ST. JOHN'S UNIVERSITY OF TANZANIA

CONTRIBUTION OF COMPETENCE BASED CURRICULUM ON STUDENTS PERFORMANCE IN MATHEMATICS. THE CASE OF SELECTED SCHOOLS IN DODOMA MUNICIPALITY

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CERTIFICATION

I, the undersigned, certify that I have read and hereby recommend for acceptance by St. John's University of Tanzania a dissertation entitled Contribution of Competence Based Curriculum on Students Performance in Mathematics in Secondary Schools in Tanzania, in fulfillment of the requirements for the degree of Master of Arts in Education (M. A. ED) of St. John's University of Tanzania.

Dr. William, F.

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(Supervisor)

Date……

DECLARATION

I **Delvina Japhet** hereby declare that this dissertation is my own original work and it has not been presented and will not be presented to any other University for similar or other degree award.

Signature……..……

Date……

DEDICATION

This study is dedicated to my beloved father, Japhet Tarimo, for his love and strong support in my education. He always encouraged me to excel. I am proud of him.

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LIST OF ABBREVIATIONS

ACSEE	Advanced Certificate of Secondary Education Examination
CBC	Competence Based Curriculum
CSEE	Certificate of Secondary Education Examination
MoEC	Ministry of Education and Culture
MoEVT	Ministry of Education and Vocation Training
NECTA	National Examination Council of Tanzania
NGO	Non-Governmental Organization
TIE	Tanzania Institute of Education
T/L	Teaching and Learning

ABSTRACT

This study intended to investigate on contribution of competence based curriculum on students' performance in mathematics in secondary schools in Tanzania. The study objectives were to examine the strategies used in implementing CBC, to investigate stakeholders' perceptions on the strategies used in implementing CBC, to investigate inspector's perceptions on low performance in mathematics after the introduction of CBC and to find out the challenges that hinder implementation of CBC in mathematics.

The study employed Constructivism Theory. The study used qualitative research approach and descriptive cross-sectional survey design. It employed purposive, stratified and simple random sampling techniques whereby it uses 142 sample sizes. The study findings revealed that most of the teachers were aware of the strategies used to implement CBC although most of them did not practice it because of inadequate skills on how to implement it. Inadequate teaching and learning facilities, time and large number of students in classrooms were identified to be key factors which hindered the implementation of CBC in mathematics.

The study concludes that CBC strategies were not well implemented in secondary schools in Tanzania. The study suggests that the government should provide in- service training to mathematics teachers and supply enough teaching and learning materials so that competency based curriculum will be effective implemented in the classroom.

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 Introduction

This chapter presents the background to the problem, statement of the problem, research objectives, research questions, delimitation of the study, limitation of the study, significance of the study as well as ethical issues.

1.2 Background to the Problem

Provision of education in Tanzania has undergone several changes with the aim of improving its quality. One of the changes is the introduction of Competence-Based Curriculum (Mkonongwa, 2012). Traditionally a learner was considered an empty vessel to be filled with knowledge. In this context a teacher was considered a pivotal deliverer of knowledge (Woods, 2007).

Kafyulilo et al. (2012) found that teaching and assessment in most secondary schools have remained traditional. Traditional teacher-centered method dominates, where teachers lectured and wrote notes on the chalk board for students to copy and memorize later (Mosha, 2012). Teaching has focused mainly on enabling students to pass final examination which was used to select students for further education (Riyandari, 2005). Assessment practices on the other hand involved the use of traditional paper and pencil methods which assess factual knowledge (Woods, 2007).

The introduction of competency based curricula in Tanzania in 2005 leads to the teaching and learning process that focuses on competency development like doing experiments and assessment (World Bank, 2011). The purpose is to emphasize on the use of innovative teaching and assessment strategies which entails learner-centered and authentic assessment methods like finding out how much knowledge, skills and attitudes students have acquired in learning, and how well they can use the knowledge and skills for better life (Jallow, 2011).

Teachers are required to change from teaching for content coverage using transmission approaches to competence development using activity-based interactive approaches that enable learners develop knowledge, skills and attitude that can assist them encounter real life challenges (Mosha, 2012).

Competency Based Curriculum (CBC) has been described by Mrowicki (1986) as a component of essential skills, knowledge, attitudes and behaviours required for effective performance of a real-world task or activity. Thinkwise (2007) argues that CBC is a research-supported curriculum based on the primary goal of defining the critical behaviours needed for effective and superior individual and organizational performance. It focuses on observable and measurable behaviours which can be manifested through some underlying intents driven by a person's basic motivations, personality, attitude, values or self concept (Woods, 2007).

1.2.1 Requirements for CBC Implementation

Jallow (2011) argues that the aim of CBC is to develop in learners the ability to learn how to learn and do things accurately. Also, ability to be, to live and work with other people (Jallow, 2011). Sullivan (2005) suggests that selection of the competencies for the curriculum requires interaction and collaborative work between the subject matter experts, curriculum developers, the learners and members of the community.

This is to allow the choice of the right competencies that are needed by the learners to be successful in life during and after they leave the school. By so doing, employers and other community members are able to identify what they want for their children to be able to do. The subject matter experts are able to attain within the confined content and the teachers are able to teach so that the required competencies are attained.

A curriculum that is competency based therefore contains very specific outcome statements that describe the competencies to be attained. These outcome statements can also be thought of as learner goals and should be measurable. A student in a Competency-Based programme continues in the class until he/she is able to demonstrate a level of competency that shows mastery of subject matter (Mosha, 2012).

1.2.2 Challenges of CBC Implementation

Fotheringham and Harley (2000) observe that competency based curriculum was introduced in 2005 in Tanzanian secondary schools without formal

preparation and training of the educators. There was no significant change in the material resources base on assigning the curriculum implementation (Kafyulilo et al, 2012). Thus implies a short, or no time to train educators and develop materials to be used in teaching mathematics and sciences (Ottevanger & Hosea, 2010).

Osaki (2004) shows that lack of experienced teachers, poor infrastructural facilities and insufficient books in schools contribute to poor performance in mathematics (Osaki, 2004). Ngorosho (2011) argues that, students from rural areas perform poorly in mathematics because of home environment and unconducive social and physical environments. Lack of cooperation between school and home environment was the key challenge to teaching and learning mathematics in most of the schools in Tanzania and that lead to poor performance (De Fraja, 2010).

Laddunuri (2012) pointed out that for the past five years after introduction of CBC in Tanzania, the status of performance in mathematics was fluctuating. In some schools, especially ward secondary schools, majority of the students had shown poor performance in their examination results especially in mathematics (see table 1.1 below).

TABLE 3.1: PASS AND FAILURE RATES IN CSEE MATHEMATICS (2009-2014)

YEAR	2009	2010	2011	2012	2013	2014
% PASS	15.39	16.09	14.55	12.44	14.01	15.36
% FAIL	84.61	83.91	85.45	87.56	85.99	84.64

Source: The National Examination Council of Tanzania Records (2015)

Observation from table 1 shows that performance continued to decline even after the introduction of CBC.

Poor quality of instruction and poor performance of students in mathematics imply that the ability to produce large numbers of highly qualified students who are prepared to take responsibility in Science, Mathematics, Technology and Engineering using CBC is limited (World Bank, 2007). There have been complains by the public that students were performing poorly in science and worse in mathematics because of lack of competency-based materials and competent teachers (Osaki, 2004).

The Prime Minister, Honorable, Mizengo Pinda, acknowledged this fact in 25th April 2008 speech to the Members of Parliament by pointing out that there has been decrease in performance in science subjects and worse in mathematics due to lack of mathematics teachers. For instance, in 2003, performance of Ordinary Level Secondary Schools in Mathematics was 26.9%, Physics 56.85%, Chemistry 65.1% and Biology 57.9% (Wangeleja, 2004). This implies that implementation of CBC in classroom is a challenge as many schools lack T/L

facilities and competent teachers to enhance required competencies to the students.

Damian (2008) argues that since early 2000's when the government of Tanzania issued the directive of establishing ward secondary school in each ward the performance of these schools academically are poor especially in mathematics and sciences. The situation is similar even after the introduction of CBC. This is a result of insufficient competent teachers and facilities that lead to poor teaching and learning process (Osaki, 2004).

Meanwhile, Komba, Hizza and Jonathan (2013) pointed out a number of factors that influenced poor academic performance and the factors that hinder the use of CBC in ward secondary schools in Tanzania. Such factors include inadequate teachers who can implement CBC, unavailability of libraries, insufficient teaching and learning materials, changing in grading system, cheating in examination and poor cooperation between parents and teachers.

These less qualified teachers who have received limited professional education are likely to provide lower-quality education (Habineza, 2014). It was obvious and not surprising to find that poorly educated teachers produce poorly educated students (World Bank, 2007). Also Chonjo et al (1996) revealed that science and mathematics teaching was in a poor state with respect to books, laboratory supplies, good teachers, classroom presentation, teacher pupils' relation and professional development of teachers.

Despite the use of CBC in T/L, NECTA (2013) proves that there is a massive failure of students in national examinations. Claims by publics have been directed to the government for insufficient budget, poor governance, insufficient mathematics teachers, poor teaching and learning materials as the factors that contribute to the poor performance of students in mathematics (Sheridan & Samuelsson, 2003).

Woods (2008) contends that since 2006 when Competency Based Curriculum became operational in both primary and secondary schools, there have been serious financial and human commitments to retrain and support teachers, head teachers and other education professionals to develop necessary competence and confidence to teachers during T/L process to effectively handle CBC implementation.

1.2.3 Studies Done on CBC Implementation

Odili (2006) suggests that Competence Based Curriculum depends on effective use of new teaching and learning technologies for instruction that equip learners with more learning opportunities. Vuyisile, (2007) found that the introduction of competence based curriculum in South Africa helped the students develop adequate ideas and knowledge on how to make decisions and solve problems not only in a learning environment but also in daily life. According to Vuyisile (2007) a student who has learnt how to solve problems, makes decisions on various academic matters and plan better on how to do a better job.

Giddings and Berg (1992) found that the introduction of CBC in any education system would allow learners to interact with materials, their fellow learners, the teacher and community in a more effective way. This is because, as the learners become more active in their learning experiences, the role of the teacher becomes that of a facilitator or mediator (Bonwell & Eison, 2009)

Barret, (2007) attributes to the socio-cultural and systemic factors that force the majority of secondary school teachers to focus on preparing students for the examination. These factors include teachers being encouraged by parents to ensure their children pass final examination and the administrative practice of ranking schools according to graduates' performance in the leaving examinations.

1.3 Statement of the Problem

The emphasis of Competence Based Curriculum (CBC) implementation is on teaching students how to learn instead of teaching content. The role of the teacher is to facilitate learning. In this context, the approach is learner centered and constructivist. The teacher has to identify the competences required in a given lesson and build on learning activities to facilitate the development of those competences into the learners (Jallow, 2011).

However, a number of studies done in Tanzania (eg. Bennel and Mukyanuzi, 2005; Komba et al, 2013; Laddunuri, 2012, Kafyulilo et al, 2012; Mosha, 2012) have reported a serious shortage of well qualified teachers who are competent in guiding learners learn through competency development. These studies show

the challenges of teaching and learning facilities, inadequate teachers' knowledge and skills of implementing CBC and time to finish the syllabus.

To a large extent, teachers have continued teaching by using the traditional instructional approaches of content based (teacher centered). Students have also continued learning through memorization rather than creating and inventing new ideas through inquiry learning approaches. Despite the introduction of CBC still the performance of mathematics is fluctuating. Little has been done to examine whether CBC has any contribution to this performance. It was thus, the intent of this study to make an investigation on whether CBC is the ones that contribute to poor performance in mathematics subject or not.

1.4 Objectives of the Study

1.4.1 General Objective

The main objective of this study was to examine the contribution of competence based curriculum on students performance in mathematics in secondary schools in Tanzania given that since its establishment in 2005, performance in mathematics is still declining.

1.4.2 Specific Objectives

i) To examine the strategies used in implementing CBC and their contribution to secondary schools mathematics.

ii) To investigate stakeholders perceptions on the influence of the strategies used in implementing CBC to students performance in mathematics.

iii) To investigate inspectors perceptions on low performance in mathematics after the introduction of CBC.

iv) To find out the challenges that hinders implementation of CBC in mathematics.

1.5 Research Questions

i) What are the strategies used in implementing CBC and their contribution to secondary school mathematics?

ii) What are the stakeholders perception on the influence of the strategies used in implementing CBC to students performance in mathematics?

iii) What are the stakeholder's perceptions on low performance in mathematics after the introduction of CBC?

iv) What are the challenges that hinder implementation of CBC in mathematics?

1.6 Significance of the Study

The findings of this study would be helpful for the government and educational stakeholders to ensure that curriculum and assessment under CBC are implemented properly to improve performance of mathematics subject. Therefore, educators should develop appropriate instructional materials to support learning activities including textbooks, workbooks, charts, three-dimensional models, simulations, puzzles, games and many other items that could enhance proper implementation of CBC strategy during teaching and learning mathematics. Generally, this study will help the education stakeholders

to take into account the strengths and challenges teachers faces when implementing CBC in the classroom.

1.7 Delimitation of the Study

Since it was not easy to conduct the study throughout the country due to shortage of time and financial problems the study was conducted in Dodoma region. The study was conducted in selected six secondary schools in Dodoma municipality. It included form one, two, three and form four students studying in public secondary schools. It also included educational inspectors (mathematics specialists) and experienced mathematics teachers from the selected school.

In due course the study delimits the scope to the key competencies that were required for a teacher to apply in the classroom in order to improve the performance of students in mathematics subjects. Since competence based curriculum was very wide the study focused on three variables, namely resources (physical and human), teacher's knowledge and teaching/learning strategies.

1.8 Limitation of the Study

The researcher presumed that during collection of data, some obstacles hindered the process accordingly. These included; time limit, shortage of funds as well as administrative bureaucracy. In spite of such limitations, data were calmly collected from the few selected schools which ultimately simplified data analysis.

1.9 Definition of Key Terms

This section provided an insight into the understanding of the key terms used in the study. The researcher adopted the meaning of the terms as they were defined in the section.

1.9.1 Stakeholders

A stakeholder is a person, group or organization with a legitimate interest in a given situation, action or enterprise. Stakeholders can affect or be affected by the organizations actions, objectives and policies. In education, the term stakeholder typically refers to anyone who is invested in the welfare and success of a school and its students, including administrators, teachers, staff members, local business leaders and elected officials such as school board members, city councilors, and state representatives.

1.9.2 Competence Based Curriculum

Competency based curriculum has been described by Mrowicki (1986) as a component of essential skills, knowledge, attitudes, and behaviours required for effective performance of a real-world task or activity. Also, Thinkwise (2007) defines Competency Based Curriculum as a research-supported curriculum based on the primary goal of defining the critical behaviours needed for effective and superior individual and organizational performance. It focuses on observable and measurable behaviours which can be manifested through some underlying intents driven by a person's basic motivations, personality, attitude, values, or self concept (Kafyulilo *et al*, 2012).

1.9.3 Performance

The accomplishment of a given task measured against present known standards of accuracy, completeness, cost and speed (Bilali, 2008). Under this study performance is the measurable or observable student responses in cognitive, affective and psychomotor domains that are the results of students learning.

1.9.4 Content based curriculum

Content based curriculum judges the effectiveness of instruction by focusing on amount of content to be covered by learners. A teacher controls the teaching and learning process by feeding the content to learners as they remain passive (Mosha, 2012).

1.10 Organization of the Study

The study has been organized into five chapters. The first chapter provided the background of the study, statement of the problem; research objectives, research questions, scope and delimitation of the study, limitation of the study, significance of the study, definitions of key terms as well as the organization of the study. Chapter two is all about the reviewed literature whereby chapter three presents the research methodology and chapter four is about results and discussions of the research findings. The last chapter provides a summary of the study and conclusions as well as recommendations.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

2.1 Introduction

This chapter reviews the literature related to the contribution of competence based curriculum on student's performance in mathematics in secondary schools. The aim of reviewing the literature was to get an insight into the complexities of the problem by drawing empirical evidence from different parts of the world. The chapter is divided into different sections including theoretical framework, empirical literature review, conceptual framework and literature gap.

2.2 Theoretical Framework

The theoretical framework for this study follows constructivism theory of learning. The proponents of this theory are Vygotsky (1978), Piaget (1972) and Bruner (1960). Constructivist theorists view learning as an active process in which a student's constructs new concepts based on his/her past knowledge. The role of the teacher is to enable students to discover principles by themselves, where teachers act as facilitators during learning process (Bruner, 1960).

Constructivist theory explore on how teachers should enable students become creative and innovative by the application of new way of teaching and learning which is influenced by competence based curriculum because it focuses much on practical skills rather than theory. However, recent studies (eg. Wang, 2008; Sikoyo, 2010 & Jallow, 2011) regarding instructional practices indicate that,

school expect to be meaningfully involved in adapting existing teaching methods and creating new ones which can enable learners be knowledge creators and not knowledge recipients (Henderson & Dancy, 2008).

Vygostky (1978) views learning as socially constructed activity, where students learn what is necessary to enable them participate in their society activities. Vygotsky was mostly recognized for the Zone of Proximal Development concept. He believes that learners can utilize a social support system as a kind of tutoring process whereby they can realize the zone that exists between what one knows and what one needs to know.

The constructivist theory focuses much on what a child can do independently and when assisted by an adult or more competent peer (Bruner, 1960). As far as Competence Based Curriculum (CBC) is concerned, there is a need to put much emphasis on constructivist ideas in classrooms and other learning environments to enable students construct knowledge independently under minimum guidance of the teacher.

Vygotsky's theory does not mean that anything can be taught to any child. Only instruction and activities that fall within the zone promote development. Teachers can use information about both levels of Vygotsky's zone of proximal development in organizing classroom instruction that can provide practice in the zone of proximal development for individual children or groups of children (Vygostky, 1978). For example, cooperative learning activities is an element of

CBC that can be planned to help each student learn in either a group or as an individual.

According to Wood, Bruner and Ross (1976) Scaffolding is a tactic for helping the child in his or her zone of proximal development in which the adult provides directions and act at different levels to enable students learn. In scaffolding, the adult does not simplify the task, but the role of the students is simplified “through the graduated intervention of the teacher” (Greenfield, 1984, p. 119).

The application of competence based curriculum which integrates teaching into practice can be seen in a secondary school laboratory science class, where a teacher provides scaffolding by first giving students detailed guides to carry out an experiment. Then giving them a brief outlines that they might use to structure the experiments and finally set up experiments entirely on their own.

Furthermore, constructivist teachers encourage students to constantly assess how the activity is helping them gain understanding of coming to the conclusions on their own instead of being told. Piaget (1972) argues that a student does not passively take in knowledge, but actively constructs it on the basis of his/her prior knowledge and experiences. Thus, Piaget’s theory of constructivism must challenge the student by making them effective critical thinkers.

This gives students ever-broadening tools to keep on learning (Luke, 1999), with a well-planned classroom environment. This means that the learning environment should provide the students with opportunities to test and try out their new conceptual understanding in various problem solving situations.

Therefore, Mathematics can help students to develop thinking in many ways including reasoning, understanding and creativity.

Bruner (1960) was influenced by Piaget (1972) ideas about cognitive development in children. Bruner introduced the ideas of readiness for learning and spiral curriculum. He believed that any subject could be taught at any stage of development in a way that fits the child's cognitive abilities. Spiral curriculum is the idea of revisiting basic ideas over and over, building upon them to the level of full understanding and mastery (Bruner, 1960).

Bruner believed that intuitive and analytical thinking should both be encouraged and rewarded. He believed that the intuitive skills were under-emphasized and he reflected on the ability of experts in every field to make easy understanding of concept and skills from one level to another (Bruner, 1960). Training that affects student-centered teaching in competence based curriculum cannot come in one-day workshops. A systematic and long term development that allows practice and reflection on that practice is required for proper implementation of CBC in enhancing teaching and learning mathematics in all secondary schools.

The constructivist's view of learning can be pointed towards a number of different teaching practices. The role of teachers is very important within the constructivism learning theory. Therefore, the theory will fit to the study because it might enable effective interaction between a learner and the teacher. This can be done by integrating theory into practical as far as competence based curriculum is concerned.

The theory has been used by other researchers such as Jallow (2011) who reveals that, applying constructivist theory in learning environment allows students learning needs to be met, it provides relevant learning opportunities, engages learners in learning tasks, and creates a safe place to make mistake and construct new meaning.

2.3 Empirical Literature Review

The quality of education is directly related to the quality of instructions. Although learner-centered approach means learners are the centre of instruction, the teacher is instrumental for better instruction that can develop learners' competencies.

2.3.1 Strategies Employed Towards Implementation of CBC

A descriptive survey research was done in Nigeria by Odili (2006) on the impact of science teachers' motivation on science students' academic performance in Senior Secondary Schools. The study used 510 science teachers (male and female) taken under stratified sampling and were given questionnaires. The data collected from the study were analyzed using descriptive analysis, Multiple Regression analysis and Pearson Product Moment Correlation. All the hypotheses were tested at 5 % level of significance.

The study revealed that there was a significant relationship between regular payment of science teachers' allowance and academic performance of science students (Odili, 2006). Also, there was significant relationship between regular teachers' participation in seminars/ workshops and academic performance of

science students. Therefore, the adequate science allowance should be regularly paid to the science teachers to enhance their excellent performance (Katabaro & Mbele, 2003).

A study done in Ohio's State (U.S) by Haney, Czerniak and Lumpe (2004) on the factors influencing teachers' intentions to implement the four strands (inquiry, knowledge, conditions and applications) in Competency Based Science Model whereby 800 teachers were randomly selected and stratified by grade level.

The data obtained using survey research indicated that, the attitude toward the behavior construct held the greatest influence of Ohio teachers' intent to implement all four strands of the science model; several salient beliefs for each of the three constructs significantly contribute to the constructs; and significant differences exist between various teacher populations for both intent and the three constructs (Haney *et al*, 2004).

In Germany, a project known as "Chemie im Kontext" (ChiK) funded by the German Federal Ministry of Education and the participating federal states aimed at the improvement of chemistry teaching at secondary school. Based on a framework that was derived from theories and empirical data on the teaching and learning of science, science education researchers and teachers worked together to transform this framework into teaching and learning practice (Dasman, 2011).

However, data showed that the learning communities have indeed inspired and supported the teachers to change their teaching towards a more context-based and student-oriented teaching (Dasman, 2011).

A re-synthesis of the research dealing with student performance in new science curricula was conducted in America using the refined statistical procedures proposed by Hedges and Olkin (1985). The results of the re-synthesis generally supported the conclusions drawn in the earlier meta-analysis by Shymansky, Kyle and Alport (1983). That, the new science curricula of the 60's and 70's were more effective in enhancing student performance than traditional textbook-based programs of the time (Ngorosho, 2011).

2.3.2 Teachers Perceptions towards Strategies Used in the Implementation of CBC

A survey was done in Rwanda by Habineza (2014) on Students Teachings' Difficulties in Implementing Learner-Centered Approaches in Rwanda Secondary Schools whereby 19 student's teachers were given questionnaire to fill in which thirteen situations were surveyed using Likert-scale questionnaire. The data collected from questionnaire were analyzed using descriptive statistics and content analysis.

Findings indicated that the difficulties faced by the student teachers could originate from learners (eg. Lack of motivation, lack of interests, lack of text books and low understanding of students) and again from students teachers preparedness for the implementation of learner-centered approaches the

following difficulties were found: lack of teaching aids, lack of time to finish the programme and lack of pre-prepared mathematical problems (Sikoyo, 2010). Habineza recommended that student teachers should be trained and assisted on how to handle such difficulties by experienced mathematics teachers (Habineza, 2014).

A study done in Nigeria by Kamoru, Uche and Umar (2009) on Total Professional Development for Mathematics Teachers in Nigeria which included a total sample of 1000 teachers and educators who were selected randomly. The study revealed that, there was a need for complete review of the current mathematics teacher education curriculum for the total professional development of mathematics teachers. The following were suggested to be included in the review: Content for developing the competence, teaching and learning methods and competence based assessment.

Wambugu and Keraro (2011), in their study titled Improving the learning of science in secondary schools in Kenya using TESSA science OERS: Current methods of teaching: Prospects and Challenges conducted in Kenya pointed out that TESSA OERs (Teacher Education in Sub-Saharan Africa) have potentials to enhance teachers' pedagogical skills and provide learners with an opportunity to effectively and meaningfully learn science. Therefore, teachers collaboratively developed learning materials based on active learning approaches to enhance learning of science in secondary schools.

A study done in Morogoro by Kafyulilo et al. (2012) on the implementation of competency based teaching approaches in Tanzania involved 78 pre-service teachers from Morogoro teachers' college in which questionnaires were administered to all 78 and 46 among them participated in a structured interview. Results revealed that pre-service teachers perceived their understanding and ability to implement competency based teaching approaches to be high, but during interviews it was revealed that they had difficulties in explaining some competency based concepts.

Thus, it was concluded that, competency based teaching approaches were not well implemented in schools in Tanzania and more efforts were needed in the process of development of tutors' and principals' understanding of competency based teaching approaches (Kafyulilo *et al*, 2012).

2.3.3 Challenges in Implementing Competence Based Curriculum

In a study conducted by Mosha (2012) which involved officials from MoEVT, TIE, NECTA, Kisarawe, Kinondoni, Moshi Municipal and Moshi Rural districts as well as teachers revealed that curriculum has been changed from content-based to competency-based although there are mismatches between the design and its implementation. Most of the books did not convey the competence ethos of the curriculum.

The implementation of the competency-based curriculum in the classroom was difficult as many schools lacked space, facilities and equipment while teachers received little or no trainings on the new curriculum (Kitta, 2004). It was

recommended that, teachers should be equipped with basic competencies to develop and use appropriate learner-centered methods (Kafyulilo et al, 2012).

According to Sabia (2005), assessment of competencies is time-consuming and labour intensive. Moreover developing and using valid and reliable assessment is crucial, but difficult. Henderson and Dancy (2008) found out there were various problems faced by Moroccan educators during implementation of competency based curriculum. These include the appropriateness and variety of materials used, expectations for student achievement and challenges of motivating learners.

Osaki (2004) argues that, classroom management, teachers' and students' readiness as well as the assessment are the challenges faced by teachers in implementing competence based curriculum during teaching and learning process. In Indonesia a study done by Riyandari (2005) on Challenges in Implementing Competency-based English Language Teaching at University Level revealed that, competency-based approach was new for Indonesian teacher and students, many teachers did not really understand the concept of competency-based teaching.

While the materials were intended to be a competency-based, the way teachers delivered the materials was conventional. There were limited materials for competency-based curriculum especially for mathematics (Wang, 2008). With regard to evaluation, teacher's ability to be objective towards the students' individualized goals needed to be improved. Individualization as one of the

characteristics of competency-based curriculum was difficult to apply because culturally Indonesian students tended to be not very confident when they worked alone. They preferred to work together with friends (Riyandari, 2005).

Haney et al (2004) argues that the school inspector's report (2002/2003) has indicated that lecture method prevailed in classroom instruction by an average of 68% at all levels. It implies that students learnt through memorizing taught concept, copying material in notebooks and were heavily tested through factual questions making the subject very boring to them. As a result, majority of children from a very early stage of learning disliked mathematics even though in real life they could use ideas in a variety of ways.

A descriptive survey on challenges facing technical institute graduates in practical skills acquisition in the Upper East Region of Ghana done in Ghana by Dasman (2011) using a sample of 434 obtained through simple random sampling and purposive sampling. The study revealed that inadequate supply of instructional materials, large class sizes, inadequate training facilities, weak linkages with local industries for hands-on-experience for both instructors and trainees lead to ineffective and inefficient training of students. The emphasis was on passing final examinations.

A study done by Osaki (1999) in Tanzania on Science Education in Secondary schools (SESS) found that pupils depended mainly on the notes given by teachers instead of relevant textbooks. Teachers also, gave hardly any questions that made students refer to text books or other reference books from

library. Most of the time, science was taught as rigid formulated facts, rather than knowledge related to nature and its behavior. Osaki argued that science teachers were lacking some skills, such as observations, generation and testing of hypotheses through analysis of data and writing reports of observations and experiments. Thus student had only superficial knowledge rather than the specific concept.

Sikoyo (2010) conducted the study titled contextual challenges of implementing learner centered pedagogy. The study adopted a qualitative interpretative design and data were collected through classroom observation and interview. The study comprised of 16 science teachers in the fifth and sixth grade. The study reported observations on the teaching of the curriculum in practice and sited these in the economic and social context of the school system and broader society in Uganda.

The study found that although teachers understood and recognized the benefits of active learner engagement in pedagogic process, they were unable to implement the problem-solving approach in the manner prescribed (Bonwell & Eison, 2009). Limitations cited included time constraints, inadequate learner participation in instructional activities owing to large class sizes and learners' low proficiency in English, pressure to complete the centrally mandated, overcrowded curricula as well as inadequate instructional materials, particularly science equipment and materials (Sikoyo, 2010).

The evidence from this study suggested a need for education researchers in developing countries including Uganda to focus on helping teachers develop strategies for teaching large classes as learner-centered pedagogies have a bleak future in the region.

Yuen (2010) researched on the topic titled “The Use of Constructivist Teaching Practices by Four New Secondary School Science Teachers”. Survey and questionnaire were employed in the study. It was revealed that experienced teachers who were recognized as effective constructivist teachers performed much better than new teachers in most of the sub-categories of constructivist approach. The new teachers outperformed the experienced teachers in some categories. They suggested that future educators should be taught the theory of constructivist and how to use it for effective teaching-learning process (Vygostsky, 1968).

2.3.4 Challenges of Learning Materials and their Influence to Students Performance

A study conducted by Mringi (2012) on the status of curriculum for A-level secondary schools showed that the majority of ex-Form Six students lack many crucial competences including proficiency in spoken and written English, entrepreneurial skills, creativity, self confidence, patriotism, and ICT mastery and application.

A survey was done in Kenya by Kindiki (2009) using sample of 15 schools with 15 head teachers, 70 teachers and 65 governors represented by 5 members

from each school using purposive, stratified and simple random sampling. Data collected using interviews, questionnaires and documents review revealed that, training of the members of Boards of Governors was directly related to the implementation of the curriculum.

The Board of Governors supported schools to acquire physical resources and enhanced curriculum development. The study recommended that schools should strive to provide pre-requisite training to the members of board of governors and more involvement of it in the daily running of the schools (Mosha, 2012).

2.3.5 Challenges of Science Facilities in Developing Competence in Students

The study done by Giddings and Berg (1992) to compare students' performance who participated in laboratory lessons with students who had never participated showed that laboratory-trained students performed better in experimental techniques and using instruments than non-participatory students.

Since science and mathematics focuses on developing competences in students through development of understanding of concepts and skills then, a well-equipped science laboratory with chemicals and apparatus must be there in schools in order to enable students learn by doing. For that case, where there is an under-resourced laboratory, improvising is inevitable to enable students develop competences in science through interaction with resources (Gidding, 1992).

According to Osaki (2004) science teaching cannot be reduced to imparting knowledge and facts to students. Also, it cannot be imparting a new philosophy to children having the traditional philosophy and culture using conventional transmissive teaching methods, which focus on teachers knowing all the content and preaching or telling learners the truth (Osaki, 2004).

It has to be evolving and nurturing approach to scientific inquiry relevant for African learners. Such an approach should enable students to re-construct the new philosophy of science by doing and discovering how it works and developing a repertoire that includes interactive and transformative pedagogical techniques (Osaki, 2004).

2.3.6 Currently Designed Materials which Aim at Improving Science and Mathematics in Tanzania

Tilya (2003) developed teacher support material for use of Microcomputer-based Laboratory (MBL) in activity-based Physics teaching in Tanzania. Finding from the study reveals that in-service intervention could play an effective role in improving science education if it is geared towards professional needs and teachers are supported with appropriate exemplary materials (Tilya, 2003).

The study found out that it is important for teachers to be involved in designing of materials for improvement of science education in Tanzania. Kitta (2004) in his study on enhancing mathematics teachers' pedagogical content knowledge and skills, developed materials for teachers' collaboration teaching to enhance

mathematics. Results from the study showed positive impacts of the approach on teachers and students.

2.4 Synthesis of Key Issues and Knowledge Gap in the Reviewed Literature

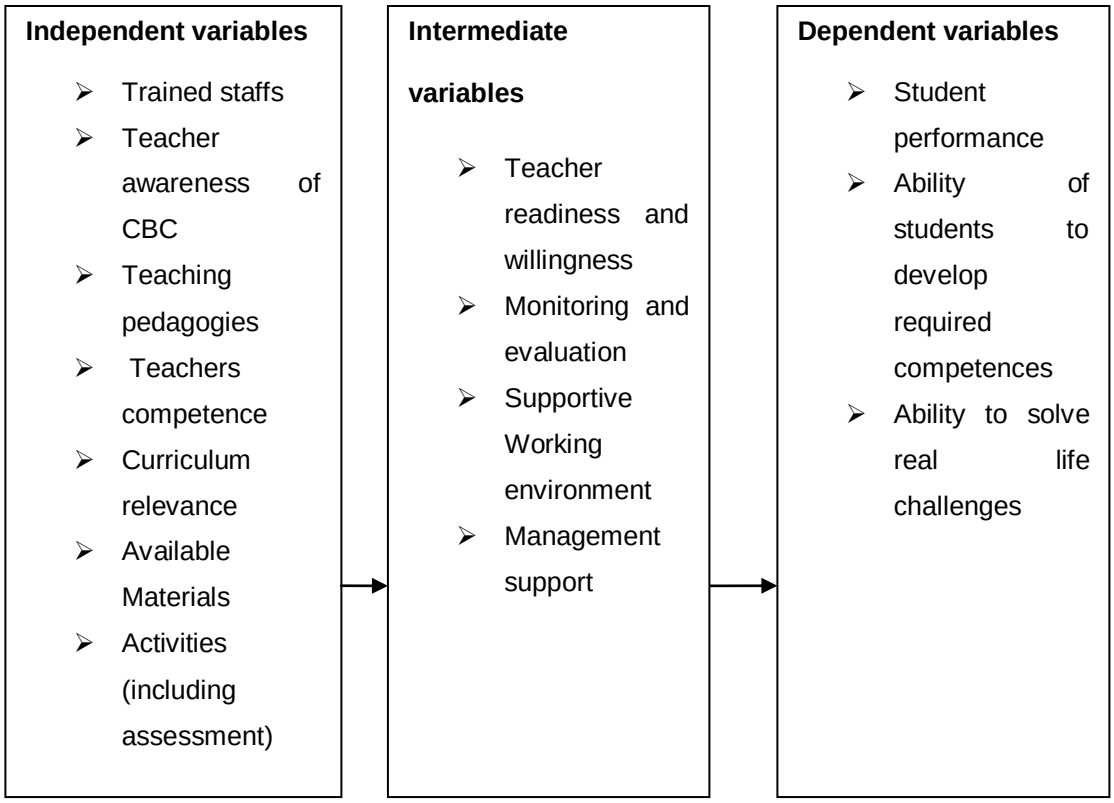
The reviews of different literatures shows that, various studies have been done in Tanzania on the competence based curriculum implementation strategies and challenge that hinder it during implementation**.** For example, Tanzanian researchers such as (Tillya, 2003, Osaki 2004, Kitta 2004, Mosha 2012, Kafyulilo et al, 2012, Komba et al, 2013 and Hizza and Jonathani, 2013) focus on different aspects regarding CBC implementation strategies which result to poor performance of students in mathematics.

Despite the introduction of CBC, still the performance of mathematics is low. Little has been done to examine CBC implementation strategy and their contribution to student's performance in mathematics given that there is decline in performance even after its introduction in 2005. It was thus, the intent of this study to make an investigation on whether the strategies used in implementation of CBC are the ones that contributes to poor performance in mathematics subject or not. This gave an excellent opportunity for this study to be done in Dodoma Municipality under the requirements of the education reforms and improvement of performance of students in mathematics which result to quality product.

2.5 Conceptual Framework

The figure below gives a framework illustrating how variables in the study were conceptualized and related:

FIGURE 2.1: CONCEPTUAL FRAMEWORK



Source: Adapted from Oso (2008)

Independent Variable

An independent variable is the presumed cause in an experimental study. From the above scheme of the conceptual framework, trained staffs, teacher's awareness of CBC, teaching pedagogies, teachers' competence, curriculum relevance and materials were assumed to have an effect on the ability of students to develop required competences, ability to solve real life challenges

and performance of students in mathematics at secondary schools in Tanzania. For instance, a study done by Katabaro and Mbelle (2003) revealed that, performance is determined by school characteristics than individual students character (school characteristics involves sufficient teaching and learning resources, trained staffs, teachers competences, teaching strategies, libraries and laboratory).

Intermediate Variable

These are variables which do not have direct relationship with the outcome variable. The change in the intermediate variable determines the value of the independent variable. In this study teacher's readiness and willingness, monitoring and evaluation, supportive working environment of students in class and management are termed as intermediate variable because they have no direct relationship with the performance of students in mathematics.

Dependent Variable

The presumed effect in an experimental study. It is expected to change whenever the independent variable is altered. It is believed that student's performance, ability of students to develop required competences and ability to solve real life challenges has been influenced by trained staffs, teachers' competences, teaching strategies and, teaching and learning materials.

This model was purposefully chosen to guide this study because it describes all variables needed by institution such as school to fully perform its objectives. The

model shows how best schools can come up with best results for students if all variables mentioned in the model are readily available.

2.6 The Chapter Summary

Chapter two started with the introduction, then followed by empirical evidence from the learning theory of constructivism on how incorporates learning process wherein the pupils gains their own conclusions through the creative aid of the teacher as a facilitator. The chapter also reviewed literature from different sources that is, empirical literature review and conceptual frame work as well as knowledge gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the methodology used in the study. It describes the study approach, research design, area of the study, study population, sampling size and sampling technique, trustworthiness of the data, instrument of data collection and data analysis plan as well as research ethics.

3.2 Research Approach

Kothari (2004) argues that qualitative research is concerned with subjective assessment of attitudes, opinions and behavior. Qualitative research is an exciting and a highly rewarding activity as it engages the interaction between the researcher and the participant to get the information about the problem under investigation (Ezzy, 2002). This approach was guided by objectives of the study which requires an in depth description of the phenomenon.

Qualitative research approach was used to gather the data regarding investigation on the perceptions and opinion of teachers and educational inspectors on the influence of strategies used in implementing CBC to student's performance in mathematics, examine strategies used in implementing CBC and their contribution to students learning mathematics. Also, investigation of stakeholder's perception on low performance in mathematics after introduction of CBC and finding out the challenges that hinder the implementation of CBC in mathematics.

3.3 Research design

Research design is the plan that guides the researcher in the processes of collecting, analyzing and interpreting the observations. It stipulates different procedures for data collection, organizing and analyzing them (Mkonongwa, 2012). The study used descriptive cross-sectional survey design which based on three variables which are resources (physical and human), teacher's knowledge and teaching/learning strategies. It was used in the study because it guided the collection of information regarding views, attitudes and other characteristics of students, teachers and educational inspector regarding contribution of CBC on students' performance in mathematics.

In this regards, the study aimed to develop an understanding of the competency based curriculum from students, educational inspectors and teachers' points of view. The descriptive cross-sectional survey design involves descriptions and explanations of issues concerned with the implementation of CBC in mathematics. The design was used to seek information through questionnaires which were filled by students and in-depth interviews which were administered to mathematics educational inspectors and teachers in the selected schools. This design was selected to guide the study because it utilizes a smaller sample for in-depth analysis.

3.4 Area of the Study

The study was conducted in Dodoma municipal, Dodoma region. Dodoma is a region which is growing very fast in terms of social services like hospitals, infrastructures and schools. Dodoma Municipality is characterized by semi-arid climate with relatively warm temperatures throughout the year. Main activities of the residents are commerce, farming, civil service employment and livestock keeping (Bidya, 2007).

Dodoma region has a total of 209 secondary schools, 5 under Central government, 177 community secondary schools, 23 private schools and 4 seminary schools. Also Dodoma region apart from being an academic zone center has experienced unconducive academic performance in mathematics with reference to NECTA form four results of 2010-2014 (Regional Education officer's office, 2015). These was caused by many factors like low teacher-students ratio, overcrowded classroom, lack of teaching and learning materials, negative attitude of students towards mathematics and lack of competence to foster the required competence to the learners.

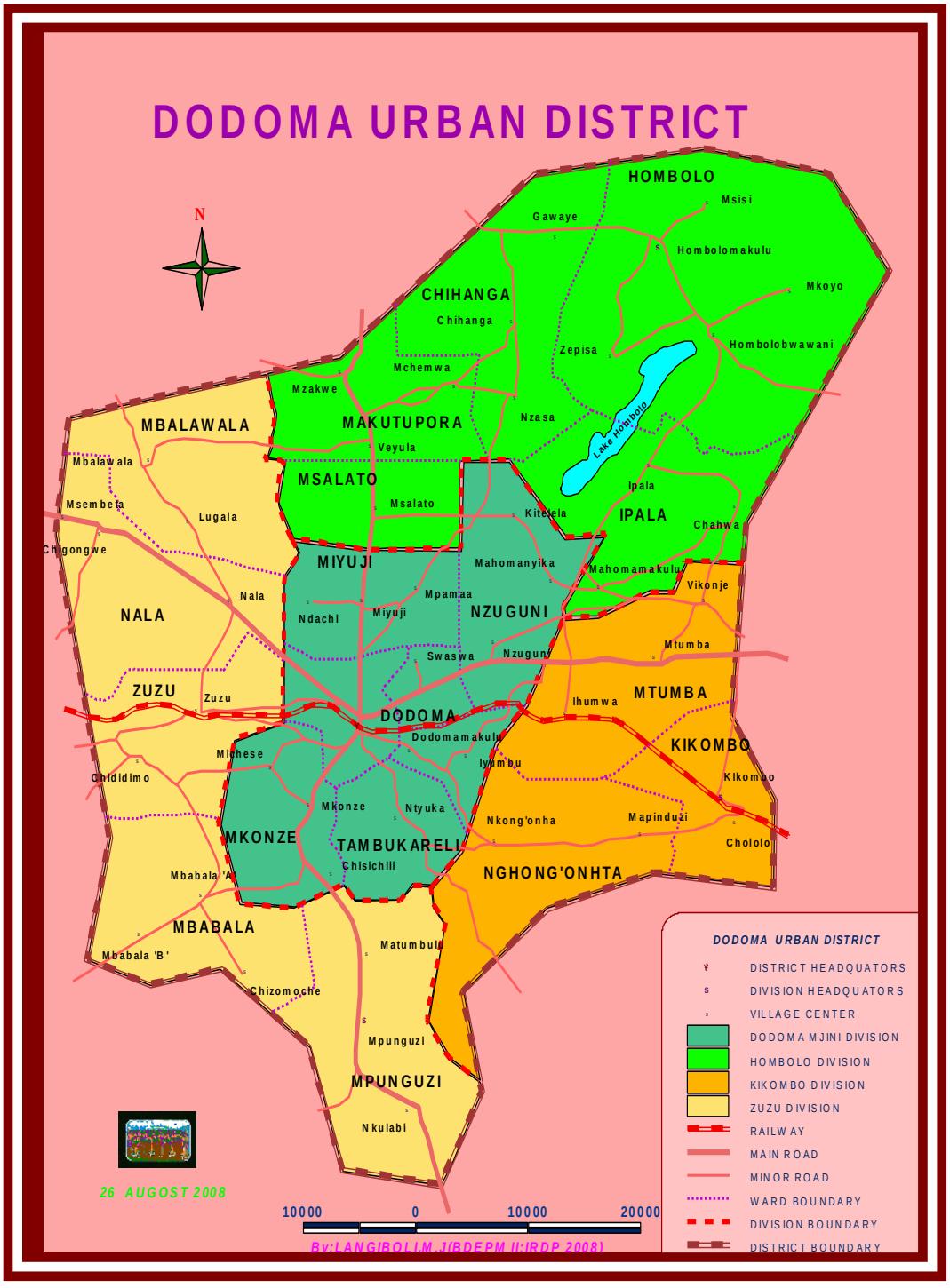
Dodoma Municipality covers an area of 2,669 square kilometers of which 625 square kilometers is urbanized (Bidya, 2007). The study was specifically conducted in urban division where the selected schools were allocated. The municipality of Dodoma is subdivided in 4 divisions which in turn are divided into 30 wards and 42 villages as shown in the table below.

TABLE 3.1: THE MUNICIPALITY OF DODOMA WITH ITS DIVISIONS

Division no.	No. of wards	No. of villages
Urban (Mjini) Division	**17**	**7**
Hombolo Division	**5**	**16**
Kikombo Division	**3**	**7**
Zuzu Division	**5**	**12**
Total	**30**	**42**

(Source: Bidya, 2007)

FIGURE 3.1: MAP OF DODOMA URBAN DISTRICT TO SHOW STUDY AREA



Source: DMC Profile (2008)

3.5 Study Population

According to Msabila and Nalaila (2013) research population refers to an entire group of persons or elements that have at least one common thing. It also refers to the largest group from which the sample was taken. Dodoma municipality contains both government schools and private schools. The study involved government secondary schools only.

The government (community) secondary schools have uniform kind of education and also they were doing the same all over the country. That means they were implementing equally the Education and Training Policy and also CBC. The study also involved students and mathematics teachers from the selected government secondary schools and mathematics educational inspectors. The total numbers of population used were approximately equal to (2486) two thousand four hundred and eighty six. The sample drawn from the approximated population were (142) one hundred and forty two.

3.6 Sample, Sample size and Sampling techniques

A sample is defined as a group of people, objects, or items that are taken from a larger population for measurement (Kothari, 2009). The group of respondents that was used in this study includes mathematics educational inspectors, mathematics teachers and students from six public secondary schools which are located in Dodoma Municipality. This study employed three types of sampling techniques namely purposive sampling, stratified sampling and simple random sampling.

Purposive sampling refers to a non-probability sampling in which decisions concerning individuals to be included in the sample are taken by the researcher, based upon a variety of criteria, which may include specialist knowledge of the research issue or capacity and willingness to participate in the research (Kothari, 2009). Simple random sampling refers to probability sampling where each and every item in the population has an equal chance of inclusion in the sample and each one of the possible samples, in case of finite universe, has the same probability of being selected (Kothari, 2009).

Stratified sampling is a type of probability sampling which involves dividing the population into homogenous subgroups and then taking a simple random sample in each subgroup (Kombo & Tromp, 2006). All these techniques were used in order to have mixed sampling techniques and to overcome bias in a sample selection which could affect the data and results of the study. In addition to that the purpose of using this sampling aims to reduce doubt about why certain case is selected for study.

3.6.1 Schools

Six government secondary schools were selected among 182 schools. These schools were purposively selected based on their advancement in terms of years since their introduction in order to get rich information on why the performance is dropping while the CBC implementation requires availability of teaching and learning facilities, and competent teachers to guide learners into the required competency.

The reason for choosing six schools was that the researcher had limited time to conduct the study therefore; it was believed that comprehensive study could be done using few schools so as to get representative data which could be used to answer the research objectives. The selected government schools were Dodoma High School, Msalato High School, Lukundo Secondary School, Kikuyu Secondary School, Kisasa Secondary School and Miyuji Secondary School.

3.6.2 Teachers

Teachers were part of sample because they were in a position to implement CBC strategies which bring about the effects on the performance of students in mathematics. Under purposive sampling technique 18 mathematics teachers (three from each school) were purposively selected to be included in the study. It was found that each school which was selected to be included in the study was having at least three mathematics teachers.

The information collected from the teachers were: their perceptions and opinion on the influence of strategies used in implementing CBC to student's performance in mathematics; strategies used in implementing CBC, their contribution to students learning mathematics and challenges that hinder implementation of CBC in mathematics.

3.6.3 Students

The students who were involved in this study were from form one, two, three and four. These students were part of the sample because they were affected by

the problem. 120 students (20 from each school) were selected under simple random sampling technique.

Also, from the selected classes (Form One to form Four) stratification was used to get gender representative in a sample. Then, from group of girl's random sampling was used to get 10 girls likewise to the group of boys. The reason for taking 20 students from each school was that the school has many students therefore taking small sample from that group would provide a researcher with rich information.

These students they provided information on how teachers were teaching, strategies used by their teachers during teaching and learning mathematics, challenges they face in learning mathematics and how they participate on the lesson. The table 3.1 below shows the schools and the number of participants per each school basing on gender.

TABLE 4.2: GENDER DISTRIBUTION PER SECONDARY SCHOOL

School name	Number of participants								
	Form I		Form II		Form III		Form IV		Total
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	
A	-	2	-	3	-	6	-	9	**20**
B	1	1	3	2	3	2	5	3	**20**
C	2	1	2	2	3	3	4	3	**20**
D	1	2	2	2	3	2	4	4	**20**
E	1	1	2	2	3	3	5	3	**20**
F	1	1	2	2	3	3	4	4	**20**
Total	**6**	**8**	**11**	**13**	**15**	**19**	**22**	**26**	**120**

3.6.4 Educational Inspectors

In this study, purposive sampling was used to select 4 educational inspectors (mathematics specialist). The secondary educational inspectors are quality control personnel of education. They have more information on how classroom practices have been proceeding as far as competence based curriculum implementation is concerned.

Educational inspectors are responsible for facilitating the implementation of different educational plans, programs and policies for educational development in Dodoma municipality. They were selected because of their responsibilities on educational assessment, evaluation and monitoring of all secondary schools.

They were interviewed on how they assess mathematics teachers if they implement competence based curriculum and how they view mathematics performance in general.

TABLE 3.3: A SUMMARY OF THE RESPONDENTS

Category	No. of Respondents	Sampling techniques
Students	120	Simple random Sampling
Teachers	18	Purposive Sampling
Education Inspector	04	Purposive Sampling
Total	**142**	

Source: Field report (2015).

3.7 Instruments for Data Collection

In this study, primary qualitative data were collected by the use of interviews and questionnaires while secondary data were found from the documentary reviews. The use of the tools was guided by the nature of the data collected and the study questions.

3.7.1 Interview

Interview is the two way systematic conversation between an investigator and an informant, initiated for obtaining information relevant to a specific study. Interview can gather information that cannot be obtained through observation, or they can be used to verify the observation (Ary et al, 2002).

Semi-structured interview uses an interview schedule to keep some control of the interview and allows some flexibility in terms of the interviewee's responses.

It was employed in this study whereby it enabled the interviewees to enter some new ideas and produce rich data. The context of interview was highly secured so as to protect and provide freedom to the interviewees. The information's provided by the interviewees were kept privacy. This interview was applied to four educational inspector and 18 mathematics teachers from the selected schools.

A written list of questions to be covered during the interview was used but the order and formulation of the questions varied from one informant to another. When the researcher wanted to investigate certain themes further, the guide contained clear instructions regarding the main questions and themes that could be probed further. Such interview with a schedule useful because they provide for a relatively systematic collection of data and ensure important data is not forgotten.

This study employed semi-structured interview because the interviewer was flexible to omit or add to some of the questions depending on the situation and the flow of the conversation. Consideration was given to the informants' daily routine so that ample time was allowed for them to attend the sessions. The identified informants were notified about one week before the sessions and a reminder followed a day prior to the sessions**.**

The information was obtained regarding the perceptions and opinion of teachers and educational inspectors on the influence of strategies used in implementing CBC to student's performance in mathematics, strategies used in implementing

CBC and their contribution to students learning mathematics, views of educational inspectors on low performance in mathematics after introduction of CBC and the challenges that hinder implementation of CBC in mathematics.

3.7.2 Questionnaire

Questionnaire refers to an instrument which consists of questions and statements in order to collect data directly from the respondents (Bless & Higson-Smith, 1995). The questionnaire was an extremely important instrument in collecting data because this method gathers data over a large sample, it saves time and confidentiality is maintained. This study employed semi-structured questionnaire containing both close and open ended questions to avoid bias. In this case, students were given questionnaires to fill. They were responding to both closed and open ended question regarding their views in mathematics, challenges they face during learning math's and strategies used by their teachers during implementation of CBC.

3.7.3 Documentary Review

Documents refer to the materials which are in written form like journal, diaries and magazines to mention just a few (Hutchinson, 1990). Oka and Shaw (2000) argues that such documents can provide the researcher with useful information about the study participants and the issues under investigation.

The study intended to investigate the contribution of competence based curriculum on student's performance in mathematics. In this study documents such as lesson plans, and scheme of works were reviewed. These were

reviewed in order to see the kind of activities, assessment procedures and, teachers and students role in teaching and learning mathematics.

This method was used to support the data that were collected through interview and questionnaire. Data collected from mathematics teachers and students regarding CBC implementation strategies and student's performance were compared with the record of trends of performance of the school in national examination and internal examinations (Annual examinations results) before and after introduction of competence based curriculum.

3.8 Trustworthiness of the data

Validity determines whether the research truly found what was intended to be found or how truthful the research results are (Golafshani, 2003). The validity shows whether the instrument was reflecting a true story or at least something approximately true. Therefore by constructing well the data collection instruments and collecting detailed data during questionnaire and flexibility of interview method; all these help to ensure maximum validity. Moreover, data was recorded accurately, thick description, the study used several quotations from participants as well as descriptions to make the reader see exactly the basis upon which the researcher's conclusions were made and the use of pilot study.

Questionnaire (open ended and closed ended) and semi-structured interview questions were assessed through pilot study in order to check for their content validity including readability and language clarity so as to avoid ambiguity during

interview sessions. The researcher, during Pilot study, quoted some explanations from the informants to ensure appropriateness of the study findings during filed implementation of the questionnaire.

Meanwhile, reliability is a phenomenon used for testing or evaluating the research. According to Enon (1995) defines reliability as the manner research procedures or techniques used are consistent. The researcher should make sure that the instrument used give out consistent results across time, space, similar instrument, irrespective of being used by another researcher. This made research phenomenon consistent and stable. To ensure reliability in this study the researcher carefully reported the methodology which was used in data collection and interpreted the findings carefully.

Therefore, the researcher conducted pilot study at Viwandani Secondary School which was not among the sampled schools. Fifteen respondents from Viwandani Secondary School were involved to test the study instruments. The items that were not understood by the respondents were modified to avoid misconceptions during data collection.

3.9 Data Analysis

Data analysis is the systematic process of working with data, organizing and breaking them into manageable units, synthesizing them, searching for patterns, discovering what is important and what is to be learned and deciding what to tell others (Bodgan & Biklen, 1992).

The data which were obtained from semi structured interview were subjected to thematic analysis whereby some quotations were made, and documentary review data were subjected into content analysis. These analysis were done by coding them with brief verbal description, categorized and identified their relationship, also the data was modified basing on the experience.

Also data from the questionnaires were screened, coded and analyzed using statistical package for social science (SPSS) software so as to get powerful and easy ways to extract meaningful information from data. The results were presented in percentages, tables and charts.

TABLE 3.4: A SUMMARY OF DATA COLLECTION PROCESS AND ANALYSIS PLAN

S/N	Data collection methods	Respondents	Type of data to be collected	Data analysis procedure
1	Open and Closed-ended Questionnaire	Students	Students' views in mathematics, challenges faced by them during learning math and strategies used by their teacher in the implementation of CBC.	SPSS Analysis
2	Semi-structured interview	Mathematics teachers and Educational inspectors (mathematics specialist)	1. Strategies used in implementation of CBC 2. Perception on the influence of strategies used in the implementation of CBC to student's performance in mathematics. 3. Perception on low performance in mathematics after the introduction of CBC. 4. Challenges that hinder implementation of CBC in mathematics	Thematic Analysis
3	Documentary review.	Public document; Scheme of work and lesson plan	To find out if CBC implementation contribute to students academic performance in mathematics.	Content Analysis

3.10 Ethical Issues

The consideration of ethical issue was vital important aspect in any research work. This helped a researcher to make sure that all rights were preserved. Again it reminded a researcher on his/her responsibility to acknowledge all sources used, keeping participant and authority informed, maintaining privacy and confidentiality, and reporting correctly.

All these were done by seeking permission from educational officers, heads of schools and other authorized leaders from Municipal in order to ensure smooth conduct of the study in the respective area. These were clearly facilitated by the clearance letter obtained from the Directorate of Research, Consultancy and Postgraduate Studies. Again, the researcher avoided plagiarism and maintain confidentiality by allocating numbers to the respondents rather than names and careful store the data.

Also, privacy was maintained so as to make sure that no one could access information during interview than the researcher and respondents. Respondents' time table was highly respected in order to avoid interruption of their daily routine and they were free to withdraw from the study at any stage they could feel uncomfortable.

3.11 Dissemination of results findings

Research findings were presented in report form and the report was submitted to St. John's University of Tanzania. The University is responsible for keeping and disseminating the findings.

3.12 Chapter Summary

This chapter explained the research design and data collection techniques that were used to gather information with regard to this study. The study has used questionnaire and semi-structured interviews. These tools enabled to provide answers for specific questions that focuses on contribution of competence

based curriculum on student's performance in mathematics in secondary schools in Dodoma Municipality.

CHAPTER FOUR

PRESENTANTION AND DISCUSSION OF THE RESEARCH FINDINGS

4.1 Introduction

This chapter presents, analyzes and discusses the findings and observations of the study on the contribution of competence based curriculum on student's performance in mathematics in secondary schools. The data were gathered from six secondary schools whereby education inspectors (Mathematics specialists) and mathematics teachers were interviewed and students were given questionnaires to fill in.

The data were collected through semi-structured interview, questionnaires and documentary review. The research questions were used as a guide in data collection and were developed from specific objectives. Again, research questions were used in the presentation of the study findings and discussion.

4.2 Respondents' Characteristics

The demographic characteristic of mathematics teachers, educational inspectors (mathematics specialist) and students were presented by sex and educational level. The study involved 142 respondents. As for sex, it was observed that, the majority of the respondents involved in the study were male totaled 73 (51%) while female constituted 69(49%).

The education level of respondents illustrated as follows: Table 4.1 shows that majority of the respondents 120 (85%) were secondary level, 15 (11%) of the informants with degrees, 4 (3%) with diplomas and 3 (2%) with masters.

Education level of teachers has been shown through previous studies to be associated with teacher effectiveness, especially for those who had passed through in-service training and professional development in respective field.

Komba and Nkumbi (2008) assert that there were no predefined periods of time at which teachers are expected to attend certain courses for upgrading of skills and competencies. They proceeded that, it is noted that the professional development of teachers has not been incorporated in the strategic plans at any level and has not been budgeted for. This includes the training in emerging skills for example the use of CBC in teaching and learning mathematics. This implies that, the skills upgrading that is currently taking place is based on individual efforts but not geared towards addressing the identified needs of practicing teachers. Table 4.1 summarizes the characteristics of informants in the study.

TABLE 4.1: CHARACTERISTICS OF INFORMANTS

Parameter	Frequency (n = 142)	Percent (%)
Sex		
Male	73	51
Female	69	49
Total	**142**	**100**
Education Level		
Secondary	120	85
Diploma	04	03
Degree	15	11
Masters	03	02
Total	**142**	**100**
School/Teachers		
Msalato	03	16.7
Kisasa	03	16.7
Dodoma	03	16.7
Miyuji	03	16.7
Kikuyu	03	16.7
Lukundo	03	16.7
Total	**18**	**100**
School/Students		
Msalato	20	16.7
Kisasa	20	16.7
Dodoma	20	16.7
Miyuji	20	16.7
Kikuyu	20	16.7
Lukundo	20	16.7
Total	**120**	**100**

Source: Field Data (Questionnaire and Interview), 2015

4.3 Presentation of the Findings and Discussions

The presentation of the findings was based on research questions which corresponded with the specific research objectives.

4.3.1 What are the stakeholders' perceptions on the strategies used in implementing CBC to student's performance in mathematics?

This question was addressed through interviews to teachers and education inspectors. The study intended to find out the perceptions and views of teachers and educational inspectors about CBC implementation on performance in mathematics.

4.3.2 General Respondents Responses on the perceptions of stakeholders on the strategies used in implementing CBC in Math's performance

Interviews conducted to four (4) educational inspectors and eighteen (18) mathematics teachers revealed that most of the teachers and educational inspectors perceived CBC as learner centered 9 (41%), application of knowledge 7 (32%) and increase of creativity and innovation 6 (27%). The findings are summarized in table 4.2 below and thereafter discussion is followed.

TABLE 4.2: STAKEHOLDERS PERCEPTION TOWARDS THE USE OF CBC

Parameter	Frequency	Percent
Learner centered	9	41
Application of knowledge	7	32
Increase creativity and innovation	6	27
Total	**22**	**100**

Source: Interview Data (2015)

As Learner Centered

The findings obtained from the interview responses from 18 mathematics teachers and 4 educational inspectors revealed that most of them were aware of the concept of CBC implementation. The study found that six (6) mathematics

teachers and three (3) educational inspectors who makes a total of 9 (41%) perceived CBC implementation as learner centered approach where teachers act as a facilitators. In this case, learners are the centre of instruction and teachers help to develop learners' competencies. This was evidenced by one teacher from school C who said:

> *"…CBC is the situation where by a teacher provides guidelines to students and let them solve problems on their own..." (Source: Interview data, 2015).*

The findings indicated that most of teachers understood the concept of competency based curriculum as the findings indicated that CBC implementation focus much on the competency of the learners that is what a learner can do independently at the end of the course of study.

The findings concur with the study done by Kafyulio et al. (2012) who emphasized that CBC implementation focuses much on the understanding of the concept rather than memorization of the facts whereby teachers act as the facilitators and students act as problem solvers (learner centered approach). Similar observations were made by Garfield (2002) who pointed out that students learn best when they are actively and individually construing their own social knowledge, rather than merely sitting passively, complying with the information provided to them by the teacher.

As Application of Knowledge

The interview conducted to 18 Mathematics and 4 educational inspectors found that 7 (32%) teachers and educational inspectors who were interviewed explain

the concept of CBC implementation as the application of knowledge by students' in a broad range of complex technical or professional activities performed in a wide variety of contexts. One teacher in school A said:

> *"…CBC is useful for guiding learner to higher levels of thinking and inquiry and can help learners to be ready to apply what they learn in real life..." (Source: Interview data, 2015)*

The findings of the study show that teachers had the knowledge of competence based curriculum as the findings indicated that students must be actively engaged in learning task so that they would be in position of working independently.

These findings are in line with the study done by MoEVT (2010) which revealed that students should be able to apply Mathematical skills they learn in schools to various and unpredictable situations that they might encounter in their course of their work lives. This implies that through the use of CBC students can apply mathematical knowledge obtained from the classroom in daily life. Teachers should focus on teaching and learning that calls for students to acquire new mathematical knowledge, apply what has been previously learned in activities which lead to self generated knowledge (Sullivan *et al*, 2005).

As a means of Increasing Creativity and Innovation

The findings from the interview conducted to 18 teachers and 4 educational inspectors 6 (27%) out of 22 revealed that CBC is viewed as a means of increasing creativity and innovation to students whereby teachers pose the

challenges and the students exhibit creativity and innovations in solving the posed challenges. One educational inspector explained:

> *"...CBC enhances creativity and innovation because students participate actively in the learning process. A learner is perceived as the knowledge creator and not knowledge recipient…" (Source: Interview data, 2015).*

Generally, the findings on perceptions of stakeholders towards CBC implementation in Math's performance revealed that; most of the teachers and educational inspectors were aware of the concept of CBC and its implications in teaching and learning process.

These findings are supported by the study done by Ottevanger and Hosea (2010) who argues that, secondary school graduates require mathematics knowledge and skills for them to take initiatives in different activities that enable them to be creative problems solvers and then innovate products and processes of different kinds. Mutambara et al. (2012) also contends that the way teachers teach is heavily influenced by their awareness and beliefs on using CBC in teaching and learning process as they believe that it enhances the students learn Mathematics by enhancing to them problem solving capabilities by being creative and innovative on how to apply different techniques in solving mathematical problem (Mutambara *et al*, 2012).

This implies that engagement of CBC in the classroom contributes to student's social and cognitive development as well as academic achievement. It focuses on student's thinking and not students writing correct answers in mathematics.

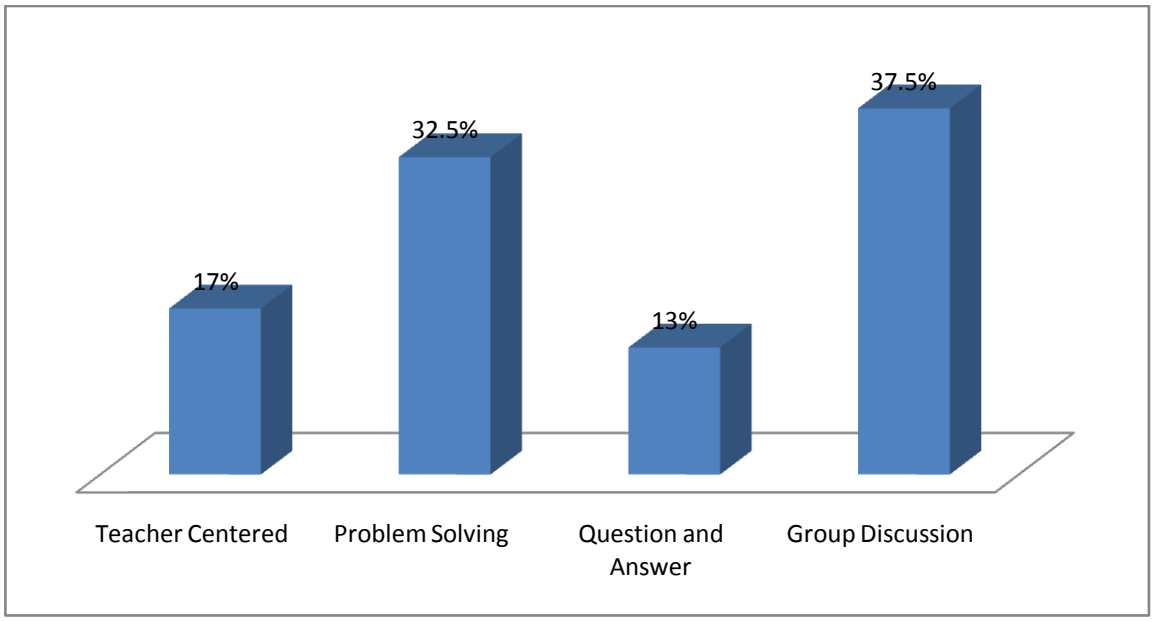
4.3.3 What are the strategies used by teachers in implementing CBC?

The question aimed at identifying the strategies used by teachers in implementing CBC and their contribution to mathematics. This was successful done through the use of questionnaires filled by the 120 students and interviews responses from 18 mathematics teachers.

4.3.4 Overall responses from students on the strategies used by their teachers in implementing CBC

Questionnaires responses from 120 students revealed that there are several strategies used in CBC implementation in mathematics as summarized in figure 4.1.

FIGURE 4.1: RESPONSES OF STUDENTS ON TEACHING STRATEGIES USED BY THEIR TEACHER IN LEARNING MATHEMATICS IN SECONDARY SCHOOLS UNDER CBC



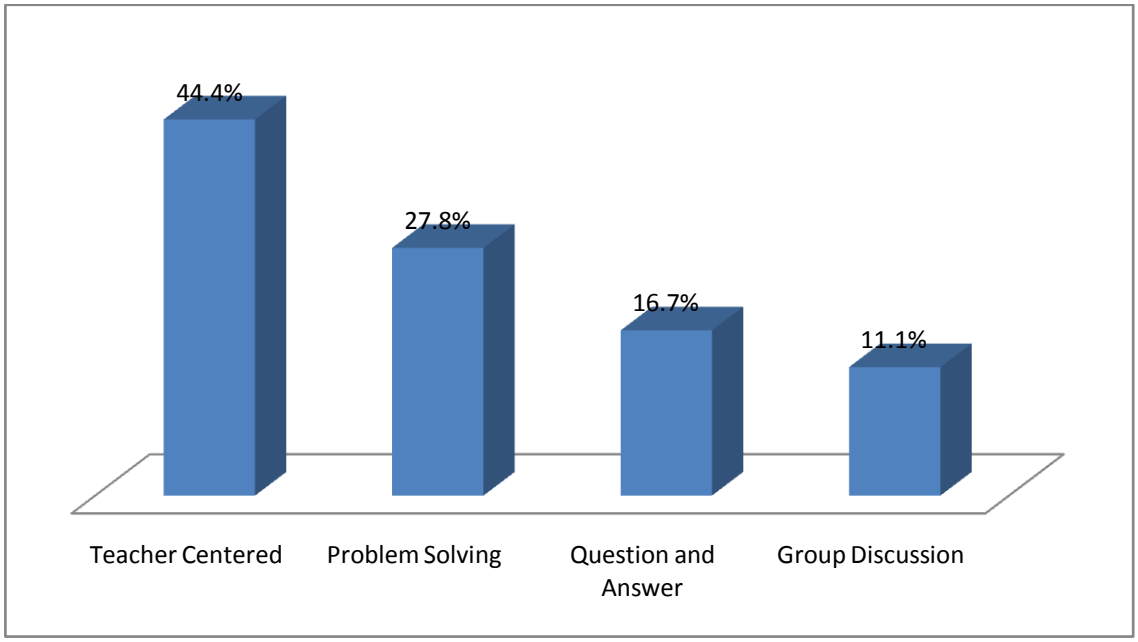
Source: Questionnaire data, (2015)

The findings of the study show that teachers had the knowledge of competence based teaching methods and that they used different methods in practicing competency based instruction in classroom. They also revealed that majority of teachers act on what they see and adjust their instruction to try to engage students in competency based learning activities though they were limited by some factors like lack of competence, lack of teaching and learning materials, time constraints and overcrowded classroom.

Moreover, the interview conducted from 18 mathematic teachers revealed that teacher centered is the dominating strategy. This was reported by 8 (44.4%), other approaches were Problem solving [5 (27.8%)], Question and Answer [3

(16.7%) and Group discussion [2 (11.1%)]. Figure 4.2 shows the summary of the findings.

FIGURE 4.2: RESPONSES OF TEACHERS ON TEACHING STRATEGIES USED IN T/L MATHEMATICS IN SECONDARY SCHOOLS UNDER CBC



Source: Interview data (2015)

Group Discussion Approach

On the group discussion method the findings showed that 2 (11.1%) teachers viewed group discussion as the method which involves students in higher order cognitive skills such as analysis, synthesis and evaluation and stimulates peer group learning. For example one teacher from school A said that;

> *"…though it stimulates critical thinking I failed to engage students in group discussion because of large number of students in the class (Source: Interview, 2015).*

The study findings indicated that some of the teachers were aware of the methods used to implement competence based curriculum though they fail to use it in the classroom due to some factors like overcrowded classroom and time constraints.

These findings are in line with Dasman (2011) who pointed out that inadequate supply of instructional materials, large class sizes and inadequate training facilities were the challenges which hinder implementation of group discussion in the class which lead to poor performance in mathematics. This made teachers continue teaching using traditional approach (teacher centered). These findings concur with Osaki (2004) who pointed out that with group discussion students can get an opportunity to express their opinion and ideas, also exchange of ideas and awareness of mutual concerns with well provided teaching and learning facilities and competent teacher who can guide learners in acquiring those competences.

Problem Solving Approach

During interview sessions most of the respondents explained problem solving as the process of working through details of a problem to reach a solution. From the study 5 (27.8%) mathematics teachers revealed that problem solving was a difficult method to apply in the class because most of teachers were not competent enough to solve some problems on some topics. One teacher from school D responded:

> *"….I failed to engage students actively in problem solving, because of being incompetent with the subject matter" (Source: Field data, 2015).*

This reveals that, most of teachers failed to practice CBC using problem solving methods as the technique used in teaching and learning mathematics. It was observed that most of teachers were not able to emphasize problem solving as they were not competent with the subject matter.

These findings are supported by Bonwell and Eison (2009) who suggests that students must do more than just listening. They must read, write, discuss or engage in solving problems but it is difficult to guide students through this if the teachers lack knowledge and skills towards subject matter. Therefore, it is difficult to guide students to engage in higher-order thinking tasks including analysis, synthesis, evaluation and judgement of issues related to problem solving life situation because they were not prepared in such habit.

Sikoyo (2010) support these findings by arguing that although teachers understand and recognize the benefits of active learner engagement in pedagogic process, they are unable to implement the problem-solving approach in the manner required. Limitations cited included time constraints, inadequate student's participation in instructional activities due to large class sizes and learners' low proficiency in English. Also, pressure to complete the centrally mandated curriculum, overcrowded curricula as well as inadequate instructional materials including science equipments and materials.

Teacher Centered Approach

From interview session most of respondents view teacher centered as the useful method when introducing new topics. From the study 8 (44.4%) mathematics teacher revealed that teacher centered method is useful when introducing new topics as it enables the teacher to cover a large content within a short time. One teacher from school F said:

> *"…I used teacher centered method because it saves time and helps to present ideas and concepts more clearly to the large group of students" (Source: Interview data, 2015).*

The findings of the study indicated that majority of teachers were using teachers centered method as they believed that, it was the only method which could help them to cover a large content for a short period of time. This was due to lack of knowledge about what methods to use in learner centered teaching and lack of training and skills on how to use competency based teaching methods.

These findings are supported by Kafyulilo *et al*. (2012) who suggests that most of the teacher are using teacher centered approach due to the fact that the approach helps teachers to cover large content within short period of time. In that case the syllabus is covered on time. Saldanha and Thompson (2003) contend that student's learning depends on the teaching strategies and, teacher centered usually alerts students on the matter being presented by the teacher and makes them attentive during teaching and learning process.

Question and Answer Approach

Regarding questions and answers method the findings shows 3 (16.7%) mathematics teachers had opinion on question and answer as the method of challenging capable students as it keeps them attentive and more involved in the lesson. One teacher from school C said:

> "…….*I failed to use questions and answers method to make student more participatory in the lesson." (Source: Interview data, 2015).*

General observations concerning the teaching strategy used by teacher in implementing competency based curriculum in the classroom revealed that most of teachers were not well oriented to practice competency based teaching approaches through questions and answers. They had a surface knowledge of what a competency based approach was. This shows that teachers knew what methods were required to foster competence in students but they fail due to lack of skills and competences in practicing them in the classrooms.

The findings concur with Sabia (2005) who argues that mathematics subject is much concerned with social interaction which is one of the effective ways of creating proper interaction through asking questions which help students to assess their own learning. But this needs teacher to be competent with the subject matter.

In summary concerning teaching methods used to enable students to learn effectively revealed that traditional teaching methods were predominant though it was not among of the teaching methods used in implementing CBC. This gave an

impression that teachers were not well oriented to the practices of competency based teaching approaches and they did not have skills to do what was required

Other methods like problem solving, question and answers and group discussion were not mostly used by mathematics teachers during teaching and learning mathematics in the classroom due to lack of skills, knowledge and competence to implement it. Other factors mentioned were overcrowded classroom and shortage of time. Therefore they were unable to select experiences that were student-centered and that were appropriate to specific lesson objectives, and the mental ability and age of the learners.

These can be evidenced by Kafyulilo et al (2012) who suggested that teachers were not well oriented to practice competency based teaching methods; rather they continue teaching using traditional approach.(teacher centered). Also the study of Sabia (2005) suggests that ineffective teaching methods resulted weak of practicing competencies.

Therefore it can concluded that teachers are more likely to positively impact student achievement if they are appropriately qualified with the requisite content knowledge, teaching skills, and, have access to resources and materials that allow them to create a facilitating learning environment. Osaki (2004) writes, If high-quality teachers lack necessary supplies and equipment, reasonable class sizes and necessary competency to create both appropriate lessons and enjoyable environment for learning, the quality of teaching students experience may be suboptimal, even if the quality of teachers is high.

4.3.5 What are stakeholder's perceptions on low performance in mathematics after the introduction of CBC?

In the third research question, the study investigated stakeholders' perception on low performance in mathematics after the introduction of competence based curriculum. The findings were collected from educational inspector through the use of semi-structured interview and documentary review.

4.3.6 General Respondents Responses on the stakeholder's perceptions on low performance in mathematics after the introduction of CBC

The findings revealed that 1(25%) educational inspector had opinion that statistically there is an increase in performance since introduction of CBC because during inspection she found most of the teachers using lesson plan, scheme of work, T/L materials and different strategies related to CBC. One educational inspector marked:

> *"…Some of the teachers participate fully in the selection and preparation of the teaching methods, content and materials used throughout the implementation of CBC. Some of them were having well prepared scheme of work and lesson plan" (Source: Interview data, 2015).*

This implies that good preparation prevent poor performance as the findings indicated that most of the teacher were found having well prepared scheme of work and lesson plan. Therefore the role of the teacher in the preparation of instructional planning has a great influence towards performance of students.

Also the findings from documentary review indicated that the role of the classroom teacher in achieving the objectives was to prepare a lesson plan which would guide them in teaching and learning process. Therefore, the researcher found that those teachers who went to class unprepared, their lessons appeared haphazard and were lacking subject focus.

These findings are supported by De Fraja (2010) who argues that with well prepared scheme of work and lesson plan guides teacher to facilitate learning process smoothly. These findings concur with Melhuish (2010) who signifies that academic achievement of the students depends much on both teacher and students. Each one has to play a great role in enhancing the performance of each other. With the provision of teaching and learning resources, a teacher can be able to guide students in learning task.

On the other hand, 3(75%) of educational inspectors claimed that there is no increase in performance because performance is influenced by many factors including competency of the teachers, teacher-student ratio, motivation and accountability. One educational inspector said:

> *"…Performance of students depends on their readiness to learn, availability of T/L materials, conducive environment and well prepared teachers" (Source: Interview data, 2015).*

The study findings showed that performance of students is associated with different factors like students readiness to learn, teacher motivation and students self confidence in learning mathematics. This implies that there is no

single factor or element that can really contribute to good performance of students.

These findings are in line with Osaki (2004) who shows that lack of competent teachers, poor teaching and learning facilities in schools and insufficient books in the school library contribute to poor performance in mathematics. Ngorosho (2011) confirms that, students from rural areas perform poorly in mathematics because of unconducive learning environment. Lack of cooperation between school, community and home environment were also noted to contribute poor performance in mathematics (De Fraja, 2010).

The study findings also are supported by Damian (2008) who argues that, since early 2000's when the government of Tanzania issued the directive to Ward Executive Officer (WEO) that each ward was required to have secondary school the performance of these schools academically were poor especially in mathematics and sciences. Reasons for this include teacher-student ratio, lack of teaching and learning facilities and insufficient qualified teachers (Osaki, 2004).

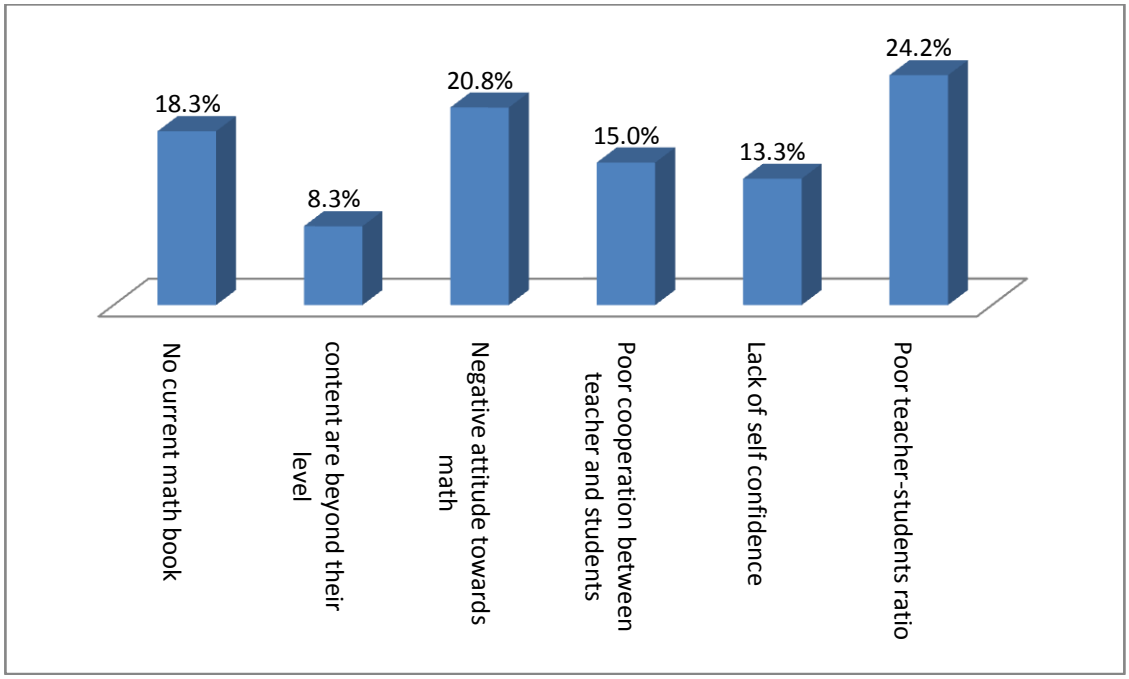
4.3.7. What are the challenges that hinder the implementation of CBC in teaching and learning mathematics?

This question was successfully attempted through the use of questionnaires filled by 120 students and interviews conducted to 18 mathematics teachers and 4 educational inspectors (mathematics specialist).

4.3.8 The findings on the challenges that hinder the implementation of CBC in teaching and learning mathematics

Through the use of questionnaires filled by students, it was found that there are several challenges faced by students during teaching and learning mathematics. From the findings it was revealed that 2(18.3%) students reported that there were no current mathematics books with an updated information's, 10(8.3%) students reported contents taught in the class to be beyond their level, 25(20.8%) reported negative attitude towards math, 18(15%) poor cooperation between mathematics teacher and students, 16(13.3%) lack of self confidence in learning math and 29(24.2%) low teacher students ratio. Figure 4.3 summaries the student's responses

FIGURE 4.3: STUDENTS RESPONSES IN CHALLENGES ASSOCIATED WITH IMPLEMENTATION OF CBC



Source: Questionnaires data, (2015)

These findings shows that most of students failed to attain an academic merit due to poor cooperation between teacher and students, lack of self confidence and low teacher-students ratio. This signifies the notion that performance of students in mathematics depends on different factors including availability of an updated teaching and learning materials, teacher's competency, student's readiness and interest in learning mathematics, learning environment and high teacher-student's ratio.

These findings are supported by Bilali (2008) who found that, the major problem facing secondary school students is that most of students perform poorly in mathematics due to lack of self confidence in learning mathematics, negative attitude towards mathematics and poor teacher-students ratio.

On top of that, Beggs (2000) asserted that fear of failure in mathematics cause lack of confidence in learning mathematics. This limits the role of the students to display their competence during learning process. Madden et al. (2007) found that many students in mathematics fail in their examination due to lack of confidence and being incompetent in their subject matter.

Moreover, the responses from teachers' interviews showed that 5 (28%) teachers identified lack of competence as the challenge that hinder implementation of CBC. Other factors includes 4 (22%) lack of enough time to practice CBC, 4 (22%) lack of motivation, 3 (17%) poor teacher-student ratio and 2 (11%) lack of teaching and learning facilities. These can be evidenced by one teacher from school F who commented that:

> *"…If you are not competent on something, you tend not to like it, and therefore you cannot practice it. If I have never attended training or any seminars on how to use competency based instruction, I cannot pretend to try it to my students…" (Source: Interview data, 2015).*

However, there are some teachers who acknowledged that they had received training on CBC implementation although the training content did not satisfy their requirements. The training time was not enough. One teacher from school D said:

> *"…I attended to one week training on competence based teaching at TIE. I tried in classroom what I learnt there several times, but it took too long to complete one topic. I decided to continue using teacher centered method so as to cover the syllabus" (Source: Interview data, 2015).*

In addition to that another teacher from school A commented:

> *"…To practice competency based instruction in classroom is difficult because it takes longer time…" (Source: Interview data, 2015).*

In spite of that a teacher from School C said:

> *"…It is difficult to meet the CBC teaching approaches due to the large number of pupils in the classroom. This forces me to continue using teacher centered teaching approach…" (Source: Interview data, 2015).*

Findings of this study revealed that unavailability of teaching and learning materials such as textbooks, overcrowded classroom that hinder teaching process, lack of motivation, lack of enough time to practice competence based curriculum in the classroom and lack of competence are the factors that intervene competency based curriculum and do not encourage teachers during teaching and learning process.

These findings are supported by Sheriden and Samnelsson (2003) argued that children's Mathematics learning is significantly affected by teacher's pedagogical awareness, education and ability to meet each child's interest. This was also emphasized by Wang (2008) in generic model that social interaction depends very much on the availability of teaching and learning material. Without sufficient support of teaching and learning material, in-service training on CBC implementation, pedagogical and social design activities would be hard to implement.

On top of that, Flavell (2006) contends that inadequate or inappropriate training leads to teachers being neither sufficiently prepared nor sufficiently confident to carry out fully teaching strategies of Mathematics in the classroom. Also study of Odili (2006) indicated that professional and social status, school infrastructure and poor libraries could account for negative attitudes of teachers towards teaching profession.

It is therefore important to realize that the majority of teachers hardly meet the needs of all children through the use of a variety of teaching strategies to accommodate different learning styles because of the limited mathematics resources, poor teaching and working environment, time constraints, lack of competence and lack of motivation. This forces teachers sometimes to skip some topics. Therefore, it was suggested that there is a need of providing all necessary requirements for teaching and learning for the academic development of the students and school.

Chapter Summary

This chapter began with an introduction in which the main sections of the chapter were outlined. The chapter covered data presentation, analysis and discussion. The main issues covered in this chapter were guided under the research questions including strategies used in implementing CBC and their contribution to secondary school mathematics, stakeholders perception on the influence of the strategies used in implementing CBC to students performance in mathematics, stakeholders' perceptions on low performance in mathematics after the introduction of CBC and challenges that hinder implementation of CBC in mathematics.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings and the conclusions based on the responses that the study collected, analyzed and discussed. The last part presents the recommendations for improvement of practices and further research.

5.2 Summary of the Study Findings

The study revealed that most of the teachers had knowledge of competence based curriculum and they used different methods in practicing competency based instruction in classroom. They also show that majority of teachers act on what they see and adjust their instruction to try to engage students in competency based learning activities**.** This indicates that most of the respondents were aware of the concept of CBC and its implication in teaching and learning process.

Also, it was observed that the majority of teachers did not meet the needs of all children through the use of variety teaching strategies to accommodate different learning styles because of lack of knowledge about what methods to use in learner centered teaching.

Moreover, lack of training and skills on how to use competency based teaching also influence the attitude of teachers towards competency based instruction because they had not been prepared. Although it was found that some of them

received training but the training was found to be insufficient because some of teachers failed to practice it in the classroom context. Shortage of understanding the importance of competency based teaching skills and learning process play a big role in shaping teachers attitude towards competency based instruction.

The study also reveals that after introduction of CBC the performance of students in mathematics could increase but from the study it was found that since introduction of CBC still the performance of mathematics is dropping and this was caused by lack of competent teachers to guide learners into the required competency, lack of enough time to practice CBC in the classroom and, poor teaching and learning facilities.

The study found out that there were many challenges associated with students and teachers during implementation of CBC. These challenges include absence of current mathematics books with an updated information's, contents taught in the class are beyond their level, negative attitude towards mathematics, poor cooperation between teacher and students, lack of self confidence in learning mathematics, poor teacher-students ratio, lack of competence and lack of enough time to practice CBC.

5.3 Conclusion

From the findings obtained together with their discussion, the following conclusions were made: In teaching and learning process CBC requires the need to shift from the traditional teacher-centered pedagogy to more learner-centered methods. When this process of instruction is practiced as learner-

centered, teachers are currently faced with a variety of challenges like class size, lack of skills to practice CBC, a need for a variety of instructional strategies, lack of enough time to practice CBC, curriculum changes and new technologies.

The study holds the conclusion that CBC is not well implemented in secondary school in Tanzania. In the same vein, it can be considered that if teachers who graduate from teacher training colleges do not acquire sufficient and applicable knowledge on how to implement competency based curriculum, it would be a sheer dream to expect them to apply it in their teaching. That why the performance of mathematics is still dropping despite the introduction of CBC.

5.4 Recommendations

The movement to quality education has taken the learner-centered approach in teaching and learning process. Therefore basing on findings of this study, the researcher recommends the following;

5.4.1 Recommendation for implementation

- The Ministry of Education and Vocational Training need to develop different strategies to ensure a sufficient and quality of teachers in each subject especially in mathematics in order to enable teachers to apply competence based teaching and improve teaching and students' performance.
- The Ministry of Education and Vocational Training needs to re-train teachers in in-service training programme to enable them to manage

classes and the teaching and learning process under competence based curriculum.

- The heads of schools should encourage team teaching where those who are competent in competence based teaching can mentor others and hence cascade the knowledge of competence based curriculum to all the teaching staff in their respective schools.
- The heads of secondary schools should ensure that there are necessary facilities like books and other teaching and learning resources to facilitate a smooth teaching in competence based curriculum.

5.4.2 Recommendation for further studies

The current study aimed at assessing the contribution of competence based curriculum on student's performance in mathematics in Dodoma Municipality. This study was conducted in six public secondary schools selected from Dodoma Municipality. Thus, the study findings could hardly be generalized. For this case, the following are recommended:

- The comparative studies need to be done in relation to other regions on the same study. This would help the educational stakeholders and teachers in general to learn what is going on other regions regarding CBC implementation on students' performance in mathematics.
- Further studies should be conducted based on the inadequacy of teaching and learning resources towards implementation of competency based curriculum in Tanzania secondary schools.

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APPENDECIES

APPENDIX A

QUESTIONNAIRE FOR STUDENTS ON THE CONTRIBUTION OF COMPETENCE BASED CURRICULUM ON STUDENTS PERFORMANCE IN MATHEMATICS IN SECONDARY SCHOOL.

Dear respondents, I am glad to inform you that, you have been selected to help the researcher to answer the following questions. All answers given by the respondent will be treated confidentially and the participants will not be identified by their names. The information obtained will be used for academic research purposes only. Please read each item carefully.

Please fill in the space or put a tick in the space provided to indicate the appropriate answers.

A: **BACKGROUND INFORMATION**

Gender: Male. [ ] Female. [ ]

School name:.....

Class. Form **i** [ ] Form **ii** [ ] Form **iii** [ ] Form **iv** [ ]

Age category 13-18 [ ] 19-24 [ ] More than 24 [ ]

B: **QUESTIONS**

1. Please put a tick (√) where the aspect is provided/correct

    a) Do you clearly understand concepts/procedures/principles of learning mathematics? YES [ ] NO [ ]

b) Are you interested in learning mathematics? YES [ ] NO [ ]

c) Does your teacher provide you with learning materials for mathematics (eg. text books)? YES [ ] NO [ ]

d) Does your teacher provide you with an exercise after the lesson and make follow-up on it? YES [ ] NO [ ]

e) Are the materials provided by your teacher support you in learning mathematics? YES [ ] NO [ ]

f) What is your average performance in mathematics? (i) Below 20 [ ]
(ii) 20 – 40 [ ]
(iii) 40 -60 [ ] (iv) 60 – 80 [ ] (v) 80 – 100 [ ]

g) Do you think the performance you have in mathematics is influenced by the materials provided by your teacher? YES [ ] NO [ ]

2. Which method is used by your teacher in learning mathematics?
   i) Group discussion where teacher provides you with questions to discuss [ ]
   ii) Teacher solves problems in the blackboard alone without involving you [ ]
   iii) All of them [ ]
3. Mention other methods used by your teacher in learning mathematics……..
4. Are you interested in the methods used by your in teaching mathematics? YES [ ] NO [ ]
5. Do you think the performance you have in mathematics is influenced by the teaching methods used by your mathematics teacher? YES [ ]

NO [ ]

6. Explain how teachers support you in solving problems during class hours? .....

7. List the challenges you face in learning mathematics

   i.....

   ii.....

   iii. ……..

   iv.……

8. Suggest solutions for the challenges you have identified in 7 above

   i. .....

   ii. …….

   iii. ……

   iv. …….

THANKS FOR YOUR COOPERATION

APPENDIX B

SEMI-STRUCTURED INTERVIEW GUIDE QUESTIONS FOR MATHEMATICS TEACHERS ON THE CONTRIBUTION OF COMPETENCE BASED CURRICULUM ON STUDENTS PERFORMANCE IN MATHEMATICS IN SECONDARY SCHOOL.

I am conducting a research about the contribution of competence based curriculum in teaching and learning mathematics to student's performance in secondary schools in Tanzania. I am kindly requesting you to give out your opinions and views without hesitation. The ultimate results of this study will help to improve the kind of strategies used in teaching and learning mathematics in secondary schools using competence based curriculum. Please welcome to an interview session.

A: **BACKGROUND INFORMATION**

Please provide the appropriate answer to the following questions

Gender: Male. [ ] Female. [ ]

Occupation.....Station name:.....

Marital status Single [ ] Married [ ]

Level of education Diploma [ ] Degree [ ] Masters [ ] PhD [ ] Prof [ ] none of the listed [ ]

Age category 20-25[ ] 26-30[ ] 31-35[ ] 36-40[ ] 41-45[ ]46-50 [ ] 51^{+}[ ]

B: QUESTIONS

1. What do you understand by competency based curriculum?

2. What are your views about competence based curriculum?

3. Where did you learn the skills of competence based curriculum?

4. What techniques do you use in teaching mathematics?

5. How do you engage students in competency based learning activities?

6. Do you think the teaching strategies you used helped to maximize the learning potential of all students? Explain

7. In your views are students performing well in mathematics? YES { } NO { } Give comments

8. How do you help underperforming students to overcome the difficulties related to learning mathematics?

9. What challenges do you face when you implement competency based curriculum in teaching and learning mathematics?

10. What are your suggestions in order to overcome the challenges you have mentioned in 9 above?

THANKS FOR YOUR COOPERATION

APPENDIX C

INTERVIEW GUIDE QUESTIONS TO EDUCATIONAL INSPECTOR OFFICER ON THE CONTRIBUTION OF COMPETENCE BASED CURRICULUM ON STUDENTS PERFORMANCE IN MATHEMATICS IN SECONDARY SCHOOLS.

I am conducting a research about the contribution of competence based curriculum in teaching and learning mathematics to student's performance in secondary schools in Tanzania. I am kindly requesting you to give out your opinions and views without hesitation. Please welcome to an interview session.

A: BACKGROUND INFORMATION

Please provide the appropriate answer to the following questions

Gender: Male. [ ] Female [ ]

Occupation.....Station name:.....

Marital status Single [ ] Married [ ]

Level of education Diploma [ ] Degree [ ] Masters [ ] PhD [ ] Prof [ ] none of the listed [ ]

Age category 20-25[ ] 26-30[ ] 31-35[ ] 36-40[ ] 41-45[ ]46-50 [ ] 51^{+}[ ]

B: QUESTIONS

1. In your view, do you think students perform well academically when they have sufficient teaching and learning materials? YES { } NO { } Give reasons to your answers.....

2. Can you relate the performance of students in mathematics to the provision of teaching/learning materials in secondary schools in your area?
3. Would you please comment on the performance of students in mathematics?
4. Is the mathematics teacher-student ratio relevant/adequate? Are schools provided with adequate teaching/learning resources/materials? (eg. Books,) Comment on this
5. Are you aware of competence based curriculum? Please define it
6. Would you please comment on the methods/techniques/strategies teachers use to implement competence based curriculum when teaching mathematics?
7. Since the establishment of competence based curriculum, does it yield the desired outcome? Give comments
8. Did you provide any training to mathematics teachers on how to implement competence based curriculum?
9. Do you make follow-up in schools to see how these teachers implement competence based curriculum in classroom?
10. How do you see the trend of performance in mathematics after the introduction of competence based curriculum?
11. What are the things done by teachers which show you that they are implementing competence based curriculum?
12. What are the factors that mediate competency based curriculum?

THANKS FOR YOUR COOPERATION

APPENDIX D

ST JOHN'S UNIVERSITY OF TANZANIA

Directorate of Research, Consultancy and Postgraduate Studies

Tel: +255 26-2390044
Fax: +255 26-2390025
Website: www.sjut.ac.tz

PO Box 47
DODOMA
Tanzania

Date: 05.03.2015

TO WHOM IT MAY CONCERN

Graduate Student's Research Clearance

This letter serves to introduce **DELVINA JAPHET.** (Registration Number M2013/5102), who is a bona fide student of St John's University of Tanzania in the School of Humanities and Education.

She is currently in the research stage of her Masters studies and is required to collect data. She has already obtained ethical clearance from SJUT Internal Review Committee/

Her approved research topic is:

Perceived contribution of competence based curriculum in teaching and learning mathematics to students' performance in secondary schools in Tanzania. A case of Dodoma municipality secondary schools

I request that you grant this student all possible assistance to facilitate the completion of her research study.

Should you need further clarification please contact my office.

I wish to thank you for your kind assistance for this student.

Yours sincerely

PP Dr Angela Savage
Director of Research, Consultancy and Postgraduate Studies
Email asavage@sjut.ac.tz

St. John's University of Tanzania
P. O. Box 47 – DODOMA
Signature _____
DIRECTOR
Postgraduate Studies & Research

APPENDIX E

ST JOHN'S UNIVERSITY OF TANZANIA

DIRECTORATE OF RESEARCH AND CONSULTANCY

INTERNAL REVIEW COMMITTEE

RESEARCH CLEARANCE CERTIFICATE

FOR MASTER'S AND DOCTORAL STUDENTS

Date of meeting: 05th, **March 2015**

Project title: **Perceived contribution of competence based curriculum in teaching and learning mathematics to students' performance in secondary schools in Tanzania. A case of Dodoma municipality secondary schools**

Researcher: **JAPHET, DELVINA**

Supervisor: **DR. F. WILLIAM**

Faculty / Institute / School: Faculty of Arts Humanities and Education

Degree being studied for: **MA In EDUCATION**

This is to certify that the research proposal herein detailed has been examined and approved by the Internal Review Committee of St John's University of Tanzania

Dr. Angela Savage
Director, DRCPGS

Prof. Casmir Rubagumya
DVCA

APPENDIX F

THE UNITED REPUBLIC OF TANZANIA
DODOMA MUNICIPAL COUNCIL
(All correspondence to be addressed to Municipal Director)

DODOMA REGION
Tel.: 2354817/2321550
Fax: 026 - 2321550

Office of Municipal Director
P.O. Box 1249
Dodoma
E-mail: dodomamunicipality@yahoo.co.uk

In reply please quote:

Date: 26 March, 2015

Ref.No.HMD/A.30/12

To whom it may concern

RE: **RESEARCH PERMIT FOR DELVINA JAPHET.**

Reference is made to the heading above.

The above mentioned is the bonafide Student from St. John's University who is doing a Research with the Topic **"Perceived Contribution of Competence Based Curriculum in Teaching Mathematics to Students' Performance in Secondary Schools in Tanzania: A Case Study of Secondary Schools in Dodoma Municipality"** The Researcher will visit different Public Public Schools within Dodoma Municipality.

Therefore you are requested to give her a full support so that she could accomplish her Research Report at the right time for the benefit of the Nation.

Thanks for your cooperation.

Dominic K. Mikambo
For Municipal Director
DODOMA.

Copy: Municipal Secondary Education Officer
P.O.Box 1249,
DODOMA

K.n.y. MKURUGENZI WA MANISPAA DODOMA

:Head of Secondary Schools
DODOMA MUNICIPALITY.