

## Competency-Based Training – The case of Civil Engineering Department, Kumasi Technical University

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**ABSTRACT:** Undoubtedly, the Competency-Based Training (CBT) mode of learning in Technical and Vocational Education and Training (TVET) institutions is the current and brilliant method to the skill training and development of youth in developing worlds today. The CBT learning mode is concentrated on skills training rather than abstract training thus emphasizing hands-on practical knowledge acquisition through task-based project work assignments, laboratory works, field trips, internships, and practical assignments. Since the inception of the CBT learning mode in the Civil Engineering Department, the successes and failures of the system have not been evaluated. In this paper, the CBT mode of learning in the Civil Engineering Department of the Kumasi Technical University in Ghana practiced over the past eleven years is reviewed through learner interactions and interviews. The successes and failures of the delivery mode are enumerated and discussed. The paper concluded that the CBT mode of learning is a great way to impart practical skills to improve upon the employability of learners but recommends a modification to include some research component that will suit learners who may have research interests in addition to the practical know-how. This will encourage and challenge facilitators to research into new and emerging technologies that will make them better facilitators and learners.

**KEYWORDS:** CBT, TVET, Civil Engineering Department, Kumasi Technical University.

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### I. INTRODUCTION

Competency-Based Training (CBT) according to Albanese et al., (2008) is a form of training that focuses on achieving specified goals. It is a combination of one's skills and understanding in performing an assigned task. This model gives the industry more say in the training of students, which is a shift from the normal theoretical approach to training where the training programmes are determined by users/employers (Aboko, 2017). It is a system of training that gives credence to skills acquisition through practical training of industry-based problems and challenges. This is achieved through the development of core tasks and their associated project works. It is on this basis that Boahin and Hofman, (2012) asserted that the CBT training is demand-driven and expected outcomes are based on standards generated from industry.

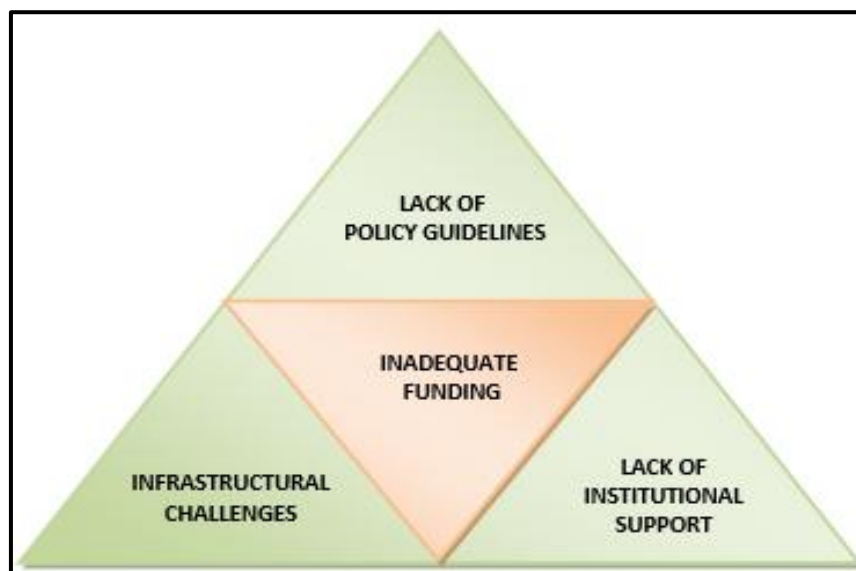
The CBT model of learning has been successfully introduced in many Polytechnics and Technical Universities across different countries and Ghana is no different. Its introduction has seen many successes as well as challenges. In the early sixties, there was the implementation of CBT training efforts in the United States of America (USA) (Brown, 1994; Hodge and Harris, 2012). After that Australia, United Kingdom, New Zealand, and Canada also embraced and implemented CBT formally in their educational system (Hodge, 2007; Gammie and Joyce, 2009; Parker and Walters, 2008; Hendry et. al. 2007; Willmott, 2006). Subsequently, other countries such as Britain, Singapore, and South Africa also successfully incorporated CBT in their educational curricular and training system for a more efficient and effective education (JICA, 2001).

Before the 2014 decree by the National Board for Professional and Technician Examination (NABPTEX) and the National Council of Technical Education (NCTE) to convert all training methods (especially Engineering and Applied Sciences) in the technical universities to the CBT model, the Civil Engineering Department (CED) of the Kumasi Technical University had already begun using that mode for about five years. The skepticism that surrounded the initial introduction of the system soon melted away as it began to yield some good results. With the introduction of the CBT model of training in the CED, graduates of the Department were being more sought after on the job market. This was as a result of the frequent oral

presentations and defenses organized that equipped them with the confidence to make presentations in public. This also enhanced their public speaking skills and overall improved performance on teamwork since most of their project works had to be executed in groups. With the CBT system in the CED, the main focus of the training was its profound emphasis on skills acquisition and mastery of competencies which gave the graduates of the Department an upper hand on the job market as evidenced in the positive results traits enumerated above.

The structure of the curriculum in the CBT system is such that very high premiums are placed over industry problems and needs, which are in turn used to establish core tasks that are used as the fundamentals of the project work prepared by course facilitators to be completed by the learners. Again, the assessment of the learners is based on the completion of a task, rather than the learner's ability to memorize and pass a strictly set written exam at the end of each course taken. The promotion criteria in the CBT Training mode is one where the system recognizes that different learners may attain different degrees of competency at different levels of the ladder and therefore does not accept a withdrawal of learners due to poor performance but rather tags the learner as "not yet competent" and allows the learner more time within which to gain competence.

Despite all the positive results and gains chalked by the CBT learning mode over the years, the system is not devoid of challenges. According to Acquah, et. al. (2017), the main challenges of the CBT implementation are 1. interpretation of learners' academic transcripts and grading system; 2. inadequate funding to the technical universities; 3. lack of institutional support; 4. infrastructural challenges; and 5. lack of proper documentation from regulatory institutions. The authors postulated the theory as shown in Figure 1 below.



**Figure 1: CBT Challenge Model** Source: Acquah et. al., 2017

From Figure 1 above, it can be seen that inadequate funding is the pivot of all challenges facing the CBT training mode in Technical Universities and these challenges have to do with the implementation, training methods, assessment, promotion, and possible certification. The other aspect of the challenge as pertains to the learner graduate and the facilitator has not yet been opened to scrutiny. The CBT training mode requires the learner to be equipped with the hands-on skill and practical know-how that will enable the learner or graduate to perform similar tasks when placed on the job thus putting the learner in a tight box that can only be opened by the practical or technical industry. Therefore, learners who after completion of their courses may want to divert into other areas in terms of occupation are usually found wanting.

In their paper, Acquah et. al. (2017), made no mention of the lack of scientific theoretical research in the structure of the CBT curriculum as delivered in the Civil Engineering Department though it poses a great challenge to many. This obvious lack of research component in the CBT training delivery mode as practiced by the Civil Engineering Department greatly affects the learner and the facilitator in varied ways such that graduates have had to begin the research process from scratch.

As it stands, there is no research component in training and curricular development. Learners are required to produce project reports that are assessed by facilitators at the end of each module together with a defense of the respective live project work. Learners therefore do not have the chance nor opportunity to go through the rigorous process of scientific research. The instructors are also handicapped because there is no help with data collection for their respective research projects since the learners are only required to produce project reports based on a live project they have practically been attached to work on.

As pertains to all public universities, the publication of researched papers is key to the promotion of facilitators from one grade to another, and Departments using the CBT mode of training are not exempt. It is therefore imperative for the inclusion of a research component in the Civil Engineering CBT training and learning mode. The paper, therefore, suggests and recommends an amendment to the current CBT curricular in the Civil Engineering Department to include a rigorous and scientific research process component for the benefit of both staff and learners in the Department and the University at large.

## II. METHODOLOGY

For this research, the main methodology was personal observation and interviews. This type of research is one that the researcher observes ongoing behavior and attitudes concerning the topic under study. In this case, the research output of facilitators in the Civil Engineering Department was observed over ten years. Learners who have graduated from the Department and have gone for further studies, as well as those who have enrolled in the four-year Bachelor of Technology program, were interviewed. Learners who have enrolled in other institutions within the country were interviewed as well as facilitators in the Department. The results of the interview have been analyzed and the findings presented in this paper.

## III. THE NEED FOR RESEARCH IN THE CBT CURRICULUM

The need for research as a major component in the CBT curriculum can be explained in two main ways. The need for the instructor or lecturer and the need for the learner or learner. It is a known fact that research studies are extremely important to help contribute knowledge to society and find or create good progress in areas that require additional or continued investigation. These are dealt with in the subsequent subsections.

### The Need for Research for the Instructor

The instructor or the lecturer benefits from research in several ways. When facilitators can conduct good research, their visibility on the local as well as international research platforms are enhanced and improved. Research also enhances their Training skills and keeps them abreast with emerging technologies. They are also able to fulfill their basic requirement of contributing to the body of knowledge/learning society by being in the position to publish or disseminate the results of their research outputs as it is said “publish or perish”. According to Wikipedia, publish or perish is a term coined to describe the pressure in academia to rapidly and continually publish academic work to sustain or further one’s career (Fanelli, 2010 and Neill, 2008).

Conducting good research by facilitators and being able to publish the findings also facilitates academic progression, promotion, and development in their respective institutions. Again, when the research and publication output of the facilitators are enhanced, it projects the image of the Department and the University and country at large making it more relevant to the society.

### The Need for Research for the Learner

One most important way research can be helpful to learners is that it gives them great exposure to previous knowledge and information that other people have already researched so that the wheel is not reinvented. Apart from the fact that researching the learner is in partial fulfillment of the basic degree from most universities, the ability to go through a proper scientific research process further equips and prepares the learners for higher academic excellence in their academic progression.

Some learners after having the opportunity to work closely with facilitators on their on-going research works enable shapes their thinking and mentalities and give them more options and opportunities after completion of their studies.

## IV. THE CIVIL ENGINEERING DEPARTMENT CBT CURRICULUM STRUCTURE

The CBT curriculum in the Civil Engineering Department is organized in such a way that there are two modules or blocks run per semester which is focused on the performance of a mini-project that is set to address a core task that is specified for the block or semester. The project work or core task is set to be as practical as possible. For example, for a semester that is focused on the design and supervises the construction of a simple road and drains, the learners are put into groups of five (5) and taken to the field where they are expected to pick field data and use the data to design the simple road and drains. After completion, the learners are expected to defend the project work in front of a panel of judges for scoring.

In the final year project work, the learners are put in working groups of five (5) and sent to industry to work on live project work. Live project work here means that, the projects can be worked on in real-time and with a defined deadline to provide a hands-on experience on any on-going work in a company of their choice.

This kind of live project can be likened to an internship or training because the learner can gain real work expertise before getting a full-time job.

This component in the CBT curricular is a great addition to the traditional mode of training as it offers the learners the practical know-how that places him/her an edge higher than his/her other counterparts who have not had the opportunity to gain that hands-on skill and experience.

That notwithstanding, there is no research component whereby the learner is required to go through the rigorous scientific research process. This involves a systematic process that focuses on being objective and gathering a multitude of information for analysis so that the researcher can conclude. The process involves the problem identification, background or literature search, collection of data, analyzing the data, and concluding. This knowledge obtained or gained from this process allows the learner to deepen their knowledge and help them to produce and develop scientific knowledge.

#### V. LEARNER INVOLVEMENT IN RESEARCH WORK

Learner involvement in research work be it their research or in collaboration with their supervisors or facilitators is an inspiring way to whip up interest in research in the upcoming generation. This creates an opportunity for collaborative learning which according to Dillenbourg (1999), involves a situation in which two or more people learn or attempt to learn something together. The extent of learner involvement in research work with facilitators and their perceptions of who does research varies by discipline as noted by Allin (2014).

Fielding (2001) identified four levels of learner involvement as a) learners as a data source b) learners as co-researchers c) learners as active responders and d) learners as researchers and went on to say that the last point is what every lecturer must strive for. Though learner involvement in research is an acceptable phenomenon in institutions of higher learning, it is imperative that the power relations that exist and the way it can potentially challenge both the traditional power balance and nature of higher education itself be properly looked at and harmonized to create an enabling environment for both the lecturer and the learner as acknowledged by Allin (2014).

#### VI. RESEARCH OUTPUT OF FACILITATORS IN THE CIVIL ENGINEERING DEPARTMENT (2008-2018)

The research output of facilitators in the Civil Engineering Department (CED) from 2008 to 2018 is displayed in Table 1 below. It can be seen from the table that within the last ten years, there has only been an average of less than one paper per facilitator.

**Table 1: Research Output of Facilitators in CED from 2008 to 2018**

Table 1	
<u>Year</u>	<u>Number of Publications/Yr</u>
2008	2
2009	0
2010	0
2011	0
2012	0
2013	14
2014	13
2015	14
2016	3
2017	0
2018	0
<b>Total</b>	<b>46</b>

Table 1 above shows the number of publications in the Civil Engineering Department from 2008 till 2018. Over the ten years, a total of 46 papers have been published by senior members of the Department. With a staff strength of eighteen (18), it means that every lecturer has approximately 2.5 papers to his credit within the ten-year period which comes to 0.25 paper per year per facilitator. This situation is worrying and must be looked at critically.

Notable in Table 1 is the fact that a total number of 41 publications representing 89% of all the publications in the Department were published between 2013 and 2015 alone. This can be explained by the fact that about five (5) of the facilitators in the Department were undertaking their PhDs while some others were in the process of completing their terminal degrees and therefore were publishing out of their project works and theses. After most of these five (5) facilitators were completed, it has become very difficult for the Department

to record more publications. For a Department with a total number eighteen (18) facilitators of which five (5) have been promoted to senior lecturer grade since 2014 and 2015, it is not encouraging even for the other members of the Department who because they have not had the chance to pursue their PhDs have not been able to publish. The lack of a research component in the CBT curricular is one of the causes of this sad publication picture faced by the Department though there is apathy on the part of some facilitators to publish.

#### VII. PROMOTION CRITERIA – KUMASI TECHNICAL UNIVERSITY

The promotion criteria for all facilitators in the Kumasi Technical University of which the Civil Engineering Department falls under is the same for all irrespective of whether the lecturer is in a CBT Training mode department or otherwise. The requirement is six (6) researched journal papers from lecturer to senior lecturer and ten (10) researched journal papers from senior lecturer to associate professor and another ten (10) researched journal papers from associate professor to full professor.

If a change in the promotion criteria is not advanced for facilitators in the CBT training mode departments, then there is the need to modify the existing CBT curriculum to include a research component whereby both the learner and the instructor benefits as in a symbiotic relationship. This paper does not seek a change in the promotion criteria for facilitators using the CBT mode of training but rather an inclusion of a research component in the curricular to create equal opportunity for all and also allow all facilitators to compete on equal levels both locally and internationally.

The research type could still be sourced from industry in that facilitators and learners can pick challenges that the industries currently face and use the scientific research process of data collection and analysis to come out with conclusions and recommendations that can be implemented by industries.

#### VIII. CONCLUSIONS AND RECOMMENDATIONS

The paper has established through the literature that Competency-Based Training (CBT) focuses on achieving specified goals through the completion of practically oriented tasks that are industry-specific to address the challenges and needs of the industry. It has also looked at the evolution of the CBT system of Training in the Civil Engineering Department of the Kumasi Technical University. The authors have looked at the challenges the facilitators and learners of the Department face due to a lack of research component in the present curriculum. The paper has also looked at the present promotion criteria in the University which looks mainly at the number and quality of research papers that one has published to be able to move from one rank to another while comparing with the publication output of facilitators of the Department.

The authors conclude that without an amendment to the present curricular which is geared towards only equipping learners with the hands-on practical know-how and leaving behind the scientific research aspect, the lecturer will not be encouraged to move into new technology research. Also, there will be no enthusiasm for facilitators to do further study or research work in their area if their only job is to teach learners to be practically oriented. This kind of situation kills their interest, makes Training boring and monotonous and they are also unable to publish as required of them for promotion and progression in the University.

The learners will also be placed in the practical box such that when an opportunity for further study in a research-oriented field is made available to him/her it becomes difficult to cope. The paper, therefore, recommends an immediate review of the CBT curriculum to include a research component to facilitate an efficient and effective CBT implementation profitable to both the lecturer and the learner and the University as a whole.

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