



EXTENT OF UNDERSTANDING AND IMPLEMENTATION OF THE COMPETENCY BASED APPROACH (CBA) IN MATHEMATICS IN GRAMMAR AND TECHNICAL SECONDARY SCHOOLS IN CAMEROON

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ABSTRACT: *The main purpose of the study was to compare levels of mathematics teachers' understanding and implementation of the CBA in grammar and technical secondary schools in the North West Region of Cameroon. The study adopted a survey research design. Using the Taro Yamane's method, a sample of 153 mathematics teachers (60 from technical secondary schools and 93 from grammar secondary schools) was selected from a population of 248 mathematics teachers in the North West Region using the simple random sampling technique. Data was collected using a 25-itemised self-designed questionnaire. Cronbach alpha reliability indices for sections B and C of the questionnaire were found to be 0.82 and 0.85 respectively. Mean was used to answer the research questions and t-test to test the hypotheses at 0.05 level of significance. The findings revealed that mathematics teachers in both grammar and technical secondary schools understand the Competency Based Approach to teaching mathematics only to a low extent. Furthermore, the extent to which mathematics teachers in grammar schools implement the CBA, though low, is significantly better than that of technical school mathematics teachers. It was therefore recommended among other things that many more training seminars on CBA related issues in mathematics should be organized by the Teachers' Resource Center (TRC) in the North West Region, and that Inspectors of mathematics should carryout regular visits to monitor the implementation of the CBA in mathematics classrooms.*

KEYWORDS: Competency Based Approach, CBA Implementation, Mathematics Teachers, Technical Grammar Schools, Cameroon

INTRODUCTION

The educational system of Cameroon has two subsystems of education: the English-speaking and the French-speaking subsystems of education. The government of Cameroon has always been very concerned about the quality of the products who graduate from secondary and high schools in both systems. Recently, the government's interest tilted from the Objective Approach to Education (OAE), to the Competency Based Approach (CBA). Thus, the CBA to teaching and learning is relatively new in the educational system of Cameroon. This approach to teaching and learning was introduced in Cameroonian secondary schools in the 2012/2013 academic year. The introduction of this approach was in the hope that a more integrated approach will be used by teachers using the various components of the approach, in order to help students, become more competent and self-reliant learners.



According to Weddel (2006), the components of the CBA include: assessing the learners' needs, selecting the competencies, giving targeted instructions and evaluating the competencies attained. Thus, Weddel's components suggest that the CBA is an approach to education which enables learners to carry out measurable task practically by applying their knowledge and skills obtained through effective classroom interactions. This approach is thus intended to permit learners to progress on the bases of their aptitude to master a skill or competency at their own pace regardless of their environment (Wikipedia, 2020). This method is tailored to meet different learning abilities and can lead to more efficient student outcomes. Sudsomboon et al. (2007) on their part, identified seven elements through which the CBA can be achieved. They include: learners acquire experience and knowledge in their lives, curriculum designers provide an experience that will tap learners' values and ideas, learners experience new situations and match new experiences with previous learning, learners distil new values and new knowledge, learners try out new behaviours and acquire new experiences and knowledge in both simulated and real world environments, learners continue to process experiences and knowledge as basis of original knowledge and experiences, and learners apply new behaviours in real world situations. Thus, the process of understanding and implementing the CBA is a systematic one. The aforementioned elements of Sudsomboon et al. suggest that time may also be an important factor in relation to understanding the CBA and developing implementation skills.

Despite the fact that the CBA is just over seven years old since its inception in secondary schools in Cameroon, there is no clear evidence indicating whether or not mathematics teachers are appropriately implementing the CBA in Grammar and Technical secondary schools. A recent study done by Haki as cited in Rweyemamu (2012) asserts that mass student failure in the National Examination can be largely attributed to the fact that the curriculum has always been poorly implemented because the majority of stakeholders did not aptly understand the requirements of laid down educational guiding principles. Although educational stakeholders in Cameroon claim that the education system is competency based, there is need for research evidence to support this claim especially in mathematics.

Beyoh (2018) asserts that since the introduction of formal education in English-speaking Cameroon, mathematics has gone through several developments; from the era of formal Arithmetic, Algebra, Geometry etc, through the period of traditional mathematics and the modern mathematics controversy to the present everyday general mathematics. These changes have always been necessitated by the awareness of the role mathematics plays in the nation's scientific and technological development as well as responding to societal needs and demands (Aguele, 2004). Today, this subject remains very important to all disciplines and fields of human work and study (Odili, 2006). It is generally seen as an intellectually challenging subject affecting almost every aspect of life. Its role is such that there is hardly any discipline of study in which mathematics is not involved. Academics and educators have emphasized the important role of mathematics in several ways. As Baiyelo (2007) observed, mathematics is widely regarded as the language of science and technology. Ebude (2016) equally stated that, while technology is an engine of growth with endless potentials, mathematics is the key to accessing all these potentials. Abakpa and Iji (2011) on their part, viewed mathematics as a subject which stimulates the human intellect, hence affecting every aspect of human activities including politics, economics, science and technology. To these authors, it is the model and bedrock used in understanding scientific concepts.



Mathematics is a compulsory subject from the primary through the five years in grammar secondary education in the English-speaking subsystem of education in Cameroon. It is also a compulsory subject at all the levels in technical secondary schools. This important position occupied by the subject in the school curricula is borne out of the role of mathematics in daily life and in scientific and technological development, a sine qua non in nation building (Beyoh, 2018). Another role of mathematics is its use as a basic entry requirement into many prestigious courses such as medicine, accountancy, architecture and engineering among other degree programmes.

Unfortunately, despite the importance and benefits of mathematics to our day-to-day activities, its use as a basic entry requirement into other higher-level fields, and its role as an agent of national development and wealth creation, students' interests and achievements in the learning of mathematics have been pitiable. Akoko as cited in Beyoh (2018) asserts that there has been consistent poor performance and failure of students in mathematics at secondary school level. One wonders if there has been any noticeable change in students' interests and achievement in mathematics ever since the Competency Based Approach was introduced in Cameroon; an approach which was intended to get students involved in every aspect of their learning, thereby improving on their achievement and interest in Mathematics. One further wonders the extent to which the CBA is being implemented by mathematics teachers in both grammar and technical secondary schools.

From observation, mathematics teachers seem to have continued teaching by using the traditional instructional approaches and assessments methods more often. Students also seem to have continued learning through memorization rather than creating and inventing new ideas through inquiry learning approaches. It is against this background that this study sought to determine the extent of understanding and implementation of the Competency Based Approach in mathematics in grammar and technical secondary schools in Cameroon. Varied findings on CBA related issues further indicate that this study is very necessary and relevant.

Obodu (2018) carried out a study to find out the extent to which mathematics teachers understand and implement the CBA in some secondary schools in Onitsha. He adopted the survey research design. A structured questionnaire was used to collect data from a sample of 93 mathematics teachers. Data was analysed using means and t-test for one sample. The analysis revealed that mathematics teachers in Onitsha understood the CBA in the teaching of mathematics to a fairly high extent. It further revealed that the extent of implementation of the CBA in the teaching of mathematics was low.

Ayoub et al. (2013) also carried out a study to investigate the implementation of competency-based teaching approaches in education in Morogoro Teachers' Training College Tanzania. A total of 78 pre-service teachers from Morogoro Teachers' Training College participated in the study. To draw an understanding of the extent to which pre-service teachers were well trained to implement competency-based teaching approaches in their teaching, a questionnaire was administered to all 78 pre-service teachers, and 46 of them also participated in a structured interview. Results revealed that pre-service teachers perceived their understanding and ability to implement competency-based teaching approaches as high, but during interviews it was revealed that they had difficulties in explaining some competency-based concepts. Thus, it is concluded that, competency-based teaching approaches are not well implemented in schools in Tanzania and more efforts need to be devoted in the development of tutors' and principals' understanding of competency-based teaching approaches.



Purpose of the Study

The main purpose of the study was to compare levels of mathematics teachers' understanding and implementation of the CBA in grammar and technical secondary schools in the North West Region of Cameroon. Specifically, the study set out to:

- Compare the extents to which mathematics teachers understand the CBA in mathematics in grammar and technical secondary schools in the North West Region.
- Compare the extents to which mathematics teachers implement the CBA in mathematics in grammar and technical secondary schools in the North West Region.

Research Questions

- What are the mean scores indicating the extent of mathematics teachers' understanding of the CBA in grammar and technical secondary schools in the North West Region?
- What are the mean scores indicating the extent of implementation of the CBA in mathematics in grammar and technical secondary schools in the North West Region?

Hypotheses

- The extent to which mathematics teachers in grammar schools understand the CBA does not differ significantly from that of those in technical secondary schools in the North West Region.
- The extents to which mathematics teachers implement the CBA in grammar and technical secondary schools in the North West Region do not differ significantly.

METHODOLOGY

The study adopted the survey research design. The assessable population of the study was made up of 248 mathematics teachers in the North West Region of Cameroon. Using the Taro Yamane's method, 153 mathematics teachers (60 from technical secondary schools and 93 from grammar secondary schools) selected through the simple random sampling technique, constituted the sample of the study. Data was collected using a 25-itemized self-designed questionnaire vetted by three experts. The questionnaire had three sections; while section A elicited demographic information from the respondents, sections B and C solicited information regarding level of mathematics teachers' understanding and implementation of the CBA respectively. Using the four-point Likert scale, teachers were required to indicate the degree to which they agreed or disagreed with statements relating to their understanding and implementation of the CBA in their respective schools. The instrument was pilot tested and the Cronbach alpha reliability indices for sections B and C were found to be 0.82 and 0.85 respectively.

The data collected was analyzed using mean to answer the research questions and t-test to test the hypotheses at the 95% confidence interval. Positive statements were scored four points for the Strongly Agreed option, three points for the Agreed option, two points for the



Disagreed option and one point for the Strongly Disagreed option. The scoring key was reversed for negative statements. Thus, Sections B and C had a total score of 40 points each. The benchmark for making decisions was set as follows: $35 \leq$ Very large extent ≤ 40 , $25 \leq$ Large extent < 35 , $15 \leq$ Low extent < 25 and $10 \leq$ Very low extent < 15 . The limits are obtained by multiplying midpoints and end points (that is 4, 3.5, 2.5, 1.5, 1) on the four-point Likert scale (that is, 4, 3, 2, 1) by the total number of questionnaire items (that is 10) in each section.

FINDINGS

Research Question 1: *What are the mean scores indicating the extent of mathematics teachers' understanding of the CBA in grammar and technical secondary schools in the North West Region?*

Table 1: Extent of Mathematics Teachers' Understanding of the CBA

School Type	Mean	N	Std. Deviation	Std. Error of Mean
Technical Secondary Schools	20.03	60	3.58	.46
Grammar Secondary Schools	20.95	93	3.62	.38
Total	20.59	153	3.62	.29

Table 1 indicates that the mean score indicating the extent of technical secondary school mathematics teachers' understanding of the CBA is 20.03 with a standard deviation of 3.58. On the other hand, the mean score for grammar secondary school mathematics teachers is 20.95, giving a standard deviation of 3.62. This finding suggests that although mathematics teachers from technical secondary schools and those from grammar secondary schools understand the CBA only to a low extent, grammar secondary school mathematics teachers however have a slightly better understanding of this approach when compared to their counterparts in technical secondary schools.

Research Question 2: *What are the mean scores indicating the extent of implementation of the CBA in mathematics in grammar and technical secondary schools in the North West Region?*

Table 2: Extent of Mathematics Teachers' Level of Implementation of the CBA

School Type	Mean	N	Std. Deviation	Std. Error of Mean
Technical Secondary Schools	14.83	60	1.88	.24
Grammar Secondary Schools	18.53	93	3.02	.31
Total	17.08	153	3.19	.26



Table 2 shows that the mean score indicating the extent to which mathematics teachers implement the CBA in technical secondary schools is 14.83. That of mathematics teachers in grammar secondary schools is 18.53. This finding indicates that while the extent of implementation of the CBA in mathematics in grammar secondary schools is low, that in technical secondary schools is very lower.

Ho₁: *The extent to which mathematics teachers in grammar schools understand the CBA does not differ significantly from that of those in technical secondary schools in the North West Region.*

Table 3: t-test for Equality of Means of Grammar and Technical School Mathematics Teachers' Understanding of the CBA

		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Extent of Mathematics Teachers' Understanding of the CBA	Equal variances assumed	-1.53	151	.13	-.91	-2.09	.27
	Equal variances not assumed	-1.54	127.08	.13	-.91	-2.09	.26

Table 3 indicates that the t-value for the difference between the mean of technical secondary school mathematics teachers' understanding of the CBA and that of grammar secondary school mathematics teachers is -1.53, with a degree of freedom of 151. This gives a p-value of 0.13 ($p > 0.05$), which is not significant at the 0.05 level of significance. Consequently, Ho₁ is not rejected. We therefore conclude that the extent to which mathematics teachers in grammar schools understand the CBA, though higher, does not differ significantly from that of those in technical secondary schools in the North West Region.

Ho₂: *The extents to which mathematics teachers implement the CBA in grammar and technical secondary schools in the North West Region do no differ significantly.*

Table 4: t-test for Extent of Implementation of CBA in Mathematics in Grammar and Technical Secondary Schools

		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Extent of Mathematics Teachers' Implementation of the CBA	Equal variances assumed	-8.48	151	.00	-3.69	-4.55	-2.83
	Equal variances not assumed	-9.33	150.85	.00	-3.69	-4.48	-2.91



Similarly, Table 4 indicates that the t-value for the test was -8.48, with $df = 151$. This gives a p-value of 0.00 ($p < 0.05$), which is significant at the 0.05 level of significance. Consequently, H_0 is rejected. Hence, we conclude that the extent to which mathematics teachers in grammar schools implement the CBA, though low, is significantly better than that of technical school mathematics teachers.

DISCUSSION OF FINDINGS

The findings of this study revealed that mathematics teachers from technical secondary schools and those from grammar secondary schools understand the CBA in the teaching of mathematics only to a low extent. Furthermore, the extent to which mathematics teachers in grammar schools understand the CBA, though slightly higher, does not differ significantly from that of those in technical secondary schools in the North West Region. This finding does not agree with that of Obodu (2018) who carried out a study to determine the extent to which mathematics teachers understand the CBA in some secondary schools in Onitsha-Nigeria. His findings revealed that mathematics teachers in Onitsha understand the CBA of teaching mathematics to a fairly high extent. The disparity in the findings may be as a result of the fact that mathematics teachers in Cameroon have not had sufficient training and seminars on the use of the CBA, given that this approach was introduced in Cameroonian secondary schools just over seven years ago. This is a possible reason why the findings suggest that mathematics teachers in Cameroon do not understand the CBA in teaching mathematics as much as their counterparts in Nigeria.

The finding of the study also revealed that while the extent of implementation of the CBA in mathematics in grammar secondary schools is low, the extent of implementation in technical secondary schools is lower. This low extent of implementation of the CBA in mathematics in grammar secondary schools is however significantly better than that in technical schools. This finding agrees with that of Ayoub et al. (2013) who carried out a study to investigate the implementation of competency-based teaching approaches in education in Morogoro Teachers' Training College Tanzania and concluded that competency-based teaching approaches are not well implemented in schools in Tanzania. The finding above may be as a result of the fact that enough seminars on the implementation of the CBA approach in mathematics have not yet been organized.

CONCLUSIONS

The findings of this study seem to point to the fact that it is difficult to implement what one lacks good mastery of. Thus, many more training seminars on CBA related issues in mathematics will need to be organized by the Teachers' Resource Center (TRC) in the North West Region. These seminars should not be optional but made compulsory to all mathematics teachers in the region. This, it is hoped, will go a long way to improve mathematics teachers' understanding of the CBA and to equip them with better implementation skills.

Mathematics teachers in Teacher Training Colleges and Faculties of Education should lay emphases on the CBA in mathematics. This will go a long way to also help pre-service mathematics teachers to develop interest in the use of the CBA. Finally, Inspectors of



mathematics should carry out regular visits to monitor the implementation of the CBA in mathematics classrooms.

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