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COMPETENCE-BASED EDUCATION AND TEACHER EDUCATION EFFECTIVENESS: LESSONS FOR THE UNIVERSITY OF BUEA, CAMEROON.

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Abstract: *The paper assesses both the context specific and empirical evidence for outcomes of competence-based education which are envisaged by policy-makers, and gives some elucidations of how teacher education is handled in Cameroon. Competency Based Teacher Education (CBTE) is one in which performance goals for trainees are specified in rigorous detail and agreed to in advance of instruction. The teacher or trainee is required to (a) demonstrate behaviours known to promote desirable learning and/or (b) demonstrate that he/she can bring learning in pupils. The focus is developing in learners the ability to mobilize with efficiency, resources to solve a problematic situation. The paper assesses the conceptual, theoretical and empirical evidence for outcomes of competence-based education which are envisaged by policy-makers, and gives some interpretations of how the topic is handled in the political processes. This is achieved by a review of the research literature as documented in bibliographical databases which cover academic publications and in more practical material. The searches were generic, and included not only specific competence expressions, but also terms as 'outcomes' and 'learning'. The staggering conclusion of this exercise is that there is hardly any evidence for the effectiveness of competence-based education despite the long period since the 1970s when the approach came up in the US. Whether this is an artifact of the operationalization of the outcomes of competence-based education or not, it seems that there is only very little attention to testing the policy assumptions that competence-based education is a worthy educational innovation. As this is quite disturbing, it is recommended that more efforts are being made to prove (or falsify) the putative added value of competence-based education initiatives.*

Keywords: *Competence-Based Education, Teacher Education Effectiveness*

I.   Introduction

Competence - based education and training (CBET) is a currently emerging concept in Cameroon education system. As with any new concept there is no one acceptable definition of this term under operation. The most important thing in CBET is for the learner to be engaged actively in all aspects of knowledge acquisition, skills development and professional behaviours that need to be demonstrated and practiced in a specific discipline. Sudsomboon, Anmanatarkul and Hemwat (2007) describe competence-based education as the education that enables an individual to perform anything practically and measurably using a set of knowledge and skills acquired through effective training. Competence Based Education and Training (CBET) can be referred as the education approach that produces professionals who have the required competences to be successful in their jobs. It is an approach which focuses on outcomes of learning. Competence is described in terms of skills, knowledge and aptitude or understanding as well as the typical context and level that a person who possesses such a competence could work successfully (Mulder, 2001). Competences describe the ability of the students to apply basic and other high level skills in situations that are commonly encountered in everyday life. Competence addresses what the learners are expected to do after learning rather than on what they are expected to learn.

Furthermore, competence - based education has been described by Mrowicki (1986) as quoted by (Kafyulilo, Rugambuka and Moses, 2012) as a component of essential skills, knowledge, attitudes, and behaviors

required for effective performance of a real-world task or activity. Arguelles and Gonczi (2000) further define competence-based education as education based on outcomes and pre- determined standards, on what students can do. Specifically, Competence - Based Education and Training (CBET) is defined as a perspective on how to prepare competent graduates with knowledge of how to meet the needs of an ever-changing work situation. From this perspective, knowledge, skills and attitudes which make up the essentials of an occupation are not transmitted as separate learning activities or subjects. These competences are acquired in an integrated way through assignments and activities that come as close as possible to the actual context of the occupation. Competence-Based Education uses teaching and learning strategies that facilitate the development and demonstration of competences.

The introduction of competence-based education and training in an education setting leads to competence-based curriculum. In competence – based curriculum (CBC), the focus is to enable learners to master the knowledge, skills and attitudes needed for the world of employment and general life. The curriculum is activity –oriented with respect to the required competencies. It is normally prepared in such a way that it requires learners to perform various tasks as a means of equipping them with knowledge and skills related to their real life situations. In CBC, a teacher is supposed to switch from the role of an expert who transfers knowledge to a coaching role of facilitating and guiding learning process (Biemans, Nieuwenhuis, Poell, Mulder & Wesselink, 2004). The teacher is required to be active in supporting the learning process rather than be active in transferring content. He/she should use didactical approach that is based on   the facilitation of active learning including group work, presentations and self-study.

The advocacy of Competence Based Curriculum has been witnessed in recent years in various levels of education system in the world. The main reason for this advocacy is to provide quality education in all levels from pre- primary education to the university level. Competence Based Curriculum is the leading paradigm for innovation, both at the system level and at the level of the learning environment (Biemans et al., 2004). Competence Based Curriculum therefore requires adult learners to take more responsibilities for their own learning process, which is initiated by the competence learning tasks along the continuum of curriculum implementation. This calls for the review of teaching and learning methods as well as assessing learners. Essentially, it leaves behind the traditional instruction and assessment approaches (Kafyulilo et al, 2012).

A competence–based curriculum basically seeks to develop in learners the ability to know, to learn and learn how to learn. CBC also enables a learner to do things competently, to live confidently and work with other people harmoniously (Jallow, 2011). In this context, the introduction and implementation of competence - based curriculum in the education system in Cameroon shifts the orientation of the content largely, away from the rote memorisation of factual knowledge to competency based learning which is largely instrumental. This focuses much more on the understanding of concepts, and the acquisition of skills and competencies, which in turn calls for changes in teaching, learning and assessment approaches (Woods, 2008; World Bank, 2011; Wangeleja, 2010) as quoted by Kafyulilo et al (2012)

The implementation of Competence- Based Curriculum (CBC) leads to new paradigm on the goals, learning process and approach, roles of teachers, learning environment, and assessment in education. CBET curriculum is aimed at reaching the professional practice as it is based on the future occupational practice of the graduate. The curriculum, therefore, has an integral arrangement in which the profession is essential (Boyatzis et al., 1996). The CBET curriculum advocates the learner-centered approach in which the learning process is central. Field and Drysdale (1991) point out some of the aspects of a learner-centered approach such aspects as the use of individualized materials, flexible learning time and continued feedback. In this regard, the implementation of CBC should ensure that all aspects of a learner- centered approach are included in the learning process. The Learning environment in the CBET curriculum is therefore directed towards the development of competencies at the end the study program (Kirschner et al, 1997).

During the past decade, teaching concepts in the field of higher education have been in a state of transition. The dominance of the 'knowledge transmission' paradigm has decreased in favor of new paradigms, such as 'process-oriented' teaching and 'competency-based education' (CBE). This transition has triggered curriculum reforms in many institutes for higher education. Unfortunately, the development of learning materials for CBE, providing authentic learning experiences in a domain of competence, hasn't kept pace with these reforms. Consequently, teachers involved in curriculum development for CBE are expected to adopt new roles, such as 'coach of learning processes' and 'instructional designer'. This paper attempts to explore the nature, the causes, and possible solutions of the instructional design problems that higher-education teachers have to face as a result of the recent curricular changes.

The evolution in higher education during the last decade can be characterized by two important and interrelated traits. The first is the teacher's perception of education as the facilitation of learning processes

(Samuelowicz, 2001). The teacher's most important role has changed from transmitter of knowledge to coach of the student's learning processes. This concept of teaching is also called 'process-oriented teaching' (Vermunt and Verloop, 1999), or 'new learning' (Simons, van der Linden, and Duffy, 2000). The second trait of the evolution is the shift to competency-based education (Tillema, Kessels, and Meijers, 2000; Foster, 2001). This shift has originated from the growing demand for competent employees in professional domains (Levesque, Lauen, Teitelbaum, Librera, and MPR Associates, Inc., 2000). Not so long ago, it was considered normal that competence was acquired as a function of job experience (Kolb, 1984). Novices could only become competent professionals after a few years of job experience. Currently, educational institutes are expected to deliver competent professionals.

Consequently, CBE should be directed at providing students with the knowledge, skills, and attitudes that enable them to recognize and solve problems in their domain of study or future work, i.e., authentic tasks (Keen, 1992). Although many educational institutes display themselves with a competency-based educational concept, on the level of concrete educational programs and practices this philosophy does not materialize. This may be caused by the holistic character of CBE, which confronts teachers with the very complex instructional design task of integrating theory and practice through problem solving in real world contexts and tasks (Foster, 2001; Mulcahy, 2000). Indeed, inspection reports of Dutch institutes for higher education (HBO-Raad, 1997) show that higher-education teachers experience problems in translating competency-oriented curriculum principles into concrete learning materials. Although several obstacles to the realization of CBE can be identified, this paper focuses on the micro level of the teachers and assumes that the main problem underlying the teachers' inability to design CBE can be described as an instructional design problem. It is clear that certain characteristics at the meso level, such as the inadequate fit of the current school organization, and decisions of the government at the macro level, can hinder or facilitate the realization of curricula for CBE.

The shift from knowledge-based to competency-based education forces teachers to change their way of thinking and working. The traditional knowledge-based curriculum was not very demanding with regard to the design of instruction in the form of learning tasks. The learning materials only contained piecemeal practices that consisting of isolated knowledge and skills that make up the whole task. Instead, in the new competency-based curriculum, teachers have to think holistically in terms of the whole authentic task that competent professionals perform. According to recent insights from instructional design theories (Van Merriënboer and Kirschner, 2001), learning tasks should consist of meaningful whole task experiences with integrated knowledge and skills. In order to design such learning tasks in practice, the teachers should be able to analyze the principles and strategies that are used by experts to solve the typical types of problems in a certain domain. Then, the teachers have to create a series of problem situations, which will require the students to apply these principles and strategies in order to become competent. According to Spector (2001), teachers are expected to comprehend their complex domain as one unified system.

Domain expertise is not taught in the same way as in knowledge-oriented education. Competencies are organized hierarchically, which means that sub skills of a particular skill can be seen as conditional for skills or that sub skills may relate to other sub skills as subsequent or simultaneous (Van Merriënboer, Clark, and de Croock, 2002). In most of the present curricula however, knowledge is organized as an accumulation of knowledge structures and subsequent application. In CBE, the resulting competence is considered to be more than the sum of its sub skills: it is an integrated complex skill, which may account for teacher's problems in programming CBE. This way of integrated thinking adds a lot of complexity to the design task of teachers. Teachers, more or less, have to be able to show the same level of integrative thinking as experts in the field. According to the Cognitive Load theory (Sweller, 1988; see for an overview also Sweller, van Merriënboer, and Paas, 1998), such highly integrative tasks are very complex and may impose a very high load on the teachers' cognitive system.

From the viewpoint of Cognitive Load theory, two roads can be taken to increase the chance that the ideas of CBE can be transformed by teachers into concrete learning tasks. First, according to Cognitive Load theory, the successfulness of the instructional design for CBE depends to a large extent on the cognitive support provided by an appropriate instructional design method. In the light of the complexity and the integrative demands of the task, an Instructional Systems Design (ISD) approach seems a promising candidate. A second potential solution can be found in collaborative design. The holistic and integrative way of thinking that is required to design CBE forces teachers to look over the borders of the subject that they are used to teach in the knowledge-oriented curriculum. In practice stimulating teachers to work collaboratively on the design task can promote this process. In terms of cognitive load, the proposed interdisciplinary collaboration can increase the available cognitive capacity, and consequently relatively decrease the cognitive load. Although, several publications can be found on how teachers plan and organize lessons (Shavelson, 1983; Clark and Lampert, 1986; Clark and Yinger, 1987; Reiser, 1994), a

clear-cut answer to the question whether teachers apply instructional design methodology during the design of learning tasks for CBE cannot be found in the literature.

Unfortunately, the available publications on teacher thinking originated from the paradigm of education as 'knowledge-transmission' and, consequently, cannot be directly applied to a methodology for creating authentic, whole learning tasks for a certain competence. Therefore, in this paper the perspective of recent instructional systems design (ISD) theories and models with a focus on the world of work (van Merriënboer and Kirschner, 2001) will be used to explore the contribution of ISD approaches to the solution of the teachers' design problem. Klauer (1997) and Moallem (1998) have shown that teachers do not frequently apply ISD models. They explain this from the viewpoint that teachers do not like prescriptive methods and that teachers generally work from their personal perceptions about the influence of the curriculum on their lessons.

Although in practice, teachers in the new curriculum are responsible for the design of learning tasks for CBE, the question can be raised what makes the efforts described in this paper Study to support the teachers' design of CBE, worthwhile? Why not leave the design task to instructional design experts? First, as Reigeluth (1983) acknowledges, curriculum and instruction cannot be separated. The importance of the teacher as a stakeholder/participant of the design process for the quality of the learning materials is emphasized in instructional-design theories (Reigeluth and Nelson, 1997; VisscherVoerman, 1999). Furthermore, by leaving the design of CBE to instructional design experts, the teachers' role would be limited to that of coach and assessor of learning processes that are evoked from materials that others have invented. This would devaluate the job of a teacher and the social appreciation for the job (Seddon, 1997). Also, this type of top-down curriculum development is not considered a successful strategy for curriculum development (Lang, Bünder, Kysilka, Tillema, and Smith, 1999; Foster, 2001). To determine how teachers can be supported in their struggle to design learning tasks for CBE, it is important to explore what instructional design methods they actually use in their current daily practice. Also, it is necessary to find a suitable ISD method that can be used for the design of CBE, can be mastered by the teachers, and is acceptable to them. In the next section the search for an appropriate instructional design methodology is described.

II.   Domain-specific competences and generic competences

In the literature, competence is said to consist of domain-specific competences within a discipline and generic competences. Generic competences are needed in all content domains and can be utilized in new professional situations. They identify shared attributes, which could be general to any degree, such as the capacity to learn, decision making, communication abilities, teamwork and management. The term "life skills" is sometimes used indicating that these competences are, because of their transferability, the basic set of capabilities for the life of today, within and outside the teaching profession.

The question whether there are competences specifically for primary school teachers that are potentially valid across different contexts – in other words, a common conceptual framework (a generic profile) that could be adopted internationally and worked out nationally/locally – is another matter, and one that until now has received relatively little attention. Competences for teachers are generally specified for both primary and secondary levels. The case studies in this report regarding the characteristics of CPs for primary teachers aim to serve the purpose of verifying whether there is any shared ground in the thinking about competences that are deemed essential for primary teachers across the globe.

III.   Current Interest In Teacher Competence

As stated, governments worldwide are now increasingly moving from an emphasis on so called 'input criteria' (i.e. the number of years spent in teacher education) to "process" and "output/outcomes" approaches. As part of this development, teacher competences are more and more being examined and measured. Taking into account much of the criticism from the 1970s, many attempts have been made over the last twenty years to explore more holistic conceptions of competence. A significant body of research around the brain, human development and how people learn has influenced the thinking around CBTE. In a holistic (or integrated/relational) approach, competence is seen as a complex combination of knowledge, skills, attitudes and values displayed in the context of task performance. Rather than a single acceptable outcome, performance may be demonstrable in variable contexts.

Interpreted broadly, competence is not trained behaviour but thoughtful capabilities and a developmental process. This approach leaves room for different levels of competence, e.g. entry/novice, experienced, specialist. The conception of competence as a developmental process links up with the idea of lifelong education that conceives of individuals as active subjects of a permanent teaching/learning process and focuses on the learning and competences acquired in different contexts. For example, in the EU's Tuning Project, an inter-governmental body, competences are interpreted as a dynamic combination of knowledge, understanding and skills that a person builds

on and develops, and that can be demonstrated to a certain level of achievement along a continuum. More holistic definitions are said to stress the broad development and empowerment of teacher students.

The holistic approach to CBTE is influenced by certain social constructivist perspectives, i.e. the idea that people construct their reality in interaction with others. The cultural context and social practices involved in competent performance is acknowledged, reflecting how personal attributes are used to achieve outcomes in jobs located within organisational and societal relationships.83 Attention for teaching conditions (such as classroom size or commonly held beliefs in the wider community about teacher roles) is thus essential when thinking about teachers' competence development, and a description of teacher competence should take into account the context and personal characteristics of the teacher when outlining how competence and performance are related. Unfortunately, as research has shown, the 'human agent' with his/her personal characteristics is still missing in most competence descriptions.

This point links up with ideas about collective competence. There are many sources of teacher quality (and there are even more variables that affect students learning, e.g. family, social position, motivation etc.). Research shows that whether a teacher can in fact be competent depends not only on him/her. For example, it would be much harder for a teacher thrust in front of 100 unmotivated pupils, without learning materials, to achieve the same level of competence as teachers in more favourable situations. Individual teachers' competence development should thus be firmly set in the framework of whole school development, and the individual teacher should never be solely held accountable for his/her development and that of his/her students. Problems of education quality occur across the system, and competence should thus be an instrument across the spectrum of the education system towards increased quality. This also means applying the same competence standards both in initial teacher education as well as in daily teaching practice.

Research has suggested that culture mediates school processes and outcomes, and thus cultural factors play an important role in developing meaningful and effective pedagogy. Cultural competence has been recommended as a mechanism for bridging the cultural disconnect between teachers, schools, students and the wider community, and for reducing service disparities. It is important, however, that (multi-/inter-)cultural competence training and skills not break down into application of stereotypes about groups of individuals.

The competence approach to the concept of education is concerned with meaningful objectives and content of learning that will engender the personal development of students and position them within the domain of knowledge that can best prepare them to function effectively in society. This also links up with the Freire's ideas on "learning by doing".

Developing countries need to decolonize the traditional educational systems that often do not serve the different economic, political and social realities of their countries and the increased interest worldwide in indigenous knowledge. The introduction of local languages in education, mixed-age classrooms and satellite schools (designed for the youngest students close to home with fewer numbers), and the introduction of indigenous or local knowledge in the curriculum are all driven by the concern to make curricula more contextually and culturally relevant.

Competence thinking in teacher education has also been expanded to encompass "social" or "emotional" competence. Research shows that (training in) emotional competence is necessary for teachers' well-being and success in teaching, for example to be able to build resilience to adversity in the field or to self-monitor performance. Findings also showed that a teacher's emotional competence predicts the level of burnout, stress levels and work satisfaction.

Teachers also need social-emotional competences to be able to effectively manage and develop students' emotional development. Although the exact relationship between socio-emotional competence and learning has not yet been established, a recent study has shown that socio-emotional education not only increases learning but that it facilitates longer retention in the educational system and academic performance.

Socio-emotional competence is considered by many to be a basic aspect of living in the world today, where the ability to collaborate, communicate, create, understand cultural-, religious-, class and sexual diversity and live in a community are no longer regarded as being a "nice to have" competence, but as an essential one connected to the larger questions of world peace, justice and ecological survival. Scholars are calling for the inclusion of training in socio-emotional competences within objectives for education and teacher training programmes.

IV. Instructional Design Theories and Models: Design of Authentic and Realistic Learning Tasks for Competency-Based Education

In formulating search criteria for an appropriate instructional design methodology for CBE, a first one is that application of the methodology must be suitable for the teacher to teach the student the whole complex task. Instead of isolated elements of knowledge and practice, an integrated approach is needed in which whole tasks are

used throughout the practice phase. A second search criterion is that applying the methodology results in authentic learning tasks (Clark and Estes, 1999). These are tasks of the type the experts encounter in their daily practice. Both the first and second criterion follow from the fact that higher education is expected to deliver students who are able to function as novice practitioners, and who have acquired a basic repertoire of professional problem solving strategies and techniques. A third criterion is the appropriateness of the methodology for building a competency-based curriculum.

In this type of curriculum, the focus is not on the single elements of knowledge and skills but on the integrated competence in a domain. It is not a sum-of-the-parts curriculum but a hierarchical network of sub competencies. A fourth criterion is that the model or methodology must account for a learning-process orientation. After a series of learning tasks the student must be able to display the skills or competence. Not every student needs the same exercise and coaching. Coaching of the student's problem-solving trials includes challenging students to solve problems and giving positive feedback during task performance (Vermunt and Verloop, 1999). A fifth criterion is transfer. The student must be able to solve new problems, that is, problems that differ from the ones trained on. According to Cognitive Load theory, this means that the methodology should take the human cognitive architecture into account and focus practice on the processes of schema construction and schema automation.

Finally, as a sixth criterion, the methodology should be acceptable to the teachers. In practice, this means that it should not be too prescriptive, that is, forcing teachers to follow a linear approach instead of allowing them to apply their own highly contextual, socially based reflections on instruction (Moallem, 1998). Some of these criteria can be recognized in the principles, which Merrill (2002) distinguishes as generic in instructional models, without regard of their basic assumptions or educational philosophies. These 'First Principles of Instruction' include that instruction is problem-based, activates prior knowledge and skills, demonstrates skills and application of knowledge and skills, and integrates skills in realistic tasks. Merrill refers to Instructional Design theories and models, as examples to illustrate the presence of one of more of these principles.

According to Merrill, the Four Component Instructional Design (4C-ID) model (Van Merriënboer, 1997) "is perhaps the most comprehensive recent model of instructional design that is problem centered and involves all of phases of instruction identified in this paper.". Next it will be argued that Instructional Systems Design approaches and in particular the 4C-ID model of Van Merriënboer (1997) is compatible to these principles. Furthermore, Instructional Systems Design approaches seem to fit especially to the criterion of appropriateness for building an integrated, competency-based curriculum. Systems approaches enable 'systemic thinking' and approach education as a programmable or designable, unified whole. Systems approaches are based upon the comprehension of complex unified systems that are built up of constituent parts (Spector, 2001). Spector refers to the discipline of System Dynamics (Forrester, 1961) and considers the interest from the field of education for case-based learning, situated learning and project-based learning as instances of holistic system thinking. Complex systems consist of components that outside of the context of the system do not have meaning.

Complex systems may be effectively modeled by using relatively simple representational schemas. System approaches (ISD-methods) are particularly suited for solving design problems at the curriculum level, because a complex skill or competence can, following Spector's reasoning, be seen as a hierarchically organized complex system, of which the constituent components are to be acquired or learned in relation to each other. Instead of an accumulation of disciplinary organized knowledge this results in a holistic design approach for education, (Banathy, 1991; Klauer, 1997; Reigeluth and Avers, 1997). This advantage of Instructional Systems Design (ISD)-approaches must be balanced against the often discussed and negatively criticized prescriptive character of ISD models, which could limit the autonomy of teachers. However, recent Instructional Systems Design (ISD) methods increasingly focus on stakeholder participation in the design process. Teachers and students are seen as the most important stakeholders in solving instructional design problems (Visscher-Voerman, 1999). In contrast to classical Instructional Systems Design (ISD) approaches, modern Instructional Systems Design (ISD)-approaches enable teachers to preview the consequences of the design for their daily practice in an early stage of the design process (Reigeluth and Nelson, 1997).

The critique of being prescriptive applies to the linearity of the classical five phased ISD approach, which consists of the phases of Analysis, Design, Development, Implementation and Evaluation or abbreviated as ADDIE (Wedman and Tessmer, 1993). Tennyson (1997) has suggested an Instructional Systems Design (ISD) model that views instructional design not as a linear but as a 'nonlinear system that dynamically adapts to the problem conditions of a given situation and that enables the designer frequently to switch between phases of design'. According to Clark and Estes (1999) the 4C-ID model is one of the few instructional design models that are learning-process oriented.

It is assumed in this paper that the 4C-ID model (van Merriënboer, 1997) is at this moment the only instructional systems design model that fits all the six criteria mentioned and is also consistent with Merrill's (2002) generic Five Principles of Instruction. The 4C-ID model is developed for the design of learning tasks for complex cognitive skills. In terms of this model learning tasks are viewed as concrete, authentic and meaningful whole task experiences, which help the learner to construct cognitive schemas for the solution of complex tasks and problems (van Merriënboer and de Croock, 2002).

In this model task complexity is controlled by Task Classes. These are series of learning tasks with the same task-complexity. By defining series of task classes from the simplest form of authentic whole-task performance to the most complex form, the instructional designer can regulate the level of complexity. Within one and the same task class the learner support decreases from highly supported to independent task performance in which the decreasing support is represented by the shading in the circles). Decreasing or fading support is realized by the use of different problem formats, such as worked examples (i.e., full support), completion tasks (i.e., partial support), and conventional problems (i.e., no support). In the 4C-ID model the relation between competence (complex cognitive skill), task complexity, and learning tasks is analyzed in a hierarchical skill analysis, which in most cases forms the first step of the design process. In this analysis the complex skill or competence is decomposed into constituent skills. Lower-level skills are prerequisite to higher-level skills.

The learning tasks form one of the four components of the model. The other components comprise the analysis of complex skills as recurrent or non-recurrent, providing appropriate support for tasks classes (heuristics or supportive info) or for learning tasks (rules, or just-in-time info and part task training to automate sub skills). The methodology comprises ten steps, which the order is not prescribed, and which enables a typical zigzag design (van Merriënboer and de Croock, 2002). Macro level sequencing enables the designer to generate blueprints for training with this model. To conclude about the criteria, the model seems appropriate to build an integrated, competency-based curriculum on the basis of whole authentic learning tasks. The model has a clear learning-process orientation and aims at transfer of the acquired competencies in new situations. Finally, the model is not characterized by a linear prescriptive approach but by a flexible dynamic design methodology. The model was awarded (Zemke, 2001) and has been successfully applied in practice of highly technical training. To meet the increasing call of teachers for a suitable methodology for CBE, a transcription in the Dutch language was made (Janssen-Noordman and van Merriënboer, 2002). Altogether this instructional systems design model seems to be a suitable and promising model for the design of CBE.

V.   Teaching and Learning Approaches in CBET

Competence based education and training requires teachers and learners to change their conceptions of teaching and learning practices. A wide range of teaching and learning techniques is used in delivery of competence programmes. In CBET, constructivist teaching and learning is emphasized. Constructivist teaching and learning is based on the belief that learning occurs as learners are actively involved in a process of meaning and knowledge construction as opposed to passively receiving information. This approach fosters critical thinking and creates motivated and independent learning. In constructivist teaching, the teacher's role is to prompt and facilitate discussion. Thus, the teacher's main focus should be on guiding students by asking questions that will lead them to develop their own conclusion on the subject.

Experience in many institutions of Tanzania suggests that the traditional teaching and learning methods are still used by teachers to deliver the contents despite Tanzania's declaration that it has now shifted to competence-based approach. This is supported by Mosha (2012) who declared that teachers implementing the curriculum from planning the lesson and instruction to assessing students had not changed at all. This is also supported by Kafyulilo et al (2012) on their study where they concluded that competence-based teaching approaches are not well implemented in schools and to a large extent teacher have continued teaching by using the traditional approaches and assessment. They also noted that students have also continued learning through memorization rather than creating and inventing new ideas through inquiry learning approaches. Nevertheless, teachers have declared to implement competence-based curricula but what they really practice in the classroom setting in terms of the teaching and learning methods, roles of teachers and assessment of learning do not reflect the competence-based approach (Kafyulilo et al, 2012).

Competency based education and training demands a different approach to teaching and even assessment and certification (Anane, 2013). This is because conceptually CBET is different from the traditional system. It is based on defined competency standards which are industry oriented. The education and training is more learner-centered (more emphasis is placed on the learner's role in the learning process) than teacher-centered. Anane (2013) highlighted the facilitation methods that are employed for the CBET programmes:

a) **Direct Instruction Method:** It is effective when you have to introduce learners to a new study area or define new concepts and show how they are interrelated or for teaching factual information.
b) **Discussion Method:** Allows learners to share knowledge and ideas thereby motivating them to achieve more particularly when others respect their contribution. It also helps the teacher to determine whether the learner understands the content of the lesson.
c) **Small Group Method:** Pairing is done in such a way that learners help each other to learn faster than the teacher would have been able to do with the whole class. There may however be difficulties with the physical arrangement of the classroom and individual assessment using group work is difficult.
d) **Problem Solving Method:** Provides a challenge to learners; gives them a sense of satisfaction and increases their confidence when they are able to solve new problems and thus gain new knowledge. It also allows the learner to develop critical thinking skills and the ability to adapt to new learning situations. It is however time consuming and because learners sometimes work individually, they may not learn all the things that they are expected to learn.
e) **Research Method:** It is used for workshops and laboratory tasks, field experiments, case studies. It encourages learners to investigate and find answers for themselves and to critically evaluate information. It however requires a lot of time and careful planning of research projects for the learner.

VI. Competence Based Assessment

Competence – based assessment is a process where an assessor works with a trainee to collect evidence of competence, using the benchmarks provided by the unit standards that comprise national qualifications (Biggs, 1996). The shift from knowledge based to competence based approaches does not only influence the change in teaching and learning methods but also the change in the methods of assessment. This is because when learning outcomes change from the acquisition of knowledge to the acquisition of skills, then the manner of assessment will also change (NACTE, 2008). In CBET there must be sufficient evidence to ensure that a candidate meets the competence specified by the current standard. There is no single approach to competence based assessment. Evidence can be collected using different methods at different times under a variety of conditions (Biggs, 1996).

In this regard, the learning environment should be designed in such way that it focuses on the development of competencies rather than transfer of knowledge. The learning environment should encourage and motivate self – learning and self-assessment. This is supported with the availability of the resources that support and encourage learner-centered.

These resources include: teaching and learning resources, computer laboratory, library and classrooms which allow interaction of the learners during teaching and learning process. In CBET, assessment is carried out not only by the teachers but also by the students themselves (student- self assessment) as well as by those representing the labour market (the outsiders). Students play a role of assessing themselves and reflecting upon their actual achievements. They reflect their own learning process through reflective essays, logbooks, Student Self-Assessment Forms (SSAFs) and Personal Development Plans (PDPs). In this context, the collection of evidence to demonstrate that a learner can perform or behave according to specific standards is carried out by both the teachers, students themselves and the labour market representative by using various methods include: tests, examinations, observation, field reports, portfolio, projects, and assignments (NACTE, 2008).

In CBET, assessment is the process of collecting evidence of a learner's performance, upon which an assessor judges whether or not, or the extent to which a learner has met the performance requirements of the learning outcome laid in a particular course and then making a decision, based on these judgments as to whether a learner has achieved the learning outcome as a whole or not (Anane, 2013). In other words, it is the process of measuring learner's skills, knowledge and understanding against the standards (occupational standards) laid down for a particular course. If a learner can show, by generating sufficient evidence of their competence, that they meet the standards, they qualify for that course.

Therefore, CBET assessment measures whether a learner is competent or not competent. Only two possible outcomes can be the result of the assessment process, i.e., they are competent (i.e. they can perform what is stated in the standard) or they are not yet competent (they cannot perform yet what is stated in the standard). The assessment is not designed to measure a learner who is 30% or 50% or 80%, etc. competent. If they do not meet the standards, they develop their skills and knowledge further, after which they are assessed again.

Authentic assessment methods are more useful for competence-based curriculum than other forms of assessment because they provide opportunity for students to demonstrate the competencies they have mastered in real life or related situation. In competence-based assessment, teachers are required to change from norm referenced

to criterion referenced judgment of learners' capabilities or competencies as supported by Kouwenhoven (2003) who argued that in competence-based education, performance assessment is carried out by giving the learner a clearly defined task and a list of explicit criteria for assessing the performance or product. Criteria are often given in the form of rubrics that can be either analytic (specification of parts) or holistic (looking at overall performance). Finally, teachers are supposed to provide continuous, timely and constructive feedback to inform student about the strength and weakness of their performance.

VII.   Challenges Facing Implementation of Competence Based Curriculum

Aschcraft (1994) reveals that the sources of challenges comprise assessment and classroom management. CBET is learner-centered, hence small class sizes are preferred to enable effective use of CBET facilitation techniques. The ideal CBET class size is between 40 - 50 learners. Currently in most of the institutions in Tanzania, the average class size is hundred students and above. With this number, it is difficult for facilitators to handle class size of hundred and above students. Aschcraft (1994) said that if the number of students is 30 and above it is often difficult to manage the class. This is because the teachers have to pay individualized attention to students, have to motivate and give stimulus to them. In addition, he said that it is very difficult for every teacher to develop soft skills to a large number of students.

Challenges of implementing CBET curriculum is also observed on the aspect of Readiness. The readiness applies for both teachers and students in order that they can undergo successful teaching and learning process. The ideal condition of CBC is that both facilitators and students should be ready to undergo the teaching and learning process in class, but in reality, the opposite condition happens (Hatmanto, 2011). According to him, there are some students and teachers who are not ready to learn and teach respectively. If the students are ready they can participate fully in class, but if they are not ready, they cannot develop their critical thinking in the class discussion (Hatmanto, 2011). This is also applied to teachers, if teachers are ready to teach, they can apply the various methods of teaching and learning in order to ensure that the targeted learners acquire the competencies needed in the real-life situation and verse versa.

Another challenge is that students attending the competence-based curriculum class should be proactive, but the students still position themselves as passive learners. In this situation, it becomes lecturers' responsibility to encourage them to be more active, as shared by Badan and Biklein, (2003). "Our challenge is when we find that the students are not 'tuned in' in the class. So it is our responsibility to motivate them by stimulating their meta-cognitive" (Garavan & McGuire, 2001). From this context, it is clear that the shift from knowledge based to competence-based approach involves not only teachers to change their mindsets but also students need to change too.

Assessment is also a big issue faced by the facilitators during implementation of competence-based approach. It is more difficult to assess student's performance in the CBC class than in the conventional class. This might be influenced   by the number of students in the classroom if it is big. Hatmanto (2011) argues that "In the conventional class, we just assess the students' hard skill through the fixed mechanism of examination, but in the CBC, we have to assess both hard skills and soft skills of the students. This leads to a very a complex process". The issue of using students' assignments, projects, student-self assessments, portfolio, tests and examinations as the instruments for collection of student evidences on attainment of knowledge, acquisition of skills and attitudes seem to be a challenge to the facilitators. "To assess the hard skills, we have to assess the students work based on their daily basis assignment which is really time consuming. Students have a of lot assignments on writing and we have to check them one by one. And in the final score, we have to examine all their assignments in the form of portfolio" (Hatmanto, 2011).

Another challenge of implementing competence-based curriculum is on the side of teacher changing its roles.   It can easily be overlooked how much the role of teacher and (students) changes, when CBET is implementing (Jellema, 2003). In this paradigm shift, the teacher is supposed to switch from an expert role, transferring knowledge towards a coaching role, guiding students' learning processes. Students are supposed to take self-responsibility for their learning whereas the teacher becomes in charge. This requires a totally different attitudes for both parties perhaps even a paradigm shift. This challenge is related to professional development. Unless initial training and follow up assistance is provided for these facilitators on periodic bases (Anane, 2013), there is a tendency to "teach as we were taught" and CBET trainers quickly slip back into the role of the traditional teacher. This is due to the fact that, it is the same teachers who handle the two systems: Traditional and CBET. Switching from one role to the other poses a challenge for the teacher/facilitator. One needs a lot of commitment and determination to switch roles effectively (Anane, 2013).

Some teachers who are coming from knowledge based education and training (KBET) and shift to competence based education and training (CBET) for the first time (or are new to both) feel initially rather overwhelmed with a sense of these differences (Chuachua and Mafumiko, 2013). Teachers have no knowledge and skills of how to implement the Competence based approach. It is a new approach to them. This is supported by Chappel (1996) as quoted by Chuachua and Mafumiko (2013) that 'For many teachers, competency standards are now a central and problematic feature of practice… many of them are therefore faced with the dilemma of implementing a competence-based curriculum.'

VIII.   Need to Africanize Competency-based Curriculum: Implications for the University of Buea

The diverse political and socio-economic difference in Africa display different countries with varied educational challenges. The adoption of CBC is a noble move but in the midst of the existing realities that most implementation happens with little regard for available capacities or resources; especially teachers' values, practices and beliefs that majorly shape the outcomes of application and that the way to understand implementation is to start with an examination of the context. Globalization process forms discourse on the impact of local context on considerable African diversity.

The political economy and role of decisive donors and multilateral agencies play significant external force to consider in internal curriculum implementation in Africa countries. The resilience of distinctively African interwoven social organization and educational politics need a deep understanding. For instance, scholars have argued that failure in attempts to introduce learner-centered education in Botswana has much to do with the strength of agreement between traditional and colonial approaches to learning. A sophisticated variation on this theme, which examines the complexity of local educational practices in Ghana, has demonstrated how different international, national and local discourses jostle alongside one another in the same school, where teaching can remain lackluster and rote- learning centered. But opportunities can nonetheless be created where students do learn from one another has emphasized in the CBC.

Harley et al. as cited by Kellie have highlighted the contradictions between pedagogical and political ideals and the great diversity in the context of practice. Mulder has underscored the socially reproductive role of schools and the centrality of variations in teacher knowledge. It might be a pessimist, but life and death of innovation are not merely a matter of providing appropriate supports for the change and making mutual adjustments as it is being offered. Instead, life and death of innovation depend on the unique arrangement of social, historical, administrative and ideological parts that make up the school and its social, community setting especially for the African countries which it can imply the internalize modification of the reform to emulsify it with the African context.

Several factors that can restrict curriculum reform have been recognized, and these relate to both the academic and the context in which the innovation is practicing place. They involve issues of time, parental expectations, public reviews, unavailability of required instructional materials, lack of clarity about curriculum reform, teachers' lack of skills and knowledge, and the initial mismatch between the teacher's "residual philosophies" and the policies underlying the curriculum modification. Other restrictions relate to organizational arrangements such as role overload, rigid scheduling of time, reporting systems, and failure of the administration to recognize and understand its role in change. All of these factors need to be discussed in the context of Africa.

The reforms and core competencies in primary education are expected to transcend into both Technical and Vocational Education and Training (TVET) and university education levels. Following the Science Technology and Innovation Strategy for Africa (STISA) 2024, whose mission is to "Accelerate Africa's transition to an innovation led, competence-based economy," Cameroon and other countries in Africa, will need to find a nexus between primary education and TVET which would be achieved through appropriate adoption and implementation of CBC into African context. These will help achieve continental Agenda goals 2063, which aim to address youth employment through quality and relevant education that will result in skills revolution.

The curriculum in Africa starting point is that CBC is a demand-driven where employers need to serve as curriculum advisory committees, provide internships and to shadow experiences of students. The CBC needs to look into the African countries actual learning environment, its financial ability, human resources ability, philosophy, job market needs, and vision. The African classrooms face diverse challenges ranging from infrastructures, resource, teachers' capabilities, leadership, and types of students' cohort with classes swollen with learners eager to learn in admit to background problems. The education systems in the African states have made efforts to adopt world/global class education model (CBC), but still, questions should be asked: do the adopting countries consider their "own" existing challenges? Are the states ready to face the challenges brought by that the new curriculum? Do the countries involve the curriculum implementors in the initial stages of curriculum reforms decisions?

Cameroon in particular and Africa in general needs to align well-documented duplicated curriculum designs from developed countries to their educational philosophy and vision. That will only require the use of local experts who understand the actual classroom challenges in the development of the curriculum. The long-experienced serving teachers would be in a better position to bring real rich classroom discourse in the curriculum reform. CBC requires learners to construct their knowledge, moving in their own pace, graduating based on demonstration of competencies. Teachers being facilitators may face myriad challenges with the large numbers of learners. The vision 2030, sustainable goals, continental goals 2063 among African states will only be delivered if educators consider adopting CBC in the African context. The adoption should go beyond the cultural and socio-economic limitations, deeply rooted in the local and international trends. This will help in knowledge development, increase employment, income generation, the gross domestic product, and flow of foreign currency in the African countries.

IX.　　Conclusions and recommendations

From the above literature review and analysis on the concept of competence in teacher education, its development, and the international and regional policy context of efforts that have something to do with competence-based teacher education, some important conclusions and recommendations can be drawn for those embarking on designing or revising competence profiles for teachers.

a) Teacher competence can be pointed to as one way of looking at teacher quality that seems to be applied more and more globally. Factors such as the rise of the knowledge society and consequent changing expectations of teachers; concerns about quality and accountability; inequality; violence, low learning results; and the need to decolonize curricula, have all been mentioned to have spurred discussion about quality and the rethinking of teacher education on the basis of competences;

b) Conceptual, methodological and ethical issues surrounding the term competence, both in theory and in practice, are evident. Research suggests that a holistic approach to competence emphasizes complex integrated skills, knowledge, attitudes and values. This definition allows different levels of competence. The competence profiles should include both domain-specific and broader life-skills (generic competence), as well as cultural and socio-emotional competence. It should pay attention to how personal and contextual factors are related to teachers' performance. As such a competence profiles can be helpful as a framework for discussion about teaching quality, and guideline for teachers' evaluation, empowerment and professional growth;

c) However, research suggests that in general, competences are specified and assessed too narrowly. When engaging in designing competence practices, one should be very aware of the issues raised in this report order to prevent behavioural 'checklist' approaches (long lists of 'do's and don'ts') of early competence thinking as it emerged in developed countries;

d) The formulation of competences for teachers should stem from a discussion of what is considered a good quality teacher and the profile should be designed in cooperation with all stakeholders involved, most notably with the teachers;

e) Teacher competence depends on many factors and teachers should never be held solely accountable for their teaching quality;

f) On an international scale, much effort has been put into defining competences for citizens and learners. Although some international efforts are being made, the picture is less clear about internationally desired competences for primary teachers;

g) A competence profile could be a tool for both quality assurance and as a tool towards facilitating the transition of non-formal or under-/unqualified teachers to formal education;

h) Teaching quality should encompass the competence to recognize gendered power processes in the classrooms, and being able to actively embrace diversity, ensuring a safe, protective and gender responsive/gender just school environment.

References

[1]. Anane, A. C. (2013). Competency Based Training: Quality Delivery for Technical and Vocational Education and Training Institutions. International Journal of Educational Research. 2 (2): 5-6.

[2]. Ashcraft, M. H. (1994). Human Memory and Cognition. New York: HarperCollins.

[3]. Banathy, B. H. (1991). Systems design of education: A journey to create the future. Englewood Cliffs, NJ: Educational Technology Publications.

[4]. Biemans, H., Nieuwenhuis, L., Poell, R., Mulder, M. & Wesselink, R. (2004). Competencebased VET in the Netherlands: Background and pitfalls. Journal of Vocational Education and Training, 56(4), 523-538pp. Retrieved on 8 August, 2015 from http://www.bwpat.de/7eu/biemans etal nl bwpat7.shhtml

[5].   Biggs, J. (1996). Assessing Learning Quality: Reconciling Institutional, Staff and Educational Demands; Assessment and Evaluation in Higher Education, 21 (1) 511pp.

[6].   Boyatzis, R., Leonard, D.C., Rhee, K. S. &Wheeler, J. V. (1996). Competencies can be developed, but not in the way we thought. Capability, 2(2), 25-41

[7].   Cassell. Clark, R. E., & Estes, F. (1999). The development of authentic educational technologies. Educational Technology, 39, 5-16.

[8].   Chuachua, R. & Mafumiko, F. (2013). Establishing Competences and Curriculum for Integrated Post Primary Education (IPPE). In; *Proceedings of International Open and Distance Learning conference.* 25 November, 2013, New Delhi, India. 89pp.

[9].   Clark, C. M., & Lampert, M. (1986). The study of teacher thinking: implications for teacher education. Journal of Teacher Education, 37, 27-31.

[10].   Clark, C. M., & Yinger, R. J. (1987). Teacher planning. In G. Calderhead (Ed.), Exploring teacher's thinking. London:

[11].   Cohen, M. J. (1996). Human resource management in universiteiten. Tijdschrift voor Management en Organisatie, 5, 499-510.

[12].   De Weert, E. (2001). Pressures and prospects facing the academicprofesssion in the Netherlands. Higher Education, 47(1-2), 77-101.

[13].   Forrester, J. W. (1961). Industrial Dynamics. Cambridge, MA.: MIT Press.

[14].   Foster, S. (2001). Pragmatic, problem solving approaches to curriculum and assessment policy. Journal of Educational Policy, 16, 53-66.

[15].   Hatmanto, E. D. (2011). Challenges in the Implementation of Competency –Based Curriculum   in the English Language Teaching. In; proceedings of TEFL conference, Seoul, South Korea, 15 April, 2011. 10-13pp

[16].   HBO-Raad. [Association of Universities of Professional Education] (1996). Koers gekozen. Eindrapport van de vervolgvisitatiecommissie lerarenopleidingen basisonderwijs. [Course determined. Final follow-up inspection report of Primary Teacher Training Colleges] Den Haag, The Netherlands: Voorlichtingsdienst HBO-Raad.

[17].   Janssen-Noordman, A. M. B., & van Merriënboer, J. J. G. (2002). Innovatief onderwijs ontwerpen. Via leertaken naar complexe vaardigheden. [Designing innovative education: from learning tasks to complex skills]. Groningen, The Netherlands: Wolters-Noordhoff.

[18].   Kafyulilo, A. C., Rugambuka, I. B., & Mosses, I. (2012). The Implementation of Competency -Based Teaching   Approaches in Tanzania. A case of Pre- service Teachers at Morogoro Teacher   Training College. *Universal Journal of Education and General Studies* 1(11): 339-347.

[19].   Keen, K. (1992). Competence: What is it and how can it be developed? In   J. Lowyck, P. De Potter & J. Elen (Eds.), Instructional Design: Implementation issues (pp. 111-122). Brussels: IBM International Education Center.

[20].   Kirschner, P., Van Visteren, P., Hummel, H., & Wigman, M. (1997). The design of a study environment for acquiring academic and professional competence. Studies in Higher Education, 22 (2) 151-17pp.

[21].   Klauer, K. J. (1997). Instructional design theory: A field in the making. In   R. D. Tennyson, F. Schott, N. Seel, & S. Dijkstra (Series Eds.) Instructional design: *International perspectives, Volume 1. (pp. 447-455).*

[22].   Kouwenhoven, G. W. (2003). Designing for Competence: Towards a Competence- Based Curriculum for the Faculty of the Eduardo Mondlane University. Doctoral Dissertation. Enschede, Netherlands: Twente University.

[23].   Lang, M., Bünder, W., Hansen, H., Kysilka, M.L., Tillema, H., & Smith, K. (1999), Teacher professional development in the context of curriculum reform. In M. Lang, Olson, J. Hansen, H. and Bünder, W. Changing schools/Changing practices: Recent research on teacher professionalism.

[24].   Louvain: Garant. Levesque, K., Lauen, D., Teitelbaum, P. A. M., Librera, S., & MPR Associates. (2000). Vocational education in the United States: Toward the year 2000 (Report No. 029). Washington D.C.: U.S. Department of Education. Office of Educational Research and Improvement.

[25].   Mahwah, N J: London. Kolb, D. (1984). Experiential learning: Experience as the source of learning and development. Englewood Cliffs, NJ: Prentice Hall.

[26].   Mahwah, NJ: Lawrence Erlbaum Associates. Tillema, H. H., Kessels, J. W. M., & Meijers, F. (2000). Competencies as building blocks for integrating assessment with instruction in vocational education: a case from the Netherlands. Assessment & Evaluation in Higher Education, 25, 265-278.

[27].   Merrill, M.D. (2002). First principles of instruction. Educational Technology, Research and Development, 50(3), 43-59.

[28].   Moallem, M. (1998). An expert teacher's thinking and teaching and instructional design models and principles: An ethnographic study. Educational Technology, 46(2), 37-64.

[29].   Mulcahy, D. (2000). Body matters in vocational education: the case of the competently trained. International Journal of Lifelong Education, 19,   506-524.

[30].   Mulder, M. (2001). Competence Development: Some background thoughts. *International Journal of Agricultural Education and Extension,* 7(4)147-159pp.

[31].   NACTE, (2008). CBET Facilitation: Guidelines on How to Plan and Facilitate Competence-Based Learning. Dar es Salaam: NACTE.

[32].   Reigeluth, C. M., & Avers, D. (1997). Educational technologies, chameleons and systemic thinking. In R. M. Branch, B. B. Minor, & D. P. Ely (Eds.), Educational media and technology yearbook: Vol. 22. (pp. 132-137). Englewood, Colorado: Libraries Unlimited, Inc.

[33].   Reigeluth, C. M., & Nelson, L. M. (1997). A new paradigm of ISD? In R. M. Branch, B. B. Minor, & D. P. Ely (Eds.), Educational media and technology yearbook: Vol. 22. (pp. 24-35). Englewood, Colorado: Libraries Unlimited, Inc.

[34].   Reiser, R. A. (1994). Examining the planning practices of teachers: Reflections on three years of research. Education and Technology, 43,25-34.

[35].   Samuelowicz, K. (2001). Revisiting academics' beliefs about teaching and learning. Higher Education, 41, 299-325.

[36].   Seddon, T. (1997). Education: deprofessionalized? Or reregulated, reorganized and reauthorized? Australian Journal of Education, 41, 228-246.

[37].   Shavelson, R. J. (1983). Review of research on teachers' pedagogical judgments, plans, and decisions. The Elementary School Journal, 83,   392-413.

[38].   Simons, P. R. J., Linden, J. L. van der, & Duffy, T. (Eds.). (2000). New learning. Dordrecht, The Netherlands: Kluwer Academic Press.

[39].   Spector, M. J. (2001). Philosophical implications for the design of instruction. Instructional Science, 29, 381-403.

[40].   Sudsomboon, W., Anmanatarkul, A. & Hemwat, B. (2007). Development of a competency-based instruction on automotive suspension system subject. In; Proceedings of 5th international conference on developing real-life learning experiences. 20 October, 2007, King Mangkut's University of Technology, Bangkok, Thailand. Retrieved on 18 July 2015 from http://www.kmutt.ac.th/rippc/pdf/abs50/503002.pdf

[41].   Sweller, J. (1988). Cognitive load during problem solving. Effects on learning. Cognitive Science, 12, 257-285.

[42].   Sweller, J., Van Merriënboer, J. J. G., & Paas, F. (1998). Cognitive architecture and instructional design. Educational Psychology Review, 10, 251-295.

[43].   Tennyson, R. D. (1997). A system dynamics approach to instructional systems development. In R. D. Tennyson, F. Schott, N. Seel, & S. Dijkstra (Eds.), Instructional design: international perspectives: Volume 1: Theory, research and Models. (pp. 413-427).

[44].   Van Merriënboer, J. J. G. (1997). Training Complex Cognitive Skills: A Four Component Instructional Design Model for Technical Training. Englewood Cliffs, N.J.: Educational Technology Publications.

[45].   Van Merriënboer, J. J. G., & de Croock, M. B. M. (2002). Performance-based ISD: 10 steps to complex learning. Performance Improvement, 41, 33-39.

[46].   Van Merriënboer, J. J. G., & Kirschner, P. A. (2001). Three worlds of instructional design: state of the art and future directions. Instructional Science, 29, 429-441.

[47].   Van Merrienboer, J. J. G., Clark, R. E., & de Croock, M. B. M. (2002). Blueprints for complex learning: the 4C-ID model. Educational Technology Research and Development, 50, 50-64.

[48].   Vermunt, J. D., & Verloop, N. (1999). Congruence and friction between learning and teaching. Learning and Instruction, 9, 257-280.

[49].   Visscher-Voerman, J. I. A. (1999). Design approaches in training and education: a reconstructive study. Doctoral Dissertation, University of Twente, Enschede, The Netherlands.

[50].   Wangeleja, M. J. N. (2010). The teaching and learning of competence based mathematics curriculum: Methods and techniques. In; Proceedings of mathematical association of Tanzania annual seminar, Sokoine University of Agriculture, Morogoro, Tanzania. 13-18 September, 2010.

[51]. Wedman, J., & Tessmer, M. (1993) Instructional designers' decisions and priorities: A survey of design practice. Performance Improvement Quarterly 6(2), 43-57.

[52]. Woods, E. (2008). Tanzania case study. In; UNESCO, country profile commissioned for the EFA global monitoring report 2008: Education for all by 2015, will we make it? Paris: UNESCO.

[53]. World Bank (2011). A regional exploration of pathways toward harmonization of mathematics and science curriculum in the East African Community: Discussion Paper. Washington D.C: World Bank.

[54]. World Bank (2014). *Learning in the face of adversity: the UNRWA education program for Palestine refugees*. Washington, DC: World Bank Group. Available at: http://documents.worldbank.org/curated/en/2014/10/20356650/learning-face-adversity- unrwa-education-program-palestine-refugees

[55]. Wyse, D., Hayward, L. & Pandya, J. (eds.). (2015). *The SAGE Handbook of Curriculum, Pedagogy and Assessment*. London: SAGE.

[56]. Zemke, R. (2000). Jeroen van Merriënboer, Quiet revolutionist. Training, 37, 44.