre-primary, primary, secondary and teacher education. The Government also was introducing a second Education and Training Policy of 2014 which focuses that among other things "Science and technology shall be essential components in education and

training in the whole education system" (URT, 2014). In response to this policy, in 2015, the Ministry of Education and Vocational Training (MOEVT) by then which is now the Ministry of Education, Science and Technology (MEST) reviewed primary education curriculum with emphasizes 3Rs skills namely Reading, Writing and Arithmetic in Standard I and II (TIE, 2015). In the other hand, the Government advocates the implementation of Basic Education which will start from pre-primary through ordinary level secondary school education. Despite all the efforts by the government in reforming curriculum on constructivism paradigm there was lack of competent learners as well as proficient work force. The nation's ability to solve problems and achieve economic growth seems to largely depend on cultivating a future workforce that is both social science and natural science literate. This need is urgent in Tanzania because the country's economy needs an increasing supply of workers who can use scientific knowledge and skills in their jobs to fuel scientific discoveries, innovations and entrepreneurship (Osaki, 2004). Tanzania needs a steady stream of the best science researchers and innovators and a large pool of science experts with the knowledge and desire to advance science and technology in the country (Hamilton, Mahera, Mateng'e, & Machumu, 2010). Science experts can play an important role in providing knowledge that serves a nation in various socio-economic and cultural issues such as security, mining, communication, and transportation. They can also help to develop the new ideas and inventions necessary for the country's technological development as well as inspiring and mentoring new generations of scientists, engineers and mathematicians. This group of professionals contributes immensely to economic growth, technological progress as well as developments in high-tech industries, medical research centres, and engineering firms. More importantly, they also help in retaining these advantages by building strong expertise. The prevalence of these challenges has altered global educational needs and thereby challenged most African schools including those in Tanzania, to transform their structures and processes of education towards more relevant issues for the learners and society at large (Levy & Murnane, 2005; Stewart, 2010; Wilmarth, 2010). Such challenges have also led to a mismatch between the knowledge and skills that the schools offer, and the competencies that school graduates need for them to face their futures confidently. This study intended to find out why learners fail to use the acquired knowledge and developing innovation skills although the curriculum reformed focuses on constructivism.

**Purpose of the study**

The purpose of this study was to find out why learners fail to use the acquired knowledge and developing innovation skills although the curriculum reformed focuses on the paradigm of constructivism.

**Specific objectives of the study**

The specific objectives were to:

(a) Investigate the teaching and learning approach used by teachers to implement the current reformed of the curriculum of constructivism paradigm.
(b) Find out a feasible pedagogical aspect for adequate provision of effective practical use of knowledge and developing innovation skills in schools.

**Research questions**

Specifically the study sought answer to the following questions:
(a) How do teachers implement the reformed curriculum of constructivism paradigm in classroom situation?
(b) What a feasible pedagogy required for effective practical use of knowledge and developing innovation skills in schools?

**Methodology**

This study was conducted in Dar es Salaam, Pwani and Morogoro regions. The regions were selected using stratified sampling technique. A total of six (6) districts/municipals were involved. These Municipals were including Morogoro, Mvomero, Kibaha, Ilala, Kinondoni and Temeke. The study adopted a cross-sectional survey design. The study also adopted a mixed method approach (Johson and Onwuegbuzie, 2004) which was based on the "equal-status concurrent triangulation strategy". A total of 150 participants were involved in this study from 21 secondary schools whereby participants (teachers) were selected using purposive sampling technique. The data for this study were collected using a questionnaire, group discussion, interview, classroom observation and document analysis. The quantitative data from the questionnaire were coded and analyzed through Statistical Package for Social Science (SPSS) 16.0. On the other hand, the qualitative data from open-ended questions in the questionnaire, interview, classroom observation, group discussion and document analysis were coded, categorized and analyzed into themes.

**Findings and Observations**

**Teachers used teacher-centred instead of learner-centred approach**

The findings revealed that more than three quarters of teachers out of 10 who involved in classroom observation were still implementing teacher-centred approach instead of learner centred approach in the classroom as indicated in Table 1. It shows that the use of teacher-centred approach is a barrier in developing high thinking skills to learners.

**Table 1: The findings during classroom observations on teacher-centred approach**

| Expected activities | Actual activities observed |
|---|---|
| Both minds-on and hands-on learning activities used. | only minds-on learning activities are |
| Materials learned through investigation | Memorize materials to be learned |
| Multiple resources are used | Textbook is the primary reference |
| Pupils work in cooperative groups | Learners work as individuals |
| Multiple teaching techniques are used | Single teaching techniques are used |

**Source**: Field Data (2022)

In leaner-centred approach, teachers use multiple teaching and learning techniques within a single lesson and they put the need of learners at the centre of what they do in the classroom. This trend could be attributed by the reason that teachers lacked the knowledge and skills on how to use learner-centred approach in teaching science subjects. In this approach, knowledge is constructed by learners as a result of their own activities and interaction with the environment. Learning outcomes do not only depend on teacher's presentation; instead they are interactive results of the learner's existing structure and newly encountered knowledge. The findings revealed that over two-third of the participants mentioned that one of the guiding elements in the teaching science through constructivist approach is interactive teaching and learning techniques as indicated in Table 2.

**Table 2: Participants' responses on the guiding elements for the use o Constructivist (learner centred) Approach (N=62)**

| Responses | N | % |
|---|---|---|
| Using teaching aids (E.g. Science kits | 13 | 21 |
| Using Interactive teaching/learning techniques | 25 | 40 |
| Field observation | 1 | 2 |
| Involving learner in the lesson | 2 | 3 |
| Using real things, picture and models | 6 | 10 |
| Group activities and dialogue | 11 | 18 |
| Elements of lesson plan | 4 | 6 |

**Source:** Field Data 2022

These findings indicate that all participants failed to respond correctly to the guiding elements in the teaching of science through constructivist approach. The participants' responses were not reflected on guiding elements in teaching science using constructivist approach instead, they reflected mainly on teaching and learning techniques. These responses were not new in any teaching situation especially in teaching science subject using traditional (non-constructivist) approach. What are

important are how to activate the prior knowledge of learners, how to acquire knowledge through social interaction, understanding knowledge acquired through authentic tasks, using knowledge acquired through knowledge sharing/dialogue and reflection on knowledge acquired in the classroom through assessment. In practice, without understanding how the constructivist teaching in the classroom should be interpreted, processed and completed then such a mechanism will have nothing to do with teaching using constructivist approach. The use of constructivist approach in competency-based science learning cannot occur as an accident, it requires teachers to have thorough understanding/knowledge of the constructivist approach and on how the approach is best applied in the classroom as well

**A feasible pedagogy for practical use of knowledge and developing skills**

The findings revealed that a feasible pedagogy for practical use of knowledge and developing innovation skills is an innovation space (centre). Innovation space will give an opportunity to young scholars to create culture of developing innovative activities. To enhance innovation, learning institutions have to embrace intensive programs that utilize learning by doing approach.

By having innovation space in schools, learners will become competent in the area of innovation skills. In practice, the innovation hub will comprise seven (7).

**Stage 1:** Allows various ideas from the students. Students explore their environment beyond the school and identify needs or problems to work with.

**Stage 2:** The teacher pools the needs identified on the blackboard and students brainstorm possible solutions together. In this way cooperative brainstorming techniques are used to expand understanding.

**Stage 3:** the student chooses the concept he/she wants to work with on the basis of discussion with the teacher

**Stage 4**: Sketching, modeling and discussion are good ways to understand and develop the concept towards a solution. These involve self communication and advice from the teacher.

**Stage 5**: Model or prototype will normally be made using materials and equipment found in a normal classroom. Models are made simply and quickly to give an idea about the solution and sometimes a fully functional prototype can be made.

**Stage 6**: It required making a poster of their work both for display and as a basis for a presentation. Making a poster is a good way to pull an individual's learning together. Usually the poster includes illustrations, drawings and some 3D drawings. These demonstrate how the solution works, who is going to use it and where, how and where it will be used, and the materials it could be made of.

**Stage 7:** Developing a presentation is a good way of deepening the student's understanding of their concept and its relationship with the environment and the original need/problem identified. This process also develops communication skills. Discussion around the presentation offers valuable feedback to students.

One respondent said

Innovation space makes connections between the classroom and students' real lives create the desire to know, brainstorm and create opportunities to solve a novel problem and continue the thinking beyond the lesson or classroom. Schools have been focused mainly on curriculum, standards and assessment meanwhile attention will be given to create innovative aspects to address the continuing decline in the imagination, curiosity, ingenuity and inventiveness (Interview, January 2022).

Through content analysis, findings revealed that the industrialization process requires new skills (in quantitative and qualitative terms) to support changes in technological and organizational models. In order to strengthen re-industrialization, it is necessary to boost innovation in the whole education system, from pre-primary to university level. The culture of building innovative environment should start from the low level where learners instead of high of schooling such as tertiary level, children and youth are intrinsically motivated than adults to explore the creative potential of the innovation process. Innovation processes in education need to address contents and methodologies, the required structures, resources, materials and competences as well as institutional setting.

**Discussion**

The results of this study show that teachers have been implementing teacher-centred approach under the label of learner-cented approach in the classroom. This means that teachers lacked pedagogical competency in competency–based learning of leaner-centerd approach. Competency based learning favors the use of learner-centred approach (Selemani, 2014). The leaner-centred approach emphasizes on learning which is mainly based on activities; and the leaner is the main actor in learning process while the teacher's role is mainly guiding, facilitating, focusing, suggesting and evaluating the learning process in order to encourage learners to construct knowledge. Learning occurs when a learner is actively involved in the learning process. Learning outcomes do not only depend on teacher's presentation; instead they are interactive results of the learner's existing structure and newly encountered knowledge. According to Osaki (2004), science education tries to develop inquiry and experimental skills and hence, they only end up promoting the chasing of grades through memorization of facts and procedure. Teachers-centred therefore uses the strategy of memorize materials to be learned. Quality education should prepare a competent learner who has ability to successfully meet demands or carry out an activity or task (Selemani, 2014). A feasible pedagogical approach which will give opportunity to young scholars to create culture of developing innovation skills to be competent is innovation space or centre. Experience shows that some developed countries use this pedagogy in their national education curriculum. Those countries include Iceland, United Kingdom, Norway, Finland and Malaysia. In these countries used innovation process as a simple way to teach students creative skills. The emphasis is on ideation (Shah, Smith and Vargas-Hermandez,

2003), finding a solution to problem or need discovered in one's environment and bringing it to a realization in the form of model (Gunnarsdottir, 2001). It aims to employ and integrate knowledge gain across the curriculum and life experience.

Experience shows that the development of basic model of Innovation Education in Iceland started in elementary schools (age range 6-16) over the past eleven years. The Ministry of Education in Icelandic National Curriculum established innovation education in the year 1999. It shows the main emphasis is to train students to produce valuable and practical results of their knowledge through creative work. The goal will be that over time and the course become a part of the regular school curriculum. Ideally this course develops in cooperation with the school and partners in the labour market. These partners form a nucleus that will automatically add to the wealth of knowledge and experience of the course. The culture of building innovative environment should start from the low level where learners instead of high of schooling such as tertiary level, children and youth are intrinsically motivated than adults to explore the creative potential of the innovation process(Shah, Smith and Vargas-Hermandez, 2003). There are many examples of innovation driven by youngsters' curiosity and innovation behaviors, created for the sole purpose of improving the world. For example, at age ten (10), Rebecca Schroeder invented a way for doctors to read patients' hospital notes in the dark (so as not to wake them) and at age six (6), Spancer Whate invented a toy car with built-in so that kids in hospitals could play and be more mobile. More famously, 14 year old, Philo Farnsworth invented the first electronic television, and at age 15, Braille invented his tactile reading and writing system, opening up a world of information people with vision disabilities.

**Conclusion and Recommendations**

The teacher is the heart of classroom instruction. The effectiveness of the teacher depends on his/her competency (academically and pedagogically). It is clear that teachers are not competent in teaching using learner-centred approach and failed to conduct practical activities. Failure of teachers to implement learner-centred and conducting practical activities is contributed by teachers lacking thorough knowledge and skills of using learner-centred approach and conduct practical activities.

The 5$^{th}$ Government puts the agenda of building industrial economy, hence in the preparation of youth in the process of industrialization is vital to establish innovation space. This will give an opportunity to learners to: stimulate and develop the creative abilities of the learners; teach certain processes from identifying a context, developing students own concepts and realization with appropriate models and teach students to use their creative ability in daily life. On the other hand it allows students to develop soft skills such as problem solving, efficient team working, time management, proper allocation of resources and communication skills. In the light of the findings and foregoing discussion some recommendations are made for further action and follow-up:

(i) Teacher training on learner-centred approach.

(ii) The Government may do the following:

- Ensure adequate supply of equipment, apparatus, chemicals and materials.
- Train and employ laboratory technicians.
- Establish innovation space or centre as pedagogical way of developing innovation skills.
- Ensure quality teaching and learning materials including textbooks
- Quality school infrastructure and other facilities

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