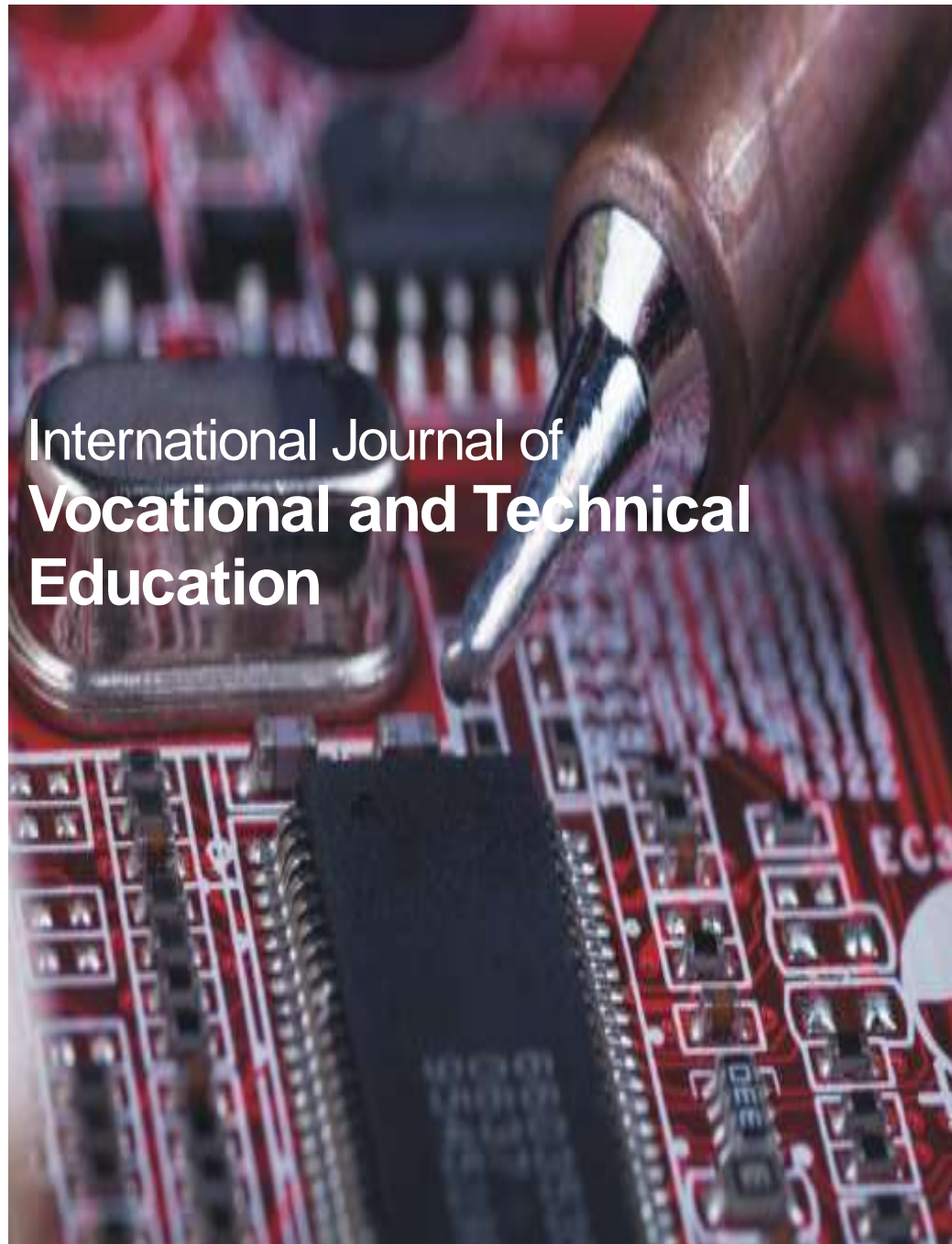


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Implementation of competence-based curriculum in technical colleges: The case of Arusha City, Tanzania
Labani Kanyonga, Noah Mtana and Heike Wendt

Full Length Research Paper

Implementation of competence-based curriculum in technical colleges: The case of Arusha City, Tanzania

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Competence-based education and training (CBET) is a functional approach to education as it emphasizes that learners need to gain necessary knowledge, skills, understanding and attitudes or values to work successful in their own profession or occupation. It is regarded as a holistic approach to education. This study aimed at finding out how technical college trainers implement CBET curriculum in Arusha city, Tanzania. The study adopted a qualitative approach through the use of case study design in order to get an in-depth understanding of the CBET implementation process. A total of 24 trainers were selected through purposive sampling from three (3) Science and Allied Technology (SAT) technical colleges in Arusha city, Tanzania in which in-depth interviews and open-ended questionnaires were used to collect information. The findings indicated that, though majority of the trainers got in-service training, more than half had limited awareness and understanding about the meaning and aim of the CBET curriculum. Also, trainers showed little knowledge and skills for employing CBET teaching and learning methods as well as conducting students assessment and evaluation. Lastly, it became apparent that, technical colleges in Arusha city have inadequate human and material resources for effective implementation of the CBET curriculum. It is concluded from the findings that, CBET was introduced without relevant and necessary preparations.

Key words: Competence, curriculum implementation, CBET curriculum, Tanzania.

INTRODUCTION

It is now more than 40 years since the introduction of competence-based education (CBE) in the world. The approach to education started in the United State of America (USA) in the late 1960s. Historically, countries such as United Kingdom (UK), Germany, Netherlands and Australia have implemented competence based education approach. However, the way in which the approach has been adopted differs from one country to another depending on the historical, social, economic and

technological advancement of the respective country (Rutayuga, 2012). The CBET is favoured due to the claim that, it has significance in development of science and technology, specifically in training students in aspects that are in line with occupational and job skills; hence, producing graduates who are more competent as per employers needs (Rutayuga, 2012). The CBET approach was successful in most of the European countries specifically, in producing competent graduates.

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Due to this success some African countries including South Africa, Malawi, Ghana, Ethiopia and Tanzania started to adopt it (Rutayuga, 2012, Okoye and Isaac, 2015; Dadi, 2014; Kufaine and Chitera, 2013).

In Tanzania, the CBET approach was introduced in the year 2000; and in the year 2002 its implementation started in technical colleges. Currently, the approach is used in the Technical and Vocational Education and Training (TVET) sector; specifically in Vocational Education and Training (VET) centres and Technical Education and Training (TET) colleges. The introduction of CBET was intended to facilitate a paradigm shift from the traditional Knowledge-Based Education and Training (KBET) (Rutayuga, 2012). Basically, the shift from KBET to CBET is in line with the Tanzania Development Vision 2025 (Kaaya, 2012) which states that Tanzania should:

be a nation with a high level of education at all levels; a nation which produces the quantity and quality of educated people sufficiently equipped with the requisite knowledge to solve the society's problems, meet the challenges of development and attain competitiveness at regional and global level (URT, 1999).

Furthermore, it is in line with the National Council for Technical Education (NACTE)'s intent, that:

Education and training undertaken by students should equip them to play roles requiring higher levels of skill, knowledge and understanding, and in which they take responsibility for their area of specialisation (Rutayuga, 2003).

The paradigm shift to CBET was introduced in Tanzania due to the claim that KBET failed to produce graduates with adequate competences to undertake diverse work activities as it was advocated by Tanzania Development Vision of 2025 (Rutayuga, 2012) and by NACTE's aim. The dissatisfaction was also shown by employers who are the main 'consumers' of the graduates from VET and TET. Their complaint was that, technical and vocational institutions delivered content-based curricula with an emphasis on theory or knowledge; hence, they produce graduates who are not well equipped with required skills to perform occupational roles efficiently (Rutayuga, 2012). This was due to the fact that KBET created a gap between the labour market and education. According to Biemans et al. cited in Kufaine and Chitera (2013) it was expected that, the gap between the labour market and education would be reduced by the introduction of CBET. The introduction of the CBET approach targets students to acquire skills, knowledge, understanding and wider attributes that are necessary for the industry. In this regard, the approach demands collaboration with industries during training so that the competences that the students develop become more relevant to the industry (Kufaine and Chitera, 2013).

In order to fulfil the aim of the Tanzania vision of 2025, NACTE's aim and CBET itself, colleges should plan to implement CBET curricula in effective and efficient manner. Due to the fact that, CBET involves some changes in pedagogy, which include instructional and assessment approaches in order to incorporate outcome-based learning rather than a theoretical understanding of concepts (content-based curriculum) as addressed by KBET (Kafyulilo et al , 2012), trainers need to implement CBET with great care to achieve the intended aims of the curricula.

Despite the fact that the CBET curriculum has been about sixteen years since its inception in technical colleges in Tanzania, there is no clear evidence to show if trainers implement it appropriately or not. Numerous studies have been conducted regarding the new paradigm of competence based curriculum and competence-based approach in general. For example, studies conducted by Tilya and Mafumiko, Kitta and Tilya, as well as Kafyulilo, Rugambuka and Moses in Tanzanian secondary schools revealed that competence based curriculum remained to be paper based rather than being practical. This means that its implementation is not effective in schools. A number of studies that are directly linked to technical colleges have been conducted but most of them have focused on contexts outside Tanzania. For example, there are studies conducted by Kufaine and Chitera in Malawi, Anane in Ghana and Dadi in Ethiopia. Generally, these studies revealed that, CBET is faced by a number of challenges in its implementation. The major challenges are that trainers have little awareness and understanding about the competence-based approach and this leads to their inability to implement it effectively. Other challenges include inadequacy of resources due to financial problems, large number of students in the classes and limited opportunities for the trainers to attend short term training on how to implement CBET curriculum (Anane, 2013; Dadi, 2014; Kufaine and Chitera, 2013).

A recent study in technical colleges that was conducted in Tanzania by Rutayuga revealed that "though CBET is perceived by many stakeholders in the country as an appropriate approach for skill and competence formation, there is a problem with the contextual environments within which CBET is implemented" regardless its vitality in making a link between education and the labour market demands (Rutayuga, 2012). Furthermore, the study did not consider the actual implementation of the CBET curricula. Instead it focused on seeking exploration of "the existing dominant concept of competence in Tanzania; how it is viewed by various stakeholders" (Rutayuga, 2012). Therefore, the study does not provide adequate information about the implementation of CBET curriculum. Therefore, due to the fact that, most of the studies that were conducted in technical colleges have been done outside Tanzanian context, little is known about how CBET is implemented in Tanzania's technical

colleges, specifically how trainers implement the CBET curriculum. Thus, a need to conduct this study was paramount and pertinent so as to know if the CBET curriculum is implemented as it is intended or not.

Research questions

The main questions to be answered by this study are:

1. To what extent are technical college trainers aware and understand competence-based education and training curriculum?
2. To what extent do technical college trainers have relevant knowledge and skills of implementing the competence-based education and training curriculum?
3. To what extent do technical colleges have adequately available resources for implementing the competence-based education and training curriculum?

The findings are expected to provide an understanding of how trainers in technical colleges implement the CBET curriculum, challenges that are encountered, and suggestions of action for improvement. Furthermore, the study provides NACTE and other stakeholders with information that can act as the basis of their evaluation on how CBET curriculum is being implemented.

THEORETICAL FRAMEWORK OF THE STUDY

The main aim of implementing any curriculum in the education sector is to make students learn. For effective accomplishment of learning, there are learning theories that guide the teaching process. Thus, in studying the implementation of competence-based curriculum in technical colleges, the underpinning learning theories are behaviourist theory, generic theory, integrated (cognitive) theory and constructivist theory. Currently, the holding teaching model or learning theory that fits for competence based approach is the constructivist theory.

Conceptual framework of the study

This study focused only on the implementation of the curriculum (dependent variable) as one of the stages in the curriculum development process, which is influenced by many factors (independent variables) that depend on each other. The influencing factors are grouped into three broad areas, which are 'profile of implementation' factors, 'capacity to support innovation' factors and support from outside agencies. In this study the researcher focused much on the support to innovation factors, specifically on three aspects: trainer factors, the major aspect that holds the study, availability of resources and administrative and management support (Figure 1). Trainers' factors include

trainers' knowledge and skills in teaching methods, preparation of assessment plan for classroom use, and assessment and evaluation methods. In addition, the other trainers' factors taken in consideration in this study were trainers' perceptions, trainers' awareness and understanding and trainers' in-service training. The variables are joined by arrows that indicate the relationship between them as shown in Figure 1.

Trainers' factors affecting implementation of CBET curriculum

Trainers' factors include but not limited to aspects such as general awareness and understanding, knowledge and skills, perceptions and attitudes and training about the CBET curriculum. Komba and Mwandanji (2015) asserted that, implementation of a reviewed curriculum essentially depends on the trainers' awareness, knowledge, skills and the general understanding that they have on the curriculum change. The same has also been claimed by Altinyelken (2009) that trainers play a significant role in any reform processes and therefore the above mentioned aspects should be taken into consideration in the implementation of the reviewed curriculum for the effectiveness of the processes of change.

Trainers' awareness and understanding of CBET curriculum

The trainers' general awareness and understanding includes the way in which the trainers are aware that they are implementing a CBET curriculum and they need to know what is emphasised in it. This includes awareness and understanding on CBET objectives and suggested teaching methods as well as assessment methods. For any new or changed curriculum, the awareness and understanding depends on the training provided to trainers in order to enlighten them about the changes made. This has been supported by Komba and Mwandanji (2015) when they write that, regular training for the trainers is very important since it enables them to acquire up-to-date teaching knowledge and skills to effectively implement the curriculum, which in this context is the CBET curriculum.

Trainers' knowledge and skills about the CBET curriculum

It is argued that trainers need to understand the context of the current CBET system in terms of the role, key characteristics, advantages and limitations, components and potential alternatives (Deißinger and Hellwig, 2011); also, to know how well trainers can design a CBET

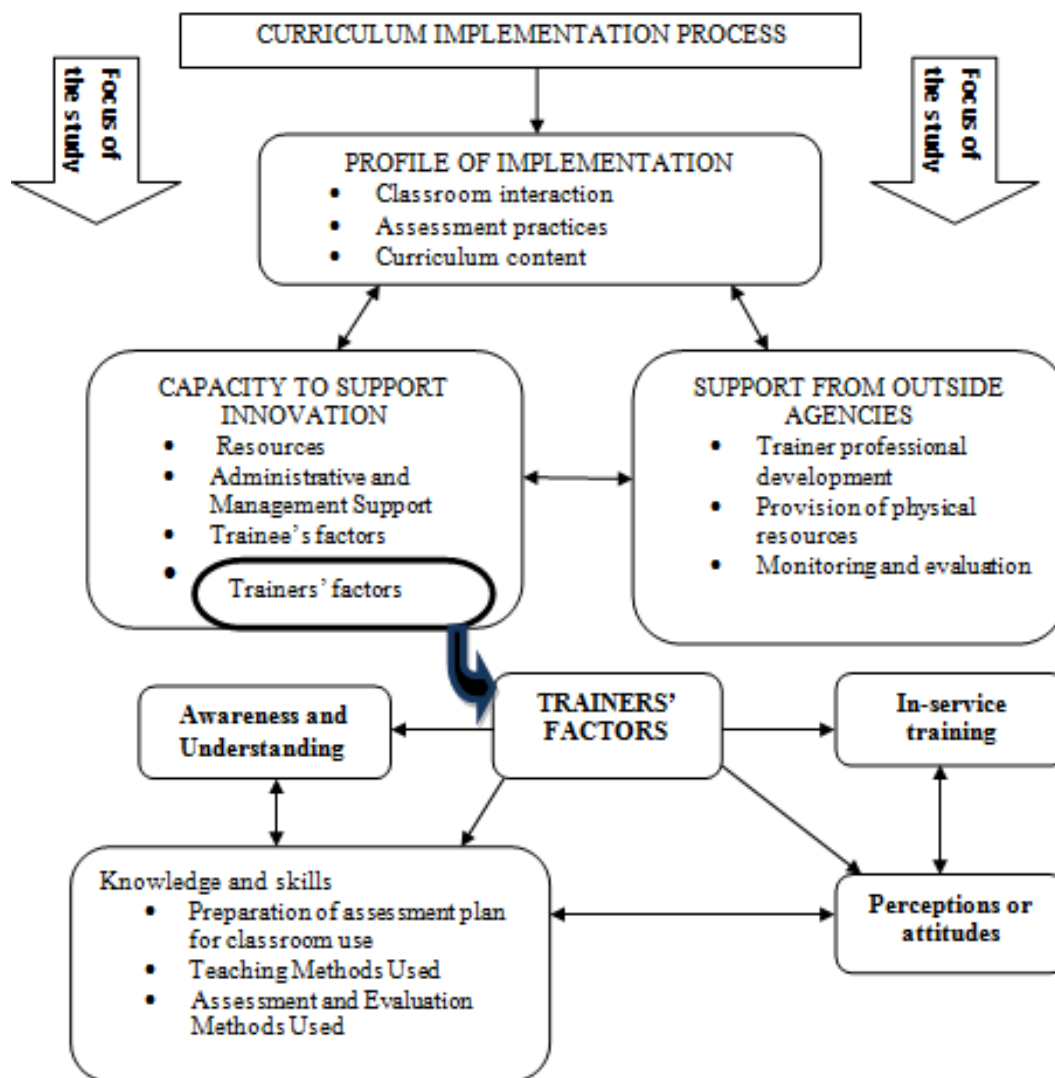


Figure 1. Conceptual framework of the study.

Source: Modified from NACTE cited in Rutayuga (2012), MOE cited in Dadi (2014) and Rogan and Grayson as adopted in Altinyelken (2009).

programme, acquire learning materials and resources, use appropriate facilities, develop procedures for managing CBET and foster partnerships between education and industry (Deißinger and Hellwig, 2011). In this study, the researcher focused on assessing trainers' knowledge and skills in two major areas: trainers' knowledge and skills in teaching methods as well as in assessment and evaluation methods.

Trainers need to be aware of the process of selecting suitable teaching methods that match with the contents to be taught or skills that need and developed among students during the process of teaching and learning. The methods that trainers need to select should foster the acquisition of knowledge, skills, understanding and wider attributes for students as these are addressed in the CBET curriculum. In CBET, trainers are usually needed

to use learner-centred teaching methods due to the fact that a CBET curriculum is learner-centred. Although sometimes trainers can "use both the teacher-centred and the learner-centred approaches, the emphasis is more on the learner-centred approaches" (Anane, 2013). Therefore, trainers need to have knowledge and skills on the ability to practice well learner-centred methods rather than teacher-centred methods. Learner-centred teaching methods include but not limited to scaffolding, small group discussions, problem-solving, demonstration, question and answer, presentation to peers, mind maps, evaluation on jointly agreed criteria, learning by doing, mentoring and coaching, discovery learning, projects, SWOT analysis, problem trees, in tray exercises, buzz groups, visits or field trips, role plays based on real life situations, case studies and real scenarios, work

simulation activities, games, enterprise activities, practical and research methods (NACTE).

In some instances, trainers can use teacher-centred facilitation method such as direct instruction method only if a trainer wants to “introduce learners to a new study area or define new concepts and show how they are interrelated or for teaching factual information” (Anane, 2013). These methods include lecturing and presentation. It is said that, in teaching, no single method is the best method, but a good teacher or trainer needs to involve a variety of teaching methods (foster, 2009). In that regard, a good trainer needs to use more than one teaching method in the teaching and learning process since students always have different strategies or learning styles.

Trainers need to have sound knowledge and skills on the assessment and evaluation methods. Assessment and evaluation of competence based curriculum is one of the essential components due to the fact that, it is the one that provides assurance of the validity of all the processes conducted in the implementation stage. Thus, quality of assessment is of paramount importance in order to provide competent graduates (Rutayuga and Kondo, 2006). Generally speaking, assessment is a necessary and important aspect since it “influences a student’s academic prospects, career opportunities, and even success on the job in the world of work and provides accurate predictions for future professional competence” (Rutayuga and Kondo, 2006).

“Competence-based assessment is conducted on demand and under conditions which should come as close as possible to real workplaces” (Wolf cited in Deiřinger and Hellwig, 2011). Also, all the assessment should be in line with the learning outcomes (Lawson and Williams, 2007) and for that matter, assessment is not conducted to measure learner’s achievement in comparison with other learners (norm-referenced assessment) but is conducted to measure the achievement of learners with reference to competence standards (criterion-referenced assessment) (Deiřinger and Hellwig, 2011). In CBET, “assessment is the process of collecting evidence of learners’ 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 unit and then making a decision, based on these judgements as to whether a learner has achieved the learning outcome as a whole or not” (Okoye and Isaac, 2015).

Furthermore, assessment helps to determine how much students have progressed in acquiring competencies necessary for their future profession and should be organised around assessment criteria specified in the respective curriculum (Rutayuga and Kondo, 2006). It involves both; formative and summative assessment. Formative assessment is done throughout the process of teaching and learning and summative assessment is done at the end of a learning unit or

semester. It is suggested that methods that can be used in assessment include written assignments (classroom assignments and tests), performance assessment that is done by observation, product assessments, portfolios, practical tasks, oral examinations and projects. CBET assessment ought to use a variety of assessment methods so as to gather enough evidence about students’ achievement (Kitta and Tilya, 2010). The most useful approach in CBET is what is referred to as “*Holistic assessment Approach*”. Holistic assessment refers to assessment, which checks a wider range of skills, knowledge, understanding and competencies combined together to successfully complete practical workplace tasks (Rutayuga and Kondo, 2006).

Trainers’ perceptions about CBET curriculum

Deiřinger and Hellwig (2011) argue that before the actual implementation of the CBET curriculum, trainers’ attitude and perceptions should be assessed. Trainers need to be enthusiastic about CBET, about applying the principles in practice and overcoming the barriers and solving the problems that are bound to emerge with CBET. For successful implementation, trainers should be comfortable with the philosophy of CBET and strongly believe in the potential of the CBET system, should be open-minded about pushing ahead into the relative unknown that lies ahead about CBET (Deiřinger and Hellwig, 2011). Furthermore, Dadi (2014) argues that “teachers’ perceptions are important elements in the teaching and learning process of the students. In addition to that, Geřit (2016) points out that trainers and teachers’ positive perception towards any educational change is vital for its successful implementation.

Trainer’s in-service training about CBET curriculum

Generally, trainers’ factors are greatly influenced by training. Training hinders or favours all the trainers’ factors explained above. It is affirmed that trainers’ “training plays a significant role in the successful implementation of innovative programmes” (Bumen and Cakar, 2014). The professional development activities (in-service training) or information on the reform movement are required to maintain the effective implementation of the curriculum. This includes short training on the intervening curriculum such as workshops and seminars regarding the philosophy and strategies for successful implementation of the curriculum. This involves training on pedagogical content knowledge (PCK) and pedagogical knowledge (PK). Pedagogical content knowledge means trainers’ “understanding of how they can help learners understand the subject matter (Kimaryo, 2011). Pedagogical knowledge means knowledge of instructional principles, classroom

organisation and management, knowledge of the learners and how they learn. PK involves training on the art and science of teaching that implies the knowledge on how to teach (Kimaryo, 2011). The two types of knowledge (PCK and PK) are important to trainers for effective implementation of the curriculum.

Availability of resources for implementing the CBET curriculum

The availability of resources for implementing the CBET curriculum includes two major types namely human resources, which imply the availability of trainers as well as teaching and learning facilities that include laboratories, workshops, library, and classrooms with necessary equipment. It is claim that "CBET requires a lot of teaching and learning materials since it emphasises practical and immediate assessment" (Kufaine and Chitera, 2013). Furthermore, CBET requires up-to-date teaching and learning aids as technology keeps on changing. That is why it is stated that, for CBET to be successful, materials need to change fast as per the change of technology so that graduates from technical colleges can have skills relevant to the industry" (Kufaine and Chitera, 2013).

Research reveals that 'CBET is a resource intensive system meaning that, CBET is demanding as it needs a lot of resources in terms of human and material' (Rutayuga, 2012). This implies that effective implementation of the CBET curriculum demands a lot of resources including adequate trainers whose numbers are in the right proportional with the number of students. Also, enough space in workshops and classrooms, adequate facilities such as laboratory equipment, books, computers, library and internet facilities that are balanced with the number of students for effective teaching and learning. It is also emphasised that resources are crucial for effective implementation of curriculum change and that poor conditions and limited resources can limit the performance of even the best trainers and students (Altinyelken, 2009).

Generally, from the above discussed factors that need to be taken into consideration during the implementation of the curriculum change, it seems that the change of any education process is a complex issue due to the fact that it may require "teachers and students to change their practices, beliefs, use new materials, and corresponding learning outcomes in the direction of some sought-after change" (Fullan, 2005). Therefore, managers must pay attention to any factor that will influence the change in a negative way so as to avoid ineffective implementation of the corresponding curriculum. In that light, literature supports that, there is a need to assess how the CBET curriculum is implemented to gain an understanding on its effectiveness. Thus, effective curriculum implementation can only occur in the context of all components and aspects viewed and implemented in

integrated ways.

METHODS

To study the implementation of CBET curriculum, a qualitative research approach was used basically through the use of a case study design. The use of case study design was due to the fact that, the researcher's aim was to explore and capture descriptive data from respondents' own written or spoken words and observable behaviour (Taylor and Bogdan, 2016). To achieve this, one needs a manageably small sample. The study took place in Arusha city which is located in the northern part of Tanzania. The selection of Arusha city to be an area for the study was due to the fact that, Arusha city has several technical colleges, which include one of the three biggest and oldest technical colleges in Tanzania.

The study involved only Science and Allied Technology (SAT) technical colleges, which include colleges that are offering courses in agriculture, livestock, engineering, information communication and technology, laboratory science and technology and others of the kind. The choice of SAT colleges was due to the fact that it is the area of the researcher's interest, specialisation and familiarity. Among the five SAT technical colleges in Arusha city, three were included in the study sample. The selection was based on ownership of the colleges (that is, whether government or privately owned) and the variety of courses that are related to SAT subject classifications.

Purposive sampling technique was employed to select the respondents for the study. In purposive sampling, the decision with regards to which elements, parameters, items or respondents' characteristics to be included or excluded in the study rests on the researcher's judgement and intuition (Adam and Kamuzora, 2008). Generally, the study involved 24 trainers selected from the three technical colleges involved in the study. The sample included the college principals, heads of departments or sections, as well as other trainers such as lecturers, instructors and technicians in each of the colleges. Data were collected through the use of in-depth interviews or open-ended questionnaires. Open-ended questionnaire was used with respondents who did not have enough time to take part in interview session; while in-depth interviews were used to collect information from respondents who had enough time and were willing to be tape-recorded. Each interview took about 35 to 40 min.

The data were analysed using the content analysis technique. Content analysis" is a research technique for making inferences by systematically and objectively identifying specified characteristics within a text" hence, summarises rather than reporting all details concerning a message set (Stone, 1966). The collected data were transcribed in the computer for easy analysis. After transcription, the researcher conceptualised the necessary variables of interests depending on the research questions.

The analysis involved formation of categories as it is understood that "the formation of categories in content analysis takes place in the context of competition between induction and deduction" (Bos and Tarnai, 1999). Thus, the first stage involved the use of deductive category construction method in which the researcher, in consideration of conceptual framework of the study, the research questions and the interview guide, formulated main categories and their definition. From the categories formulated, the data were coded. It was found that, categories formulated in this way were overlapping and were not exhaustive. It is argued that in deductive categories formulation, it is difficult to precisely ensure that the definitions of the categories to be used do not overlap and are exhaustive (Kuckartz, 2014). Hence, they must be checked, corrected and modified on the basis of the textual empirical data until all categories fit and are coded from the available data (Bos and Tarnai, 1999).

The second stage involved the use of inductive categories formation. Inductive category formation involves making or constructing categories based solely on the empirical data collected (Kuckartz, 2014). This method was used mainly in modifying the existing main categories and in formulating sub-categories for each main category. In this stage the researcher went through texts of each transcribed interview and questionnaire sequentially word-by-word and line-by-line by making consideration on how the participants formulated their statements in order to get clear understanding of the word, line and finally passage of the interview so as to create its relevant categories by paraphrasing, and finally generalising from the original empirical data.

In the last stage an independent person who was regarded as the second coder was involved in the categories formation to ensure objectivity of the categories formulated. It is argued that methodologically, the categories must be objectified by implementing one or more pre-test to determine the reliability and validity of the categories (Bos and Tarnai, 1999). The second coder employed the inductive category formation method to get the categories. This second coder was required to code or form categories of at least forty percent of the data collected. Interviews and questionnaires processed by this second coder were randomly selected to avoid bias. In this selection process, the transcribed interviews and questionnaires were assigned numbers. The coder was required to randomly pick five small pieces of numbered papers, which represented the numbers of interviews and questionnaires to be analysed.

In comparing the categories formed by the researcher and by the second coder inter-coder reliability was calculated to be 86.5% indicating that the categories were objective and valid. The comparison and reliability level allowed the researcher to establish computer coding scheme depending on the conceptualisation that was made from the information and the data collected. Finally, using the more recent MAXQDA Analytics Pro 12 version 12.3.0 programme for content analysis, data were finally analysed.

RESULTS

In this section, the results of the analysis of the trainers' responses are presented based on the research objectives and other emerging themes.

Trainers' awareness and understanding about CBET curriculum

In order to know the trainers' general understanding of the CBET curriculum, trainers were asked questions during the interview and in the questionnaire that focused on two major thematic areas: general understanding of the CBET curriculum in terms of meaning; and the characteristics of the CBET curriculum as presented below.

Expressed concepts as the meaning of CBET curriculum

In order to know the trainer's awareness and general understanding of the CBET curriculum, trainers were asked in both interview and questionnaire if they were aware that their institution used the CBET curriculum.

They were to say, 'yes or no'. The findings showed that majority (93% of the trainers) answered that they were aware. Thereafter, they were asked to explain how they understand the CBET curriculum and how it differs from the previous KBET curriculum.

In order to have a valid judgement of the responses given by the trainers about the general understanding of the CBET curriculum, the researcher established indicator words from the responses that would represent the meaning of the CBET curriculum. These indicator words were knowledge, skills, understanding, attitudes and competence. The findings are shown in Table 1.

The findings showed that, 45 % of all trainers expressed an understanding that the CBET curriculum is a curriculum used to train students so that they can acquire or develop competencies and skills. Examples of extracts from interviews and questionnaires are presented below (in brackets are pseudo names of respondents):

CBET system focuses on developing job-related skills to students and put emphasise to the practical means of training rather than theory. (TT12)

[...] the CBET system gives emphasis on training students to have skills on how to do things and in that light is more focused on practical rather than theory. (TT4)

On the other hand, it can be observed that, less than a quarter of all trainers expressed an understanding that CBET curriculum is for developing other aspects such as students' knowledge, understanding and attitudes.

CBET curriculum integrates knowledge, skills and attitudes or attributes. (Q7) I understand that the competence based programme is the programme which is trained to make sure that the trainee is going to acquire step by step the knowledge that a learner is supposed to acquire at a certain level, so learners are supposed to complete one part of the module content before moving from one level to another. (TT5)

Surprisingly, Table 1 also shows that, other trainers did not understand much about the CBET curriculum; as expressed in the excerpt below:

I know nothing about the differences between KBET and CBET but KBET is like people who just come from certain college directly to start teaching without having any training in how to teach because I just use knowledge in the teaching process. [...] CBET curriculum this is the curriculum which leads trainees to achieve the goals in education. (TT13)

In summary, trainers managed to name some aspects related to the meaning of the CBET curriculum but the extent to which each aspect was expressed is not sufficient enough to prove that trainers have adequate

Table 1. Aspects expressing Meaning of CBET curriculum.

Total participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
Indicator	No. of Participants responded and its Percentages											
Competence	2	3	42	2	1	50	1	2	50	5	6	45
Skills	3	3	50	1	2	50	1	1	33	5	6	45
Knowledge	1	2	25	0	0	0	0	1	17	1	3	16
No understanding	1	0	8	0	0	0	0	1	17	2	1	12
Understanding	1	0	8	0	0	0	0	1	17	1	1	8
Attitudes	1	0	8	0	0	0	0	0	0	1	0	8

Key: NQ: Number of questionnaire

NI: Number of interview

Table 2. Aspects expressed as characteristics of CBET curriculum.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
Indicator	No. of Participants responded and its Percentages											
Student centred	1	3	33	2	2	66	1	1	33	4	6	41
Flexible	3	1	33	1	0	17	1	0	17	5	1	25
Outcome based	1	2	25	1	0	17	1	0	17	3	2	20

Key: NQ: Number of questionnaire

NI: Number of interview

awareness and understanding on CBET curriculum.

Expressed concepts as characteristics of CBET curriculum

Some trainers expressed an understanding of the CBET curriculum based on characteristics. In order to have a fair judgement of the responses given by respondents, the researcher established indicator words from the empirical data collected through interview and questionnaire as well as from the theoretical framework. The indicator words were student centred, flexible and outcome-based. The findings are as shown in Table 2. From Table 2, more than one third of all trainers who participated in the study expressed their understanding about CBET curriculum by relating it to student-centeredness; less than one third of the trainers expressed their understanding about CBET curriculum by relating it to flexibility and outcome-based. Exemplary extracts from the data texts are:

The main difference between the CBET and KBET is that in CBET the trainees are the main player and in KBET the trainers are the key player. (TT10)

There is no big differences between CBET and KBET may be the only difference is in terms of training in which

in CBET the time for training is short only fourteen weeks but in KBET the time was longer; that is three years and then you do an exam but in terms of methods of teaching they are the same [...] In CBET assessment is done after a semester and in KBET was after three years but to me KBET is nice system compared to CBET. (Q8) [...] in CBET we need to get the output. We are supposed to train few things but to see the output [...] what is important here is what you know. If you have certain knowledge we must see the output instead of the grade. (TT3)

In summary, it can be seen that, trainers have little awareness and understanding about the characteristics of the CBET curriculum. This is due to the fact that, trainers managed to name only three out of the many characteristics of the CBET curriculum.

Trainers' perception about the CBET curriculum

During the interviews with the respondents (trainers) the researcher also managed to get the trainers' perceptions about the CBET curriculum as presented in Table 3. About one third of all trainers expressed positive perceptions about the CBET curriculum. The following are the excerpts from the data texts (interview

Table 3. Trainers' Perceptions towards the CBET curriculum.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
No. of Participants responded and its Percentages												
Positive perception	0	2	16	0	3	50	0	3	50	0	8	33
Negative perceptions	1	2	25	0	1	16	0	0	0	1	3	16
No perceptions	0	0	0	0	0	0	0	1	16	0	1	4

Key: NQ: Number of questionnaire
NI: Number of interview

transcriptions and Questionnaires):

Yeah, CBET is superior to the KBET because CBET makes our students more competent ...as you know our college started in 1999 so we have more than ten years so we get a lot of phone calls from various clients and they say that our students are good in practical compared to other institutions because we deal with what we call CBET and this concept we got from NACTE. (TT8)

On the other hand, other trainers (less than one third) expressed negative perception about CBET curriculum as indicated in Table 3. The following is an excerpt from the data texts:

[...] problem that we have here most of the trainers don't want to employ the CBET means of training and they still employ the traditional means of KBET. (TT1)

Also, from Table 3, it has been observed that, one trainer did not express either positive or negative perception towards the CBET curriculum. Generally, more trainers showed positive perception about CBET curriculum when judged by the percentages of the trainers as observed in Table 3.

Teaching methods used

In order to get a clear picture of the knowledge and skills that trainers have regarding teaching methods, the researcher asked two questions during the interview and in the questionnaire. The questions were about which teaching methods trainers use during teaching in the CBET curriculum and how they use them in the process of teaching. It has been observed that, the findings obtained are into two major categories as presented as follows.

Teaching methods used to teach theoretical modules

For the questions of which teaching methods trainers use

during the teaching and learning of theoretical modules, the findings from the questionnaire and interview are presented in Table 4.

From Table 4 above, it can be observed that, all trainers said that they use either less participatory and/or participatory teaching methods in the process of the teaching in the classrooms while they teach theoretical CBET modules or courses. But majority (more than half of the trainers) use lecture, which is a less participatory method, half of the respondents said they use questions and answers and less than half of the trainers attested to use discussion teaching methods in teaching theoretical CBET modules or courses. The following are examples of the responses given in relation to teaching methods used:

Yeah... we use lecture [...] sometimes group discussion and giving assignments to students for the areas that they have studied so that it can help them to succeed later on their course of study. (TT8)

I always involve students in participation methods like asking questions, class interaction and sometimes lecturing especially when I teach something new. (TT9)

Also, the findings from the Table 4 showed that, very few trainers have attested that, they use a variety of teaching methods. Surprisingly, one trainer showed that methods for teaching the modules are the ones stated in every module. This implies that this trainer only uses the stated method for the respective modules.

In CBET every module must have an indication on how the course should be taught as the methods needed to be used so it is stated clearly that it can be classroom discussion, case study, lecture methods, assignment based as he or she should issue some questions to the students and let them discuss and will be used as assignment. (TT11)

Furthermore, from Table 4, some trainers have expressed that, they sometime use other participatory teaching methods apart from question and answer, discussion and presentation to peer. The methods mentioned were such

Table 4.Teaching methods used to teach theoretical modules.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
No. and Percentages of Participants who responded												
Participatory teaching methods used												
Questions and answer	0	6	50	1	1	33	1	3	66	2	10	50
Discussion method	1	3	33	1	2	50	2	2	66	4	7	45
Presentation to peers	0	1	8	2	0	33	1	1	33	3	2	20
Tutorial method	0	1	8	2	0	33	0	0	0	2	1	8
Role play	1	0	8	0	0	0	1	0	16	2	0	8
Problem-solving	0	0	0	1	0	16	0	0	0	1	0	4
Case study	0	0	0	0	0	0	0	1	16	0	1	4
Field trip	0	0	0	0	0	0	0	1	16	0	1	4
Brainstorming	0	0	0	0	0	0	0	1	16	0	1	4
Less participatory teaching methods used												
Lecture	3	3	50	2	3	83	0	3	50	5	9	58

Key: NQ: Number of questionnaire
NI: Number of interview

as role play, tutorial methods, problem solving, case study, field trip and brainstorming as it is illustrated by the examples below:

Furthermore, trainers use field trip methods especially by visiting different areas that are using computers for the sake of learning on how the computer is used for understanding the lesson more. (TT12)

[...] for me it is much of two-way communication, I used to involve students in whatever I do and I sometimes even pose assignments in the class hours that is [...] I train students something then I give them a task to do and I can go through may be to several samples of students and see how they have done it that's how I do. (TT2)

In summary, it has been observed that, majority of trainers use questions and answers as a participatory teaching method and the lecture as a less participatory teaching method contrary to what has been emphasised in CBET curriculum that more participatory methods be used. Also few among the trainers are attesting to use other participatory teaching methods, though we do not know how often.

Teaching methods used to teach practical modules

On the other hand, on teaching practical modules, trainers mostly use two teaching methods as it is indicated in Table 5. In teaching practical CBET modules, trainers said that they use demonstration and practical method. The trainers explained that they always teach practical modules by beginning with demonstration before they instruct students to do the practicals. The trainers

elaborated that in demonstration, they instruct and show students how to do the respective practical activities, and then they allow the students to do by themselves as shown as follows:

For us, we have so many subjects with practicals. I usually practice it before so as I can know this practical can be done in two or one hour or half an hour; so I just practice it before; then when the students come it makes it easy to show them the concept I am supposed to train them, explain to them and then I am supposed to show them. We say that it is demonstration on what things are supposed to be done and after that the students can do that practical (TT4).

For the practical, first I start with the demonstration and after that, I explain some concepts using the blackboard and giving some demonstration it means giving some components which they don't know then after that they have to use this knowledge in doing the practical. (TT6)

The other approach is that, other trainers go beyond giving students practical only. They also prepare some questions and exercises that a student need to do after completing the practical work for the matter of gaining an understanding about that practical. As one respondent said:

... And if it is practical I have to prepare a lot of questions and exercises to assess them and know if they have understood the lesson. (TT7)

The last approach is that, other trainers explained that, they start by a theoretical part of the practical, in which the theory behind the practical is explained and

Table 5. Teaching methods used to teach practical modules.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
No. and Percentages of Participants who responded												
Demonstration	4	3	58	1	0	16	0	1	16	4	4	33
Practical	2	1	25	0	2	33	0	1	16	2	4	25

Key: NQ: Number of questionnaire
NI: Number of interview

thereafter, the demonstration follows and the final stage is the practical whereby students are supposed to perform. This is illustrated by the extract below:

For me I have three parts, the theory part, practical part and the questions. At the end after I have finished the practical I must ask the student questions in order to know if they have understood. In the practical part I must demonstrate and then I allow them to ask questions if they have and finally they will do the practical. And then I must make sure that if there is any question that will happen at the time they are performing the practical I must alert them so that they can listen and after the question, they proceed with the work. (TT7)

Looking from the percentages in Table 5, only a few trainers (not more than 33%) expressed using the required teaching methods, which are demonstration and practical, when teaching the practical modules. This can be interpreted to mean that, majority of trainers are not knowledgeable and skilled enough on what teaching methods are appropriate for teaching the practical CBET modules.

Assessment and evaluation methods used

In the aspect of the assessment and evaluation, trainers have to know how to choose relevant assessment methods for the CBET system. Trainers were asked two questions in the interview and questionnaire. The first question was about which assessment techniques they use in assessing students and the second question was how they use the assessment methods they have mentioned. The findings from the questionnaire and interview are shown in Table 6. As indicated in Table 6, the trainers use both formative and summative assessment of students. In formative assessment, the majority of the trainers mentioned assignments and classroom tests as their main means, while most of them mentioned end of semester written examinations as their main means of summative assessment. For example one of the respondents replied:

We actually use group or individual assignment in which

students are given a topic so that they can find information related to the topic. Again we use written tests and always it is two tests per semester that are always done as per planned college schedule and finally there is a final examination (end of semester examination) that is actually the same to all UCC centres (TT12).

Furthermore, as can be observed in Table 6, other trainers claimed to use observation in assessing students' understanding but the researcher found that it was not used appropriately. This was due to the fact that most of the trainers used the observation method without having any formal observation checklist. This made them more subjective in observing, which reduced the possibility to know if students have understood what they have been taught. Furthermore, it was observed that no observation data were documented for making judgement on students' performance. This makes observation to be regarded as a non-formal and un-useful way of assessing students' progress in a particular course of study.

No... I am not using the way of ticking but I am just passing through to their benches to see where they are failing and while explaining to them I try to know the problem and how they can do but not using any observation checklist (TT6).

Only one trainer explained explicitly how he used observation assessment as a formal method of assessing students' progress with the support of an observation checklist. This was done during the end of semester practical examination as summative assessment. He also admitted that he does not use observation checklists at all during formative assessment.

In practical performance, we have a form that directs us, for example, how a particular student has taken care of tools, safety precautions, how he or she has done the practical and we can arrange our exams to take almost three hours. After one hour, I am going to assess the students if they have taken care of the tools, they know how to keep the tools in proper ways and that we can see the students by observing and filling the forms (TT4).

Other trainers claimed that, they sometime use oral

Table 6. Assessment methods used.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
No. and Percentages of Participants who responded												
Formative assessment methods used												
Assignments	3	4	58	2	3	83	2	4	100	7	11	75
Classroom tests	3	4	58	2	3	83	0	4	66	5	11	66
Informal oral assessment	1	4	41	0	2	33	0	3	50	1	9	41
Informal observation	0	3	25	0	2	33	0	4	66	0	9	37
Practical Task	2	3	41	0	0	0	0	1	16	2	4	25
Summative assessment methods used												
End of semester examination	3	4	58	2	3	83	1	2	50	6	9	62
Practical tasks	2	2	33	1	0	16	0	0	0	3	2	20
Product assessment	0	2	16	1	0	16	0	1	16	1	3	16

Key: NQ: Number of questionnaire
NI: Number of interview

assessment but further interrogation revealed that they were not using it. Instead they confuse it with the question and answer method of teaching. They expressed to use oral questions during the process of teaching as a dialogue. This is exemplified in the statement below:

I use questions and answers method, ... while the class is going on I can be able to know if this is okay or not but as well I sometimes provide the class exercises at the end of the lesson to know if they are aware, also I can give them some practical tasks to perform depending on the nature of the subject (TT11).

In addition to that, it was expressed that trainers regarded oral assessment as an informal techniques of assessing students; hence, they use it in the process of teaching to know students' level of understanding. When they ask students questions and get responses from them, they judge their level of understanding. This is exemplified in the following statement:

I sometimes have oral assessment as well because I can assign student as an assignment but I will not mark it; what I do I will go back to class and ask each student to present areas I have given in the assignment and if I have questions relating to the areas that I assigned students to do I will ask them to see how much they were prepared and how much they are aware of the staff (TT2).

In summary, the results show that, trainers mainly use classroom tests and assignments as formative assessment and end of semester examinations as summative assessment. Formal observation with use of checklists, a potential for assessing practical performance, is not used at all in formative assessment. This can be interpreted to mean that the trainers have

limited knowledge and skills on assessment and evaluation methods relevant to the CBET curriculum.

Trainers' in-service Training about CBET curriculum

In this aspect, interviewed trainers and those who filled the questionnaires were asked if they got any training about the CBET curriculum; how such training was conducted; what the training was about; as well as if it was enough for them to implement the CBET curriculum in an effective and efficient manner. The findings are as presented in three categories below.

Training received on the aspects relevant to the CBET curriculum

The results of the findings from the questionnaire and interview showed that majority of the trainers (83%) got training about CBET curriculum:

Yes, we got training that was conducted by NACTE, they provide seminar on CBET specifically on the implementation of the CBET (TT8).

Yes, they get training and this is always conducted by NACTE and sometimes conducted by HOD'S in their departments and even others were conducted by international expertise like the one conducted by CANADIAN University experts and this was about the instructional skills (TT1).

The findings show that the training provided was in the areas shown in Table 7. From Table 7, the findings show that more than half of the trainers received training that was concerned with aspects related to implementation of CBET curriculum. They said that the training received

Table 7. Areas in which training were provided.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _q =5	N _i = 7	%	N _q =3	N _i = 3	%	N _q =2	N _i = 4	%	N _q = 10	N _i =14	%
No. and Percentages of Participants who responded												
Training area												
Curriculum implementation	2	5	58	1	3	66	1	3	66	4	11	62
Curriculum review	1	1	16	0	0	0	0	1	16	1	2	12
Curriculum development	1	0	8	1	0	16	1	0	16	3	0	12
Other areas	0	0	0	0	0	0	0	1	16	0	1	4

Key: NQ: Number of questionnaire
NI: Number of interview

was related to teaching methodology, assessment and evaluation as well as preparation of assessment plans. Examples of what they actually said are presented thus:

The training focused on how trainers need to deliver the training to students (implementation of the curriculum) as far as the CBET curriculum is concerned (TT10). Actually speaking of the current training we were trained on how to prepare the assessment plan. Every instructor for the course that he or she is teaching need to prepare the assessment plan before the semester starts and how to prepare the notes for the given content of the curriculum so we need to digest from the curriculum so as we can prepare our own notes (TT11).

Apart from that, the findings show that, less than quarter of the trainers, said that, other areas in which training was provided were in the aspects related to curriculum development and review processes to fit in the existing labour market demands as well as other areas related to subject matter knowledge. This was specifically for the matter of updating them to the new existing knowledge about the subject matter. This is exemplified by the statements given by respondents:

Again in March this year we had training on CBET curricular specifically on how to review the curriculum (TT12).

Exactly about the CBET? No! But as an instructor, we used to get different training sometimes we attend these seminars for us trainers to update ourselves. As I said, my area is about networking and the technology is always changing so we have to be updated to the new version of the technology by attending the seminars and training and that is what we used to do (TT14).

Generally, in terms of training, the findings indicate that, majority of the trainers received training about CBET curriculum.

On the other hand, a few trainers who participated in the study did not get any training about the CBET curriculum. Therefore, they just use their experience when teaching

students by using the CBET curriculum. They do not have knowledge about CBET as one of them said:

First of all what I see is that most of us we are not aware what is addressed in the CBET. We just use our general knowledge or experience, no any training given that can at least give us direction on different aspects because we came here after we have finished our study [...] we were looking for a job and then we got this job as instructors. We had no training because most of us are just coming from college (TT13).

Areas about CBET curriculum that need further training

The trainers were asked to express their views on whether the training provided was enough or not. The findings from both questionnaires and interviews revealed that, more than half of the trainers (58%) said that the training was not enough due to some challenges associated with its provision. Others, less than one third (25%) said that the training was enough. The main challenge was said to be that the duration of the training was not enough. This was true especially for those who were not trained as teachers or those who did not study education in any level of their schooling to acquire the necessary skills for implementing a curriculum. The other challenges were that, firstly, the training was not exhaustive as it only focused on some aspects of the CBET curriculum; and lastly it was not on continuous basis. Thus, there is still need for more training. For example, some respondents replied that:

I am not a teacher by profession so being trained for a week is not enough for me to have required skills (Q9).

The training was not enough to equip us with necessary knowledge and skills for implementing the CBET curriculum (Q8).

The training is not enough because about the CBET it is a long continuous process which requires that some staff be trained at least four or five times a year (TT3).

Table 8. Areas for further training.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
No. and Percentages of Participants who responded												
Training area												
Curriculum implementation	2	5	58	2	3	83	2	1	50	6	9	62
Curriculum review	1	1	16	3	0	50	0	0	0	4	1	20
Other areas	2	2	33	0	0	0	1	0	16	3	2	20
Curriculum development	1	0	8	2	0	33	0	0	0	3	0	12

Key: NQ: Number of questionnaire

NI: Number of interview

Due to the aforementioned challenges, trainers who said that the training was not enough and the one who did not get any training, showed concern on the need of further training in the areas presented in Table 8. From Table 8, majority of the trainers (more than half) suggested getting further training on the aspects related to implementation process which include teaching methods, assessment and evaluation as well as preparation of the assessment plans. An exemplary response is given thus:

Yes, in our college here we are three groups: there are staff members who are professional teachers, we have others who are professional engineers, and we have professional scientists. Those who passed through the education profession are aware of these things, but engineers and scientists have a lot of problems. They need at least a one year course in the implementation of the CBET and not one month. [...] we need more emphasis in the teaching methodology... (TT3).

Furthermore, from Table 8, it has been shown that, some other trainers (less than quarter) suggested training related to the curriculum review process, psychology courses as well as areas related to the subject knowledge so that they can update their knowledge base. This is because the knowledge tends to change as the science and technology change. The last concern was in the area related to the curriculum development process. They said that:

We need training on curriculum design and review (Q10). also how to review the curriculum to meet the requirement (TT3). ... and the second is the psychology on how to work with students because why do I say this, I think in our institution 80-90% of the trainers or teaching staff have no basic teaching knowledge they just acquired some knowledge such as engineering and most of them are engineers and we have not passed through teaching institutions or teachers colleges; so most of us have nothing about teaching. Therefore, we are supposed to be taught ... also psychology (TT5). We need training on curriculum design (Q4).

Model used to provide training about CBET curriculum

Furthermore, the findings revealed that the training was mostly conducted using the cascade model whereby a few trainers attend the training and came back to train others in their colleges and departments. This is exemplified in the responses below:

Yeah...there was only one training which was conducted in Dodoma and only one person - the principal - from our college participated there; and was concerning the CBET training, but after he came back he also trained us (TT8). Yes, they got training conducted by NACTE and sometimes even myself I used to conduct the training; for example one time I attended training and then after I came back I taught the other trainers what I have been taught in that seminar (TT10).

This cascade model is blamed on the basis that what the trained trainers bring back to their colleagues is of lower quality than the original training. The trainers reacted negatively to the cascade model since some of them after coming back did not conduct the training but only gave inadequate information to fellow trainers and nothing was done after that.

Yeah...he simply summarized the CBET system and said that we have to make students more competent in practical and that is the focus of the NACTE system by doing more practical and whatever, preparing the syllabus of it, making sure that a trainer knows the weaknesses of the students in practical and so on (TT8).

Availability of resources for implementing CBET curriculum

In this aspect, during the interview and in the questionnaire, the researcher asked questions based on two major thematic areas namely, availability of teaching staff as well as availability of teaching and learning materials.

Table 9. Availability of teaching staff.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
No. of Participants responded and its Percentages												
Enough	1	0	8	0	2	33	0	3	50	1	5	25
Not enough	4	7	92	3	1	67	2	1	50	9	9	75

Key: NQ: Number of questionnaire
NI: Number of interview

Table 10. Availability of teaching and learning materials.

No. of participants	Institution 1			Institution 2			Institution 3			Total		
	N _Q =5	N _I = 7	%	N _Q =3	N _I = 3	%	N _Q =2	N _I = 4	%	N _Q = 10	N _I =14	%
No. of Participants responded and its Percentages												
Enough	1	1	16	0	0	0	0	3	50	1	4	21
Not enough	4	6	84	3	3	100	2	1	50	9	10	79

Key: NQ: Number of questionnaire
NI: Number of interview

Availability of teaching staff

On this issue, there were two questions asked to trainers during the interview and in the questionnaires. The first question was if the number of trainers in the respective college was enough; and the second question was when trainers were inadequate, what did the college and trainers do to cope with or overcome the problem. The findings are as presented in Table 9.

Generally, from Table 9, majority (three quarters) of the trainers involved in the study said that the colleges had inadequate number of staff and hence trainers are overloaded with work. On the other hand, only one quarter of the trainers said that the number of teaching staff was enough. The following are examples of responses:

[...] as I see myself, trainers are not enough because you can find that one instructor has consecutive four up to five sessions per day, "in that sense how can I be effective?" Because I need to teach short courses, long courses the same person no time to prepare myself. Maybe to be effective at least two sessions per day so as I can prepare myself because nowadays we come here early in the morning at 8 am and go back home at 8 pm how can I prepare myself? This is a big burden (TT13).

Generally, the above findings showed that, technical colleges have inadequate teaching staffs hence most of the trainers are overwhelmed with workload.

Availability of teaching and learning materials

The trainers were asked questions during the interview

and in the questionnaire to say if the teaching and learning materials were adequately available in their workshops, laboratories and classrooms for effective implementation of CBET curriculum. The findings are as presented in Table 10. From Table 10, the findings from questionnaire and interview show that, majority of trainers (more than three quarters) said that, the teaching and learning materials were not adequately available, while the rest of the trainers said that materials were adequately available in their colleges. One of the trainers had this to say about inadequate materials:

Teaching and learning materials is a very difficult part in our training, especially for us who are dealing with practical activities; because even if we request for the training materials, we don't get them. (TT5)

In summary, the findings show that, technical colleges have inadequate teaching and learning facilities especially for practicals, which limit the effectiveness of the teaching and learning process.

Other challenges affecting the Implementation of the CBET curriculum

Furthermore, the findings revealed that, most of the trainers were not effectively implementing CBET curriculum due to additional challenges as shown in Table 11.

These data are supported by comments from the trainers as illustrated thus:

I think I tried to mention some of them, like some other

Table 11. Challenges affecting the Implementation of CBET curriculum.

Challenge	No. of participants responded	Percentages
The available teaching and learning equipment were outdated	7	29
Big number of students	7	29
Financial constraints	3	12
Teaching and learning materials were not provided on the right time	3	12
Inability of students to learn using learner-centred teaching methods	1	4
Large number of modules or courses	1	4
Trainers were not fluent in English language	1	4
Limited time per semester	1	4
Students poor educational background in science subjects	1	4
Some trainers were forced to teach some courses or modules which are not their field of study	1	4
Lack of some potential educational or teachers knowledge such as psychology	1	4

Key: NQ: Number of questionnaire
NI: Number of interview

devices are old and therefore we need new devices though we can still proceed teaching students with the old devices but we need latest devices as far as the technology change. (TT14).

Frankly speaking the materials are not enough especially in our workshops and this is due to the big number of the students ... (TT1).

[...] challenge is that sometimes we may need a certain amount of the materials and due to the shortage of funds we are sometimes required to reduce the amount; that is the problem that we sometimes get (TT7).

DISCUSSION

The study aimed at finding out the extent to which technical college trainers are aware and understand the CBET curriculum, assessing the extent to which college trainers have relevant knowledge and skills for implementing the CBET curriculum as well as finding out the extent to which technical colleges have adequate resources for implementing the competence-based education and training curriculum.

Starting with the understanding about the CBET curriculum, the way to make judgement was through the use of statements expressed by trainers as the meaning and characteristics of the CBET curriculum. The findings, as seen in Table 1, showed that only (45%) of the trainers expressed their understanding on the CBET curriculum by including aspects related to competence and skills while the majority of the trainers (55%) involved in the study did not do so. As indicated in Table 2, those 45% trainers named three aspects related to the meaning of the CBET curriculum, which were student centred, flexibility and outcome based. These findings show that the CBET curriculum as it was understood by trainers

took no account of important aspects. From the literature (Technical Committee Report on the Harmonisation of CBT in Ghana in Norton et al., cited in Anane, 2013; Brown cited in Dadi, 2014; Mjankwi, 2014), we remark that other important characteristics of CBET such as taking consideration of real-life or real work situations, learning to be self-paced, making consideration of critical thinking, reasoning, reflection as well as action and assessment to be an on-going process were not mentioned at all. Also, the trainers did not show a deep understanding that CBET puts emphasis on student centred approach to teaching. In fact, most of the trainers were not familiar with the characteristics of the constructivist approach and theory, which would help them partly interpret the CBET curriculum especially in relation to learner-centredness (Jonassen et al., cited in Pritchard and Woollard, 2010; Brook and Brooks as cited in Gecit, 2016; Basturk, 2016). This implies that, majority of the trainers understand the CBET curriculum differently from what is emphasised in it. This is an indicator that majority of the trainers have limited awareness and understanding on the meaning and aim of the CBET curriculum. These results agree with the findings by Rutayuga (2012), Kafyulilo et al. (2012), Dadi (2014) Kufaine and Chitera (2013) as well as Kitta and Tilya (2010).

In relation to trainer perceptions about the new innovated curriculum, we see in Table 3 that only one third (33%) of the trainers expressed positive perception about the CBET curriculum. Moreover, the findings revealed that, other trainers (16%) had negative perceptions about CBET curriculum while others (4%) did not show any perception about the curriculum. This might be due to the little awareness and understanding about CBET curriculum as it has been revealed in the findings above. These findings are in contrast with those of a

study done in Ethiopia by Dadi (2014), which showed that majority of both trainers and trainees had expressed positive perception about competence based TVET curriculum.

As for trainers' knowledge and skills on the implementation of the curriculum, the major focus was to gain in-depth understanding on how the trainers use teaching methods as well as assessment and evaluation methods during the implementation of the curriculum. On the aspects of the teaching methods used to teach theoretical modules, Table 4 shows that all trainers were attempting to use both less participatory as well as more participatory teaching methods in their classrooms. Participatory teaching methods that they use more were questions and answers as well as discussion methods while less participatory teaching method mostly used was the lecture. Comparing the percentages of participatory and less participatory teaching method used, it was revealed that, trainers attempted to use participatory teaching methods as recommended in CBET. Some of such methods were role play, tutorial methods, problem solving, case study, field trip and brainstorming. This was one indicator of effective trainers as was emphasised that, in teaching, no single method could be the best method and a good teacher or trainer need to involve a variety of teaching methods (foster, 2009). But, as observed in the study, the extent of using the participatory methods was not sufficient as the majority of the trainers mix up questions and answers with lecturing. The lecture method might not be effective enough in developing and making students master the required knowledge, skills as well as attitudes. During the teaching of practical modules, as shown in Table 5 shows, the trainers used demonstration and practical methods. When comparing the findings presented in Table 6 and the NACTE's suggested learner-centred facilitation methods, it can be judged that trainers have limited awareness, knowledge and skills about facilitation methods since majority of them rely on questions and answers among the long list of the teaching methods suggested by NACTE (NACTE, 2015). The findings of the current study support those of Rutayuga (2012) that majority of the trainers lack basic competences to develop and use appropriate learner-centred methods and Kufaine and Chitera (2013) who found out that some technical colleges were offering training using old teaching method other than CBET teaching methods.

On the case of the assessment and evaluation, the findings, as seen in Table 6, show that majority of the trainers use both formative and summative assessment when assessing students. Also, it has been shown that majority of the trainers (75%) said that they use assignments and (66%) use classroom tests as formative assessment. In addition, 62% of the trainers use end of semester written examination as summative assessment. In that regard, it can be observed that majority of the trainers use only three kinds of assessment methods

during the process of implementing the CBET curriculum. The few who said they use oral and observation assessment during practical sessions, also reported to use them only informally without any checklists. Only one trainer reported to use checklists during end of semester practical examination and not to practical assignment and classroom tests. This provides information that trainers had little knowledge on the assessment techniques to be use in CBET system. It is recommended in CBET to use "*Holistic Assessment Approach*", which checks a wider range of skills, knowledge, understanding and competencies combined together to successfully complete practical workplace tasks (Rutayuga and Kondo, 2006). The findings relate with Rutayuga' (2012) and those by Dadi (2014). They also complement those by Kitta and Tilya (2010) from their studies, which focused on secondary schools, which found that teachers lack competencies to develop and use appropriate learner-centred assessment methods; hence, focused on preparation for the examination or tests and not knowledge acquisition.

On the aspect of training about the CBET curriculum, the findings show that majority of the technical college trainers 83% involved in the study got training about CBET curriculum and CBET approach in general. Only 17% of the trainers involved in the study did not get any kind of training about the CBET curriculum and CBET in general. This implies that NACTE, the authority responsible for the technical colleges in Tanzania, has observed the potential of providing training to trainers on the new approach and curriculum. In that regard, the findings concur with those of Anane (2013) who reported that trainers in Technical and Vocational Education and Training (TVET) Institutions in Ghana were given initial training and follow up assistance on the CBET. In contrast, these findings seem to differ with those of Rutayuga (2012) who wrote that trainers in technical colleges "lack training and retraining before and during implementation of the new innovated curriculum".

It is shown in Table 7 that majority of the trainers (62%) said that the trainings that were provided to them about CBET curriculum were concerned with the implementation of the CBET curriculum. The aspects involved in the training were on raising awareness on the teaching methodology, preparation of assessment plan and how to assess and evaluate students. This would be necessary for the effective implementation of the CBET curriculum. In addition to that, from the Table 7, it can also be observed that some other trainers said that, they received training in other areas related to CBET curriculum development and reviews as well as areas concerned with upgrading their content knowledge and skills, though it seems the trainings were very minimal. This shows that, other aspects of the curriculum such as curriculum development and review were not given due emphasis during training.

The main weakness about the training is that, it was

provided through the cascade model in which a few went for central training and came back to train colleagues in their colleges. Because of this, majority of the trainers (58%) complained that the training was not enough to make them competent in implementing the CBET curriculum. They said that its negative effect was more serious to those who were not professional teachers and those who did not study education. Another weakness is that the trainings were not provided on continuous basis. Because of these weaknesses, the trainers said that they still need more training.

The findings of the study concur with the study of Dadi (2014) which revealed that though the in-service trainings were provided to TVET trainers in Ethiopia, still it is unlikely to support trainers in training competence based TVET curriculum properly. Connecting to the findings of the trainers' awareness and understanding, it could be noted that, due to the challenges mentioned above associated with the provision of the in-service training it might be the reason for the trainers' limited awareness and understanding about CBET curriculum. The above challenges on the provision of training led to the majority of the trainers (62%) to demand further training specifically in the implementation aspects like teaching methodology, assessment and evaluation and preparation of the assessment plans as it is indicated in Table 8. In that regard, it can be concluded that the trainings that were provided to trainers did not meet the required aim of equipping them with the necessary awareness, understanding, knowledge and skills for them to implement the CBET curriculum as intended.

These findings are similar to the study by Kufaine and Chitera (2013) which revealed that though Technical Entrepreneurial Vocational Education and Training Authority (TEVETA) as the governing authority that facilitate the provision of technical, entrepreneurial and vocational education and training in Malawi induct instructors into the CBET methodology, still some technical colleges were offering training using old curriculum and teaching method other than CBET.

On the aspects of the availability of the teaching staff, the findings in Table 9 showed that majority of the trainers 75% involved in the study, said that the colleges have inadequate number of staff and hence trainers were overloaded with work to the extent of being forced to teach some courses or modules which were not their field of study. The findings concur with the study of Anane (2013) in Ghana, which showed that colleges have inadequate number of trainers and that of Rutayuga (2012) which revealed CBET was challenged by many factors; the major one being the inadequacy of resources that includes human, physical and financial resources. Connecting these findings to the theory that guided the study as it gives more emphasis on students centred teaching approach; therefore it might be very difficult for the trainers to adhere to the principles addressed in the constructivist approach due to inadequacy of the teaching staff (Jonassen et al., cited in Pritchard and Woollard,

2010; Brook and Brooks as cited in Gecit, 2016; Basturk, 2016).

On aspects of availability of teaching and learning materials the findings as shown in Table 10 indicate that majority of trainers (79%) said that the teaching and learning materials were not adequately available while 21% of the trainers said that materials were adequately available in their colleges. These findings were similar with the findings by Rutayuga (2012) who wrote that, CBET faced a lot of challenges in which the "major one being meagre resources". The same has also been found by Tilya and Mafumiko (2010) though their study did not focus on technical colleges but focused on secondary schools competence based curriculum. Furthermore, the findings were in line with that of Kufaine and Chitera (2013) and Anane (2013) who reported that CBET was viewed as an expensive form of education to implement due to the fact that it needs a lot of materials for teaching and learning; hence, most of the colleges do not have enough training materials as required due to large intake of students. Moreover, the findings of this study were in line with the study by Dadi (2014) who found that most of the technical colleges in Ethiopia have insufficient learning materials and the available ones are not provided in time.

In general, the study found that there were challenges that affect the effective implementation of the CBET curriculum. The major challenges found by the study were inadequacy of the teaching staff, teaching and learning materials as well as inadequate training. Furthermore, the other identified challenges as presented in Table 11 included out-dated teaching and learning equipment, financial constraints, lack of some potential educational or teachers knowledge such as psychology, big numbers of students, teaching and learning materials in the colleges are not provided on the right time, inability of students to learn using learner-centred teaching methods, big number of modules or courses, trainers are not fluent in English language, limited time per semester, students' poor educational background, specifically in science subjects and some trainers are forced to teach some courses or modules which are not their field of study. These challenges are in line with those found by Rutayuga (2012) in which he found that, CBET was challenged by many factors the major one being financial, physical and human resources as well as outdated equipment and lastly most of trainers are not teachers by profession. This is similar to what was found by Anane (2013) that colleges have inadequate number of trainers and large numbers of trainees and that lead to difficulty in effective use of learner-centred CBET facilitation techniques. This implies that, CBET curriculum was not implemented as it is intended due to the numerous challenges revealed.

Conclusion

Thus, in the light of the findings presented and discussed

above, it can be concluded that, CBET was introduced without relevant preparation since: trainers in technical colleges have limited awareness and understanding about the CBET curriculum as well as little knowledge and skills on how to implement CBET curriculum. Also, colleges have inadequate resources for implementing the CBET curriculum. This includes inadequate number of teaching staff (trainers) such as instructors, lecturers and laboratory technicians as well as teaching and learning facilities. Lastly, the training provided to trainers about CBET curriculum did not meet the demands since the training sessions were too short, went through the cascade model and only focused on some aspects of the CBET curriculum. Furthermore, the training was not tailored to meet the demands of different participants and was not provided on continuous basis.

RECOMMENDATIONS

As the present study mainly focused on trainers' perspectives on the implementation of the CBET curriculum in SAT subject classification only, perhaps further studies should get students perspectives on implementation of the CBET curriculum and on how students' factors have impact on the implementation of CBET curriculum. Also another area could be on how trainers are involved in the CBET curriculum development and review process. Also, another study could focus on NACTE's support towards monitoring and evaluation of the CBET curriculum. Also, the authors argue for the need of large scale study to be conducted that would include all other subject area categories such as Health and Allied Sciences (HAS), Teachers Education and Learning Facilitation (TLF) and Business Management, Tourism and Planning (BTP) so as to get reliable data about the implementation of CBET curriculum. Observation and video study could be conducted that will provide data on how teaching practices are done in the classrooms, workshops and laboratories in all subject area classifications. Lastly, it is recommended to study with principals in identifying leadership challenges on the implementation of CBET curriculum.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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