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THE INFLUENCE OF THE USE OF INSTRUCTIONAL MATERIALS ON ACQUISITION OF MATHEMATICAL COMPETENCIES AMONG LEVEL ONE PUPILS IN MFOUNDI DIVISION

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DEDICATION

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ABBREVIATIONS AND ACRONYMS

DQASO - District Quality Assurance Officer

FPE - Free Primary Education

IM - Instructional Materials

MIM - Mathematics Instructional Materials

MOE - Ministry of Education

NARC - National Rainbow Coalition

TLM - Teaching Learning Materials

TLR - Teaching Learning Resources

ABSTRACT

The purpose of this study was to investigate the influence of the use of instructional materials on the acquisition of mathematics competencies among level one pupils in some primary schools in the Mfoundi division. **Mathematics**(m) is the language of science and technology and an important element in human life. Because of its significant value, teaching and learning of mathematics should be approached in ways that help pupils develop positive attitude towards it(Alshqtri et al.2019) . **Instructional material** (IM) dale (1969) defined IM as resources that help teachers and learners in making teaching and learning more real. Three research objectives guided this study: to determine the types of instructional materials available for teaching mathematics in level one classroom. To determine whether instructional materials are utilized during mathematics instruction in level one and, lastly, to establish the influence of using mathematics instructional materials on the development of mathematical competencies. A descriptive survey design was employed, and the study's sample population included all primary schools in the Mfoundi division, with a sample size of 1104 pupils and 21 teachers. The researcher used purposive, stratified and random sampling methods to select an appropriate sample for the study. The research instruments were a lesson observation schedule, a teacher interview schedule, and a competency checklist. Data were qualitatively and quantitatively analyzed. Data were analysed objectively using SPSS. Based on the first objective, the study revealed that different types of instructional materials were available in level one. The results showed that some materials were 100% available while others were less/not available. The second objective, the study, also revealed that various instructional materials were utilized during mathematics instruction. The study results showed that some materials were often used while others were less utilized. The third objective of the study revealed that utilization of instructional materials is positively correlated (+0.77) with the acquisition of mathematical competencies. The study recommends that teachers and other key stakeholders invest more resources to ensure the availability of adequate instructional materials for pupils. It also suggests that school management invest more to ensure that sufficient and right instructional materials are available to give pupils and teachers all the basic requirements required for better teaching and learning.

RÉSUMÉ

L'objectif de cette étude était d'investiguer l'influence de l'utilisation du matériel didactique sur l'acquisition des compétences en mathématiques chez les élèves du premier degré de certaines écoles primaires du département du Mfoundi. Trois objectifs de recherche ont guidé cette étude : déterminer les types de matériel didactique disponibles pour l'enseignement des mathématiques en classe de premier niveau. Déterminer si le matériel didactique est utilisé lors de l'enseignement des mathématiques au premier niveau et, finalement, établir l'influence de l'utilisation du matériel didactique en mathématiques sur le développement des compétences mathématiques. Un plan d'enquête descriptif a été utilisé et l'échantillon de population de l'étude comprenait toutes les écoles primaires du département du Mfoundi, avec une taille d'échantillon de 1104 élèves et 21 enseignants. Le chercheur a utilisé des méthodes d'échantillonnage raisonnées, stratifiées et aléatoires pour sélectionner un échantillon approprié pour l'étude. Les instruments de recherche étaient un calendrier d'observation des leçons, un calendrier d'entrevues avec les enseignants et une liste de contrôle des compétences. Les données ont été analysées qualitativement et quantitativement. Les données ont été analysées objectivement à l'aide de SPSS. Sur la base du premier objectif, l'étude a révélé que différents types de matériel didactique étaient disponibles au niveau un. Les résultats ont montré que certains matériaux étaient disponibles à 100 % tandis que d'autres étaient moins/pas disponibles. Le deuxième objectif, l'étude, a également révélé que divers matériels didactiques étaient utilisés pendant l'enseignement des mathématiques. Les résultats de l'étude ont montré que certains matériaux étaient souvent utilisés tandis que d'autres étaient moins utilisés. Le troisième objectif de l'étude a révélé que l'utilisation du matériel didactique est positivement corrélée (+0,77) avec l'acquisition de compétences mathématiques. L'étude recommande que les enseignants et les autres parties prenantes clés investissent davantage de ressources pour assurer la disponibilité de matériel didactique adéquat pour les élèves. Il suggère également que la direction de l'école investisse davantage pour s'assurer que du matériel didactique suffisant et adéquat est disponible pour donner aux élèves et aux enseignants toutes les exigences de base requises pour un meilleur enseignement et apprentissage.

CHAPTER ONE: INTRODUCTION

Mathematics is an essential subject among school curriculum subjects (Alshatri et al., 2019). The relevance of mathematics in national development, human activities, scientific and technological careers, and numerous careers is attested in the literature (Bala & Musa, 2006; Eraikhuemen, 2003; Kalyan, 2020). However, because of the abstract nature of mathematics, students have difficulties understanding this subject (Mabagala, 2019). Therefore, it is important to identify ways of making mathematics more concrete for learners so they can understand it more easily.

Cameroon is currently in its Vision 2030 program that encompasses Sustainable Development Goals Four (SDG4), with a focus on quality education that calls for ensuring inclusiveness, equitable education, and promoting lifelong learning opportunities for all (NDS30). Cameroon's current competency-based curriculum (CBC) emphasises developing students' skills and competencies, and a central approach is interaction with the available instructional materials (MINEDUB, 2015). Primary education in Cameroon usually starts at the age of 6 years and lasts for six years (MINEDUB, 2015). Integrating instructional materials into the curriculum is a key strategy for improving primary-level teaching and learning quality(Cameroon primary school curriculum.2018). It is understood that children learn better by seeing and doing. Instructional materials serve as teaching and learning aids that help students to learn effectively to increase their performance (Nyirahabimana, 2019). Using instructional materials in teaching and learning mathematics makes learning easier, more interesting, concrete, enjoyable, and clear in real-life contexts**.**

Instructional materials (IMs) are essential resources that educators utilize in the teaching course. These materials are powerful tools for they make the lessons easy both on the part of the learners as well as the teachers (Tety, 2016). The idea of Hizon (2018) centres on the importance of instructional materials in the effective academic performance of pupils. The positive attitude of teachers and the proper utilization of these resources are indeed necessary in the teaching and learning process (UNICEF.2014). Thus, using quality instructional materials would boost the students' knowledge, skills, and competence in mastering a learning area. Dale (1969) defined appropriate instructional media as resources that help teachers and learners make teaching and learning more real. They help in making permanent concepts in learners’ minds. He added that using instructional materials solves teaching and learning problems from pre-primary to college levels (Dale, 1949). In addition, the utilization of appropriate instructional materials helps the teachers complement their work and get feedback from their clients during and after learning activities. More so, they help teachers achieve the set objectives of their subjects (UNICEF, 2011). Instructional resources make the teaching and learning process complete and functional (Omuna, Onchera/Kimutai, 2016). Therefore, IM plays a very important role in the process of teaching and learning.

Studies conducted in developed countries like Australia, Belgium, France, Japan, the United Kingdom and the United States noted that the use of instructional materials in teaching and learning mathematics is embraced (Omuna&kumitai). For instance, in a study on strategies for improving mathematical instructions for students in short-term facilities in Washington DC, USA, Leone, Wilson and Mulcahy (2010) showed that the inclusiveness of the classroom environment influenced learners' engagement in mathematics activities and learning. Instructional materials in classroom environment enabled the active participation of the learners.(Researcher.2022). This meant that a variety of instructional materials was an ingredient. The use of instructional materials promoted their willingness to engage in classroom activities. Leone et al. (2010) noted that using instructional materials helped learners display a positive attitude towards classroom activities, create favourable learning conditions and engage learners in the activities. It also encouraged them to be interested in this area and develop their curiosity to learn more.

In third-world countries, especially African countries, studies show that the utilization of instructional materials in the teaching and learning process has been embraced, and its impact is evident. Iji, Ogbole and Uka (2013) posited that the acquisition of mathematical concepts improved by using appropriate improvised instructional materials, thus improving their mean achievement scores. This was because the improvised instructional materials brought about competitiveness and enlivened learning for learners. Guloba, Wokadala and Bategeka (2010) asserted that the inadequacy of teaching resources contributed to low quality of education. Appropriate instructional materials should be used during the teaching and learning process to promote active understanding and not rote learning (Machaba, 2013). The absence of the use of adequate and appropriate instructional materials would encourage passive learning. The use of instructional materials brings joy to teachers and enthusiasm to learners. Teaching and learning resources help both teachers and learners in self-discovery. They promote child-centred approaches to teaching and learning through learner participation (UNICEF, 2014).

Like other schools in Africa, Cameroonian schools embrace utilising instructional materials. The utilization of instructional materials promotes academic achievements (Otieno, 2010). Ashiona, Mwoma and Murungi (2018) noted that utilization of ICT during lesson delivery increased learners' participation in learning, thus, higher academic retention. Okongo, Ngao, Rop and Nyongesa (2015) posited that a lack of adequate and appropriate instructional materials symbolized abstract teaching of mathematics and portrayed passive learning. This would result in poor performance (Wambua & Murungi, 2018). Kariuki (2013) posited that the use of instructional materials makes teaching more effective, makes lesson plans richer and help in meeting the varying needs of learners, thus positively impacting learners as well as the school performance. He added that their unavailability cripples' the acquisition of the key aspects of education.

Background of the Study

The first known systematic teaching of mathematics started in the third Millennium in states of Mesopotamia. During scribal schools edubba, the houses of tablets – prepared the scribes who had to work for the state administration and were required to master writing and accounting techniques. Similar processes are observed in Ancient Egypt (Otieno.2010).

Thus, for a long period, the goal of teaching was professional training. Mathematics became a general education subject for the first time in the city-states of Greece when a new class of free citizens governed their state emerged.

This form of general education practised two distinct patterns:

- Rhetoric and dialectic as qualifications for political activity and
- Mathematics is a certain complement.

With the enormous expansion of the educational system from the 1960s in industrialized countries because of social changes and technological advances in the professions, "Mathematics for All" became the goal for the entire pre-college education. Likewise, from the 1980s onward, "Mathematics for All" became a popular conception in developing countries, calling for equal access to quality teaching of mathematics for everybody (Schubring 2012).

In the second half of the century, the mathematics reform in the 1950s -1960s ushered in the "new mathematics", what Ernest (1989) describes as " the decade of progressive teaching methods, including discovery learning and the beginning of interest in problem-solving and mathematical investigation". During the 1960s, discovery learning, concept acquisition and learning by doing became part of the fashionable mathematics teacher's vocabulary (Cornelius 1982). Basic skills and techniques were often relegated to a lowly position as relevant and involvement became the goal. The cockroft report, mathematics counts (1982), regarded as a land mark in mathematics development of school mathematics in Britain. Swiss Pedagogue J Pestalozzi (1746–1827) recommends that teaching at all levels, should include opportunities for exposition by the teacher, discussion between the teacher and the learners and between the learners themselves, appropriate practical work, consolidation and practice of fundamental skills and routines, problem solving, including the application of mathematics to every day situation and investigative work. (Para 243).

Mathematics in Primary schools was often the last to be institutionalized within educational systems, and when they began to be established in the seventeenth– eighteenth centuries, mathematics was not their major focus. Eventually, arithmetic became one of the "three Rs" (along with reading and writing), providing basic education for daily use, including rudimentary calculation techniques(J Pestalozi 1746-1827). The rule of three, with its various applications in converting measures, indicated the highest level of teaching for a long time. Typically, primary school teachers for this subject were poorly prepared. The situation of teaching and learning mathematics began to improve in the second half of the eighteenth century because of the Enlightenment(J Pestalozi.1746-1827). Significantly, teacher education first became a concern for state initiatives. The term "normal school," predominantly used in many countries from the nineteenth century on, first referred to such state-run teacher education institutions in Austria, in Naples, and from 1795 in France. From the 1780s, teacher seminaries were analogous institutions in various German states. The ideas of the Swiss Pedagogue J.Pestalozzi (1746–1827) had an enormous influence in Europe from the early nineteenth century onward; he called to transform dull drill and rote learning into approaches for active methods and to convert the practice of reckoning into a deeper understanding of elementary mathematics. In the same vein, arithmetic had to be complemented by basic notions of geometry.

The German pedagogue Fro¨bel (1782–1852) developed didactic materials for such geometry teaching. Yet, including geometry into primary school teaching remained highly controversial throughout the nineteenth century; governments feared that pupils and their teachers would be too highly educated. Therefore, the initiatives of F. A. W. Diesterweg (1790–1866) for including geometry into teacher training at Prussian seminaries were interrupted. This strict confinement was due to the social status of primary schools: nearly everywhere, they constituted a separate school system for the lower social classes, with schools, curriculum, and teacher education all a world apart from secondary schools. Yet, it was in institutions for teacher training that pedagogical and methodological approaches for teaching (elementary) mathematics first began to be developed. Only during the twentieth century did primary schools become the first step in a consecutive system, which all students had to pass to continue on in secondary schooling. In this process, the syllabus was reformed, and basic arithmetic was replaced by fundamental concepts of school mathematics. In large measure owing to the New Math and Modern Mathematics Movements in the 1960s, the primary school syllabus became an integral part of the entire school mathematics coursework.

It is often believed that the mathematics curriculum has essentially been the same in all countries over the world. This belief is based on the similarity of some superficially descriptive terms, like algebra and geometry. In reality, history shows enormous differences in the curriculum among countries, particularly because of diverse epistemological conceptions of school mathematics and methodological approaches to the subject. From the beginning of a somewhat broadly organized teaching in premodern times, there was already a clear difference between a Euclidean approach to geometry and an anti-Euclidean one, first propagated by Petrus Ramus (1515–1572); later, influenced by him, algebraizing approaches appeared and, even later, during the French Revolution, the analytic ones. The opposition between geometric and algebraic-analytic approaches characterizes the spectrum of school mathematics curricula at the secondary level. Since secondary schools used to be dominated by classical languages, at least until the end of the nineteenth century, mathematics followed this pattern and likewise emphasized classical geometry in some countries (England, Italy) even by directly using Euclid’s Elements.

The analytic approach was generally short-lived, appearing only at the beginning of the nineteenth century. Overcoming a static curriculum, which utilized the synthetic methodology of geometry and was unconnected to scientific progress, became the motto of the reform movement, first in Germany and France, and then, directed by Felix Klein and the IMUK (ICMI), of the first international reform movement in the early twentieth century. The reformers wanted functional thinking to permeate the entire curriculum. The introduction of the function concept and the calculus elements became this reform movement's characteristics. From then on, school mathematics tried to keep up a better pace with the progress of mathematics. The main goal of the second international reform movement, from 1959, which was known as the New Math or the Modern Mathematics Movement, was to align school and modern mathematics even more tightly, constructing the curriculum on the basic structures of mathematics. Although later many ideas of this movement were rejected, school mathematics finally became structured, from the primary level, according to fundamental concepts of mathematics in arithmetic, algebra, geometry, calculus, and, as a recent innovation, probability theory and statistics.

Education was carried out in East (Francophone) Cameroon by France and in West (Anglophone) Cameroon by Britain between 1922 and 1961 (when Cameroon was administered as a trust territory of the League of Nations and subsequently as a mandated territory of the United Nations Organisation). For nearly forty years, France and Britain each subjected their sphere to a separate civilization which left behind two contrasting and often conflicting sets of values, bequeathing one lifestyle to one part of the country and another to the other part (Shu 1995). Upon attaining independence and reunification in 1961, the question of how to deal with the inherited educational systems of the British and French became a major preoccupation of the Federal government. In the face of this dilemma, the United Nations Educational Scientific and Cultural Organization (UNESCO) made some proposals from which the government, after examination, came up with a policy to harmonize the structure and contents of the curricula to give birth to a national curriculum in both Basic and Secondary education in Cameroon. Consequently, Loi No. 1. 63/COR-5, du Juillet 1963; important organization de l'enseignement Premaire elementaire from East Cameroon, and the West Cameroon Education Policy: Investment in Education (July 1963) came into being.

Contextual Background

The intention of these policy instruments was to bring the (eight-year) primary school system in Anglophone Cameroon into harmony with the six-year system in Francophone Cameroon. Following this, a common curriculum was to be adopted so that the same content is taught in the entire country in English in the Anglophone section and in French in the Francophone section by 1965. However, the reform remained unrealized, leaving the situation of primary education, especially in Francophone Cameroon, to deteriorate. In an attempt to salvage the situation, the president created the "Institute de Pedagogic Appliqúe a Vocation Rurale - IPAR" (Institute of Applied Research in Primary education) in 1967 to research and prepare educational materials adapted to the needs of the country. By another presidential order

No.1.277/CAB/PR of 10 October 1974, a sister institute (IPAR – Buea) was created to carry out research and prepare a reform of primary education in Anglophone Cameroon.

The syllabuses created by these institutions were, unfortunately, never implemented.

In the meantime, the Ministry of Basic Education (MINEDUB), in its bid to improve the quality of teaching and learning in primary schools, experimented with several initiatives beginning in 1990 with a pedagogy-by-objectives approach (Cameroon primary school curriculum.2018.). The weaknesses of this approach to teaching and learning led to the launch of another pedagogic innovation referred to as the "New Pedagogic Approach" in 1995(Cameroon primary school curriculum.2018.) and learner-centred pedagogy aimed at improving teaching and learning in primary education. The situation of outdated and ill-adapted school syllabuses worsened and led to a national outcry for the reform of the national school system. (MINEDUB inspectorate general of education 2016)

In response to the national call for reforms, the government convened a National Forum on Education in 1995 to propose new orientations to national education in Cameroon. The forum was attended by all stakeholders in education - parents, teachers, politicians, government officials, businesswomen and men, examination bodies etc. The forum's proposals were used to prepare a national education policy for Cameroon Primary and Secondary Education and enacted in the "Law No.98/004 of 14 April 1998 to Lay Down Guidelines for Education in Cameroon". (Tambo 2003)

In 1963,the wast Cameroon government issues its education policy. In 1964, East Cameroon law no. 64/CNR/3of 9 June 1964 control primary education in private schools. The Famous 1963 law on education enacted by the three arms of government (Federal, east Cameroon and west Cameroon) is one of them. The law emphasized harmonization of education in Cameroon. In 1964, the Federal law N° 64/DF/11 of 26 july 1964 regulated Secondary education. In the same year, east Cameroon law N° 64/CNR/3 of 9 June 1964 control primary education in private schools in east Cameroon. In west Cameroon, law N° 69/11 of 2nd September 1969 regulated primary education.
Another law came up in 1976 (law N° 76) 15 of 8th July which organized private education in Cameroon. This was followed by another law in 1987 (N° 87/022 of 17th December 1987) which repealed the law of 1976.

Then come the famous National education forum of 1995 which brought out all the problems and issues of the educational system of Cameroon in the Nursery, primary, Secondary and the teacher education sectors. Diagnosis on major problems were elaborated ranging from harmonization setbacks, limited finances in the public and private sectors, poor use of didactic materials, poor working conditions of teachers, inefficient use of school resources, absence of pedagogic evaluation, absence of guidance and counselling especially in the primary Schools etc.

Between 1998 and 2000 the focus of reform was on new syllabuses that reflected the orientations proposed at the national forum on education in 1995 and enacted in the national education policy law of 1998. Based on the new orientations proposed at the national forum in 1995, a new primary school curriculum for the Anglophone sub system was developed and launched in 2000/2001 academic year. This curriculum brought the duration of studies 6 (six) years into harmony with the Francophone sub system. This ensured structural harmonization in primary education in Cameroon (New Syllabuses for English Speaking primary schools 2000)

After studying these diverse educational challenges the forum diagnosed, the government then come out with an orientation law in 1998 which went through parliament and signed by president Paul Biya on the 14th of April 1998. The law is one of the major law that guides education practice in the nursery, primary, secondary and teacher education in Cameroon. Other laws regarding education are in higher education (law N° 005/16 April 2001) to guide higher education in Cameroon. There was also law N° 2004/222 of 22 July laying down the rules and regulations governing the organization and functioning of private education in Cameroon. The 2010 prime ministerial decree transferring some competences from the central government to the councils regarding basic education and the recent decentralization code signed by his excellency president Paul Biya on the 24/14/2019 where more competences on education has been transferred to the councils and regions are all eloquent testimonies of government desire to sanitize the education sector and render its functioning apt for the desired objectives to be attained. This research will therefore diasect and see whether all these legal efforts are actually yielding fruits in the field.

However, the government's publication of the Education Sector Country Status Report in 2003 intensified the search for viable national pedagogy. It led officials of (MINEDUB) to participate in a regional education seminar organized in Yaoundé by the Organisation Internationale de la Francophonie (OIF).

Cameroon's official participation in this seminar resulted in a decision to implement a new pedagogic approach called the Competence-Based Approach (CBA) in all primary schools nationwide. To successfully carry out the implementation of the above decision, a new national curriculum needed to be developed on the following general and specific objectives of the national education policy in sections 4 and 5 of law 1998. "The general purpose of education is to train children for their intellectual, physical, civic and moral development and their smooth integration into society bearing in mind prevailing economic, socio-cultural, political and moral factors" .... and that the objectives of education shall be to:

- Train citizens who are firmly rooted in their culture but open to the world
- Respectful of the general interest and the common weal
- Inculcate the primary universal ethical values, which are dignity and honour, honesty and integrity, as well as a sense of discipline in pupils and students;
- Promote family life;
- Promote national languages;
- Provide an introduction to the democratic culture and practice, respect for human rights and freedoms, justice and tolerance, the fight against all forms of Discrimination, the love of peace and dialogue, civic responsibility
- Promotion of regional and sub-regional integration.
- Cultivate the love of effort and work well done, the quest for excellence and team spirit.
- Develop creativity, a sense of initiative and the spirit of enterprise.
- Provide physical, sports, artistic and cultural training for the child.
- Promote hygiene and health education" (Law No. 98/004, 1998)

Following this decision, the ministry selected 75 primary schools nationwide were an experimental pilot study was carried out from the beginning of 2004 to the end of the 2005 academic year (Cameroon primary school curriculum.2018) . The results of the evaluation of the pilot phase took place at the end of 2005 (UNESCO 2006)and proved to be satisfactory. Consequently, Cameroon participated in a comparative study of modalities for implementing curriculum reforms alongside Gabon, Tunisia, Mali and Senegal from 2008 to 2009. This led in 2010 to a study on the reform of the Cameroon primary school curriculum with the support of the French Development Agency (AFD) through the C2D-E Program (Ministry of Basic Education 2016).

Conceptual Background

Use of instructional materials

Instructional materials and the aqwuisition of mathematics competence in the Mfoundi division. Instructional materials are those materials used by a teacher to simplify their teaching. They include both visual and audio-visual aids and could either be concrete or non-concrete. These instructional materials bring life to learning by stimulating students to learn. The use of instructional materials in the classroom can help the teacher explain new concepts clearly, resulting in better student understanding of the concepts being taught. However, they are not ends in themselves but a means to an end (Kadzera, 2006).

It is held that good teaching resources can never replace the teacher, but the teacher uses them to achieve their teaching and learning objectives. Some of the instructional materials necessary for effective teaching and learning include the chalkboard, models, graphs, charts, maps, pictures, diagrams, cartoons, slides, film strips, radio, and television (Kochhar, 1991). The importance of the use of these materials cannot be underscored. This has been emphasized by a number of scholars. Lockheed (1991) says that instructional materials are critical ingredients in learning and that the curriculum could not be easily implemented without them. Kochhar (1991) adds that a teacher with adequate and relevant teaching facilities is more confident, effective and productive. Similar sentiments are shared by Steel (1983), who asserts that relevant instructional materials enable learners to understand Conflict and Conflict Resolution clearly.

Instructional materials are essential since they help the teacher and learners avoid overemphasis on recitation and rote learning that can easily dominate a lesson. Resource materials allow learners to have practical experiences which help them develop skills and concepts and work in various ways. The work of Sampath (1990) graphically explains that people learn more through the senses of sight and hearing compared to other senses. Walkin (1982) says that instructional materials have to meet the learning objectives, be validated, and their impact is evaluated. But Jarolimek and Parker (1993) are of the view that instructional materials need to be carefully assessed before, during and after they have been used. This is because the teacher and not the media produce the exciting program for children. As such, apart from being available and adequate, instructional materials should also be used appropriately. No material is entirely self-teaching; they all require a teacher to set the stage for learning to take place because instruction materials can be no better than the teachers who use them. In summary, Romiszowski (1988), Walkin (1982) and Hills (1982) concur on the fact that if instructional materials are properly selected and used, the following will occur:

- Learning would be exciting and meaningful.
- Knowledge acquired would be retained for a longer time.
- Learners would acquire different skills.
- Students would be actively involved during lessons.

From the above views, it is clear that instructional materials are essential for effective teaching and should be made adequately available in all schools.

Acquisation of competences in mathematics

Knowledge in mathematics involves a sound understanding of numbers, measures and structures, basic operations and introductory mathematical presentations, a sense of mathematical terms and concepts, and an awareness of the questions to which mathematics can offer answers. An individual should have the skills to apply basic mathematical principles and processes in everyday contexts at home and work and to follow and assess chains of arguments. An individual should be able to reason mathematically, understand mathematical proof and communicate in mathematical language, and use appropriate aids' (European Parliament and Council of the European Union, 2006).

In mathematics education, various organizations and educational authorities define essential mathematical procedures and practices students should develop (National Council of Teachers of Mathematics, 2000; Standards for Mathematical Practice of the Common Core State Standards Initiative, 2011). In addition, various countries have extensively discussed the debate regarding the practical perspective and the mathematical rigour in developing mathematical curricular (Sullivan, 2011). In this framework, Ernest (2010) described the goals of the functional perspective. He explained the importance of learning mathematics adequate for general employment and functioning in society and mathematics necessary for various professional and industry groups. Furthermore, the Shape of the Australian Curriculum: Mathematics (Commonwealth of Australia, 2009) distinguished the practical and the specialized aspects of the mathematics curriculum and emphasized the need to educate students to be active, to interpret the world mathematically and use mathematics to make predictions as well as to take decisions regarding personal and financial priorities.

The Victorian Department of Education and Early Childhood Development of the Government in Australia (2009) underlined the importance of developing strategic skills, such as knowing that mathematics might help, adapting mathematics to the context, knowing how accurate to be, and knowing if the result makes sense in context. It also made explicit twelve scaffolding practices that are appropriate to explore/make clear what is known, challenge/extend students' mathematical thinking or demonstrate the use of a mathematical instrument. In particular, the twelve scaffolding practices refer to excavating, modelling, collaborating, guiding, convincing, noticing, focusing, probing, orienting, reflecting, extending and apprenticing.

Classroom mathematical practices focus on the taken-as-shared ways of reasoning, arguing, and symbolizing established while discussing particular mathematical ideas (Cobb, Stephan, McClain, & Gravemeijer, 2011).

Mathematical competency describes the conditions under which students learn mathematics with deep conceptual understanding. Mathematical competency is not skill-based content that students can learn through direct teaching methods but emerge over time from opportunities and experiences provided in mathematics classrooms (Hull, Balka, & Harbin- Miles, 2011). Thus, these opportunities and experiences should be coordinated by mathematics teachers and include challenging problems, collaborative groups and interactive discourse.

Mathematical competency is interdependent; in other words, they are not developed in isolation; hence, mathematics educators need to continually assess student progress on these practices in a holistic fashion. The intent is that these essential mathematical habits of mind and action pervade the curriculum and pedagogy of mathematics in age-appropriate ways. The Common Core State Standards for Mathematics described content and mathematical competency standards.

The Standards for Mathematical competency of the Common Core State Standards Initiative (2011) explained varieties of expertise that mathematics educators at all levels should seek to develop in their students. Mathematical practices' theoretical foundation lies in critical “processes and proficiencies” with longstanding importance in mathematics education. First, the mathematical practices are related to the NCTM (2000) process standards of problem solving, reasoning and proof, communication, representation, and connections.

In addition, they take into consideration the mathematical proficiency of the National Research Council's report Adding It Up: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition. Despite the importance of Key Competences and the great emphasis to their development little attention has been given to the role of mathematics education, as a main subject in the school system, in developing students' key competences. Based on this, the Key Co Mathematics project underlined that, there is a need to infuse activities that promote the development of key competences in mathematics teaching and learning. Thus, the Key Co Mathematics project tackles the challenge of implementing the "European Reference Framework of Key Competences" (European Parliament and Council of the European Union, 2006) in mathematics education and focuses on the development, implementation and evaluation of the majority of the European key competences in mathematics. Key Co Mathematics argues that students' mathematical thinking can be developed and enhanced through active, exploratory learning in open and rich situations.

In recent years great emphasis is given on the ways used to assess mathematic competencies. Gordon et al. (2009) found that the most of the EU member states implemented curricula that include competences and identified assessment as one of their most important components. In particular, assessment might give information about the learning process, can lead to the developing key competencies and may support consequently effective changes (European Commission, 2012). Indeed, 'The assessment of mathematic competencies or similar learning outcomes that emphasize knowledge, skills, and attitudes (European Commission, 2012). In addition, the national assessments in most countries focus on the basic mathematics skills, and there is a need to reveal assessment methods for the Mathematic competences.

The first step towards assessment is the operationalization of the mathematic competences (Gordon et al., 2009). By defining the key competences in mathematics and the scope of the assessment, as well by discussing the learning outcomes might give an insight for the assessment criteria (Sadler, 1987; Wolf, 2001). Furthermore, by describing the assessment tasks' characteristics and analysing their results in the learning process, students and teachers can identify and appraise performances.

Key Co Mathematics project proposed four characteristics that tasks for measuring students' key competences should:

1) Include important mathematical aspects without complexity.
2) Allow the emergence of different solutions or processes.
3) Encourage and request pupils' productions (drawings, reasons).
4) Demand reflections such as descriptions.

As the aim of the assessment tasks is to reveal the solver's cognitive processes and results, a suitable study should be clearly specified, easy to understand, comprehensibly formulated, and fit the current learners' state of knowledge. Harlen mentions a similar conception (2007) 'A clear definition of the domain being assessed is required, as is adherence to it. Secondly, although the task is based on known facts, it might offer opportunities for the solver to link various competencies, think critically, and deal actively in a situation. Exploring open situations offers opportunities to the solver to provide a variety of solutions or different approaches and problem-solving strategies. These types of tasks allow pupils to work on their own pace and abilities, to develop mathematical competences on their individual level, forcing them to activate their initiative and autonomy.

Using appropriate scenarios such as occupational and social contexts asks learners to operate with everyday life problems and situations and adapt their knowledge in different circumstances (European Centre for the Development of Vocational Training, 2010). Such con- texts demands from the solver to exploit their social, civic and cultural awareness. Finally, appropriate assessment task should encourage the actual use and level of language, enhancing the competence of communication. As Gallin and Ruf (1998) mentioned, the use of language enables thoughts to be clarified and helps a response to be elicited. Other assessment methods with the potential to assess key competences are among others standardized tests, attitudinal questionnaires, performance-based assessment, and portfolio assessment, teacher, peer and self-assessment practices (Looney, 2011; Pepper, 2013), as follow:

Attitudinal questionnaires: These questionnaires aimed to capture learners' attitudes for learning to learn and generally for assessing affective and met affective domains. However, there is a difficulty of separating cognitive and affective aspects of learning (Frederiksson & Hoskins, 2008). Additionally, a discrepancy appears between what students answer and what they actually do (European Commission, 2012).
The use of instructional materials will help in reflection and redirection of students' thoughts and will enable them to be aware of their strengths and weaknesses and consequently to identify

fruitful use of them (Gallin & Ruf, 1998). Exchanging thoughts among the learners, discussing ideas and solutions between teacher and students, keeping track of their thoughts, problems and findings, judging others solutions, advising their peers might develop and assess the competences of communication and learning to learn. Moreover, the role of teachers is important to provide appropriate feedback on remarkable insights.

Theoretical Background

The present study is based on constructivist learning theory rooted in the famous ideas of Jean Piaget, John Dewey, and Jerome Bruner that learning occurs when learners are actively involved in the process of learning and when they construct their knowledge as opposed to passive learning that is concerned about students receiving information) (Aljohani, 2017). The constructivist learning theory argues for keeping students actively involved in building and making their knowledge (Elliott, Kratochwill, Littlefield & Travers, 2000). Research by Meyer & Turner (, 2002). also indicate that information that students gain and retain in long-term memory is what they gained through learning by doing.

The Theory of Instruction guided this study by Jerome Bruner (1966). In his theory of instruction, Bruner insisted on creating autonomous learners who create knowledge independently. He says that children's schooling should bring out important outcomes like problem solvers and critical thinkers rather than only giving them concepts and categories per the culture. Bruner (1966) explained that, for knowledge to be stored and encoded in the memory, learning has to move from enactive through iconic to symbolic representation of the world around. He called these “three modes of representation”. In enactive representation (from 0-1 years) learning is action-based, where children learn through materials. They learn through the manipulation of materials. During iconic representation (1-6 years), knowledge is stored in the form of images. Diagrams or illustrations accompanied by verbal information make learning effective. This is the level of preschoolers. Finally, in symbolic representation (from 7 years and above) learning is mainly in the form of symbols. Level one learners learn best when all the modes of representation are employed (Bruner, 1966).

This theory was relevant to this study because appropriately organized instruction promotes the appropriate acquisition of concepts. When teaching is well-planned, good results emerge. Bruner emphasized that a learner of a very young age is capable of learning any concept in mathematics so long as the instruction was appropriately organized. One of the ways of organizing instructions is by providing appropriate instructional materials.

Constructivists" teaching fosters critical thinking, and creates motivated and independent learners. Constructivists suggest that learning is more effective when a student is engaged in the learning process rather than attempting to receive knowledge passively. Children learn best when they are allowed to construct a personal understanding based on experiencing things and reflecting on those experiences. Piaget's theory focuses on how learners interact with their environment to develop complex reasoning and knowledge. As children interact with their environment and new objects, they learn and develop ideas. According to Piaget, knowledge is the interaction between the individual and the environment. He further asserts that experimenting and manipulating physical objects is the main way children learn.

Jerome Bruner's theory concurred with Piaget's that learning is promoted by direct manipulation of objects, for example, in math education, the use of algebra tiles, coins and other items that could be manipulated. After a learner can directly manipulate the objects, s/he should be encouraged to construct visual representations, such as a drawing of a shape or a diagram.

According to Lev Vygotsky (1962), learning always occurs and cannot be separated from a social context. He affirms that knowledge construction occurs within social context that involves student-student, student- expert collaboration on real-world problems or tasks that build on each person's language, skills and experience shaped by individual's culture. In the classroom, constructivist view on learning can point towards a number of different teaching practices. In the most general sense, it usually means encouraging students to use active techniques (experiments, real world problems) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing. The teacher makes sure s/he understands the students pre-existing conceptions and guides the activity to address them and then build on them. Students in the constructivist classroom ideally become "expert learners". This gives them ever broadening tools to keep learning. With a well-planned classroom environment, the students learn how to learn. Constructivism transforms the student from a passive recipient of information to an active participant in the learning process. Always guided by the teacher, the students construct their knowledge actively rather than just mechanically ingesting knowledge from the teacher or the textbook.

According to Bruner's modes of representation, level one pupils are between iconic representation and symbolic representation. They learn better through manipulations of instructional materials combined with use of illustrations and symbols. Teachers should ensure availability of different instructional materials to ensure full participate of learners in learning and maximize the acquisition of mathematics competences.

Statement of the Problem

Many students report finding mathematics difficult, and researchers recommend using concrete teaching aids (Mabagala, 2019). Students are likely to forget what they hear quickly but remember what they have seen, touched, and interacted with (Olayinka, 2016). Despite the effectiveness of the use of instructional materials, it was observed that some schools lack basic instructional facilities and materials for the teaching and learning processes (Amadi, 2019). The study by Nizeyimana and Nkiliye (2021) on the hindrances to the quality of basic education showed that there is a lack of instructional materials in schools, which was considered to be one of the barriers to quality education. Indeed, when a curriculum is developed without adequate support, sufficient materials, and competent teachers, there is a waste of the implementation of the curriculum (Ottevanger, 2001).

These numerous studies mostly focused on instructional materials and general performance at different levels of learning. A few studies focused on the performance of mathematics and the acquisition of specific mathematical concepts. None of these focused on the influence of instructional materials on the acquisition of mathematical competencies among level-one learners. Therefore, this gap of inadequate, inappropriate and unutilized mathematics instructional materials prompted the researcher to conduct a study to investigate the influence of the use of instructional materials on the acquisition of mathematical competencies in Mfoundi Division. To achieve this, the study was carried out among level one pupils.

Despite the importance of instructional materials for primary mathematics teaching and learning, no study to date has investigated primary teachers' use of instructional materials during teaching and learning mathematics and the impact of instructional materials on learner participation and understanding in Cameroon. Thus, the present study sought to answer the following question: How do primary teachers use instructional materials to enhance primary students' deep understanding of mathematics in Cameroon? The study points to the benefits of using instructional materials for primary mathematics teaching and learning in ways which support the implementation of a competence-based approach (CBA) and improves learning outcomes.

Most of the available studies focused on performance and academic achievement, while others dealt with the retention of pupils in schools. Yet other studies have focused on the final performance at the primary level and secondary levels. A few studies have focused on level II and III performances in mathematics but not on the influence of using instructional materials to acquire mathematical competencies. Others have focused on readiness to learn mathematics at level one. However, all these studies did not focus on the influence of instructional materials on the acquisition of mathematical competencies. Although few were based on level one in another context, they did not focus on the influence of mathematics instructional materials on the acquisition of mathematics competencies. Therefore, it was necessary to carry out this study to investigate the influence of mathematics instructional materials on the acquisition of mathematical competencies among level one pupils.

Purpose of the Study

The purpose of this study was to investigate the influence of the use of instructional materials on the acquisition of mathematics competencies among level-one pupils.

Objectives of the Study

i. To find out the type of instructional materials available for teaching mathematics in level one classrooms.
ii. To find out whether instructional materials are utilized during mathematics instruction in level one.
iii. To establish the influence of using mathematics instructional materials on the development of mathematical competencies.

Research Questions

i. What types of instructional materials are available for teaching mathematics in level one classroom?
ii. Are instructional materials utilized during mathematics instruction in level one?

iii. What is the influence of the utilization of mathematics instructional materials on the development of mathematical competencies among level one pupils?

Research Hypothesis

H_a: the use of mathematics instructional materials has a statistically significant influence on the development of mathematical competencies among level one pupils at p=.05.
H_o: the use of mathematics instructional materials has no statistically significant influence on the development of mathematical competencies among level one pupils at p=.05.

Significance of the study

Since it is the role of the Ministry of Basic Education (MINDUC) to provide instructional resources to all public primary and secondary schools in Mfoundi, it is hoped that the findings of this study will be helpful. The results of this study may be useful in improving the policies that govern the allocation and disbursement of funds by Ministries Of Education to public primary schools. Policies may be reviewed at different levels in the education sector to increase the allocation of funds to each child. This may lead to an increased supply of Instructional Materials to public schools, thus improving the acquisition of mathematics concepts.

The findings of this study might also be of benefit to the guardians and donors. They could willingly be involved in the provision of instructional materials in level one classroom. This would form a strong educational bond between pupils, teachers and their/guardians when the pupils see their participation in ensuring the acquisition of mathematics skills.

In addition, the study might also help in upgrading the policies governing mathematics instruction. It may help teachers and school heads to put more emphasis on the use of mathematic instructional material during the instruction of mathematics. This would help in attaining set mathematics objectives, and increase pupils' involvement in mathematics activities, thus improving performance and development of positive attitude towards this discipline.

Furthermore, it is anticipated that data collected from this study would add more information and knowledge to the existing literature about mathematic instructional material. Researchers and other educationists can benefit from this data and add to what the researcher would have started. Researchers can also identify gaps in this study that they would like to fill.

Delimitations of the Study

This study aimed to investigate the influence of different types of instructional materials and their utilization on the acquisition of mathematical competencies among pupils in level one in the Mfoundi division. The study focused on one activity area, the acquisition of mathematics competencies. This meant that other activity areas in level one were not included. The different types of instructional materials focused on were mathematics instructional and the concept they enhanced. The other instructional materials were not studied. In addition, the performance of pupils in mathematics in the previous levels was not studied, that is, pupils' performance in pre-primary, simply because enrollment of the pupils to level one was from various pre-schools. More so, teachers in pre-primary were not included in the sample, and neither were teachers in levels two nor three. The study focused only on level one pupils, their teachers and their' participation.

Assumptions of the Study

It was assumed that level one parent understood their responsibility to participate in their children's academic work. It was also assumed that level one teachers embraced the sourcing of instructional materials for teaching and learning and used them during instruction. It was also assumed that public and private primary school administration understood that the availability of instructional materials was their input.

Operational Definition of Terms

Level one

Level one refers to the first level of Primary education classification, which usually begins at age 5, 6, 7 or 8. Level one is typically designed to give pupils a sound primary education in English language and literature, mathematics, science and technology, ICT and physical education, and an elementary understanding of other subjects such as social studies, art and music. Age is usually the only minimum entry requirement at level one. Programs at the primary level generally require no previous formal education, although it is increasingly common for children to have attended a pre-primary program before entering primary education.

Teaching

According to Morrison (1934), teaching is an intimate contact between a more mature personality and a less mature one designed to further the latter's education. N.L.Gage (1962)stated that teaching is a form of interpersonal influence aimed at changing the behavior potential of another person. Edmund Amidon (1967) defined teaching as an interactive process involving classroom talk, which occurs between teacher and pupil and during certain definable activities. Smith (1969) defined teaching as a system of actions involving an agent, an end in view, and a situation including two sets of factors – those over which the agent has no control (class size, size of classroom, physical characteristics of pupil etc.) and those that he can modify (way of asking questions or ideas learned). Greens (1971) defined teaching as a teacher's task, which is performed for a child's development. According to Farrant (1980) teaching is the process that facilitates learning. The teacher plays a vital role because he acts as a catalyst, actively stimulating knowledge. Wells, (1982) has defined teaching as a cluster of activities that are noted about teachers, such as explaining, deducing, questioning, motivating, taking attendance, keeping a record of work, students 'progress and students' background information.

Acquisition of mathematical competencies

This is grasping the concepts or the understanding of mathematical concepts by learners. The use of instructional materials during instruction facilitated the understanding of skills. In this light Mulder (2001) define competence as the capability of a person, or an organization, to reach specific achievements. Personal competencies comprise integrated performance-oriented capabilities, which consist of clusters of knowledge structures and also cognitive, interactive, affective and where necessary psychomotor capabilities, and attitudes and values, which are required for carrying out tasks, solving problems and more generally, effectively functioning in a certain profession, organization, position or role. This suggests that a working definition must be developed before proceeding with the curriculum design. In the context of the curricula reform in Basic Education in Cameroon, competence refers to all the knowledge, skills and attitudes required of nursery primary school children. And Broad- based competencies refers to knowledge, skills and attitudes that are taught across different learning domains (Ministry of Basic Education 2016).

Instructional materials

Instructional materials are those materials used by a teacher to simplify their teaching. They include both visual and audio-visual aids and could either be concrete or non-concrete. These instructional materials bring life to learning by stimulating students to learn. They indicate a systematic way of designing, carrying out and employing the total learning and communication process and employing human and non-human resources to bring out a more meaningful and effective instruction. They are human and non-human material that a teacher uses to pass information to the learner in his/her class. The use of instructional materials in the classroom has the potential to help the teacher explain new concepts clearly, resulting in better student understanding of the concepts being taught. However, they are not end in themselves but they are means to an end (Kadzera, 2006).

Some of the instructional materials necessary for effective teaching and learning include the chalkboard, models, graphs, charts, maps, pictures, diagrams, cartoons, slides, filmstrips, radio, and television (Kochhar, 1991). The importance of the use of these materials cannot be underscored. This has been emphasized by a number of scholars. Lockheed (1991) says that instructional materials are critical ingredients in learning and that the curriculum could not be easily implemented without them.

Mathematical competencies in level one

Mathematical competencies are expected learning outcome of schooling. In the school system, mathematical competence encompasses basic arithmetic skills, intermediate concepts like algebra, fractions, decimals, percentage and understanding and computing geometrical shapes. But in recent times due to digitization of many aspects of our lives, importance of data for making personal decisions like health, investments, taxation etc. has reshaped what it means to be mathematically competent. It has become critical for individuals to go beyond problem solving, to a deeper level of reasoning which will provide intellectual acumen for problem solving (Potolea,2012).

CHAPTER TWO: REVIEW OF RELATED LITERATURE

Both teachers and students need instructional materials to successfully teach and learn any subject (Janovsky, 2015). Within this vein, Msafiri (2017) argues that instructional materials help teachers to easily achieve instructional objectives and students to understand the content in practical ways. Ogbu (2015) observed that a teacher that uses teaching aids to deliver his or her lesson will cover more facts in less time than one who rely on only oral lesson delivery. Brudett and Smith (2003) in their study based on 57 schools in England and Wales, concluded that the learning institutions with abundant learning and teaching resources perform better than the institutions without. Unfortunately, instructional materials are insufficient in many Cameroon schools, resulting in poor quality education (Nizeyimana & Nkiliye, 2021).

In most cases, many learners have difficulties understanding certain mathematical concepts due to their beginner level of cognitive operation. However, where standard instructional materials are scarce or unavailable in a school, those 'improvised' from locally available materials can enhance lessons (Ndihokubwayo et al., 2020). Onasanya et al. (2008) noted that improvisation demands venture, creativeness, curiosity, and determination on the part of teachers. Iji (2014) suggests that improvised instructional materials may enable students to build accuracy, understanding, and efficiency. Abimbade (2004) noted that using improvised materials in a mathematics classroom assists in the proper introduction of new skills, develops understanding, and shows the appropriate way of doing things. Egbu (2012) also argues that involving learners in classroom activities is critical as it makes teaching learner-centred. That is why educators should emphasise the use of instructional materials to guarantee a sustainable educational system(Ng'etich &Chemwei 2015).

On the other extreme, Umugiraneza et al., (2018) found that teachers in Kwazulu - Natal schools, South Africa, do not use instructional technology in mathematics lessons because they were not confident enough in the preparation and use of the tools. The researchers also found that students were not familiar with these technology tools. Ogbondah (2008) suggested that what discourages the utilisation of instructional materials is the lack of information on where tools can be found, lack of basic skills for teachers about the design, selection, and utilisation of these tools, and non-availability of electricity. But all agree that studying with instructional support enhances students' understanding of self-regulated learning of mathematics (Agwagah, 2001; Bala & Musa, 2006; Meyer & Turner, 2002).

Instructional materials can be improvised, Adebimpe (1997) and Aguisiobo (1998), Onasanya et al: (2008), (SMASE Project, 2010) noted that, improvisation demands adventure, creativity, curiosity and perseverance on the part of teachers. Such skills are only realized through well-planned training program on improvisation. Odii F, (1990) asserts that improvised instructional materials may be used as practice devices with which the students build accuracy, understanding and efficiency. According to Dada (2006), improvised instructional materials involve producing and using alternative resources to facilitate instruction. Again, Ikwuas and Onwiodiket (2006) state that improvised materials involve selecting and deploying relevant instructional elements of teaching and learning processes in the absence or shortage of standard teaching and learning materials for the meaningful realization of specified educational goals and objectives. Abimbade (2004) had earlier noted that the approach of using improvised materials in mathematics classroom assist in proper introduction of new skills, develop understanding, and show the appropriate way of doing things.

Instructional strategies need to be identified where the use of manipulative are often suggested as some of the effective approaches to improve student mathematics achievement (Gurbuz, 2010; Sherman & Bisanz, 2009). Mathematics manipulative-based instructional techniques are approaches that include opportunities for students to physically interact with the objects to learn target information (Carbonneau & Marley, 2012). For example, at the elementary level, teachers use play money to help students learn basic arithmetic functions. The use of manipulative in mathematics instruction has been cited as a strategy to allow students draw on their practical knowledge (Burns, 1996). Concrete objects that resemble everyday items should assist students in making connections between abstract mathematical concepts and the real world (Brown, Neil, & Glernberg, 2009).

Brudett and Smith, (2003) in their study based on 57 schools in England and Wales concluded that those learning institutions with abundant learning and teaching resources, favorable student-teacher ratio, commendable workload and good reward and incentives for teachers perform better than the institutions that do not provide the same. However, in a clear departure from the above views, Orji (2012) and Ekpe (2010) in their independent studiesagreed that instructional materials are not necessarily important if the learners are intelligent and the teacher has good mastery of the subject matter. Egbu (2012) argued that involving learners in classroom activities is what matters most as it makes teaching learner centered.

Eke (2010) carried out a survey study on the various roles of using instructional materials in teaching Social Studies in primary schools in the Isukwata local government. The finding showed that instructional materials make abstract ideas concrete and easier to understand. Arisi (1998) carried out a study on the usage of instructional materials by social studies teachers in junior secondary schools in Oredo local government area of Edo state. In this study female teachers were found to use instructional materials more than the male social study teachers. The finding equally showed that female teachers are more predisposed than the male teachers in terms of improvisation of instructional materials Williams (2004) conducted a study on the extent of utilization of instructional facilities in secondary schools in the Gboko Education zone of benue state, which found that instructional facilities appear to be inadequate. Nwafor (2012) carried out a study on the availability and utilization of Social Studies Instructional materials in secondary schools on Onueke Education zone of Ebony, State. According to this study, instructional mat was available underutilized. Ifeaka (2005) studied the influence on the production and utilization of instructional materials on students‟ attitude to chemistry in Anambra state. The results revealed that chemistry teachers tend to show a poor attitude towards the production of instructional materials.

The above-reviewed works have a relationship with the present study as they all focused on some aspects of instructional materials; however, they differed significantly from the present study in content and geographical scope, creating a gap in knowledge in achievement. The premise on which this study stands, the interest in filling this existing gap in knowledge, is to determine the impact of instructional materials on academic achievement in mathematics in public primary schools.

Types of Instructional Materials Available for Teaching and Learning Mathematics

Instructional materials are important elements in the teaching and learning process. Availability and appropriate instructional materials (IM) in a mathematics classroom signifies the use of most senses and learner-centred teaching approaches. Various instructional materials are used for mathematics instruction, including manipulative materials such as concrete materials, printed materials, and non-print materials.

The availability of appropriate instructional material is important in the process of teaching and learning. Dale (1969) in his theory of instruction posits that, learning is a process in which concrete and abstracts interact. Dale (1969) classified instructional material into visual, audio, and audio-visual materials. The question to ask is, what enables learners to understand concepts without much difficulty and increase their retention rate?

Various local and international studies have been done on different types of mathematical instructional materials (MIM). Studies on mathematics IM have been carried out in developed countries like United States of America (USA), Norway and Turkey. In USA for example, Cetin & Neslihan (2015), noted that instructional materials like flashcards and printed books are available and are used during mathematics lessons. Drew & Hansen (2007) added that manipulative instructional materials were also available in classrooms. Calculators and programmed computers were also availed for learners to use in the classrooms (Raven, 2016). These materials/resources reinforce learning of mathematics concepts (Raven, 2016). Drew & Hansen added that adequate and appropriate teaching/learning materials make mathematics real. Raven added that appropriate instructional materials reinforced appropriate concepts among young learners. Concepts reinforced included classification, number relationships, geometry, place value, time, among others. Although these studies focused on instructional materials and reinforced mathematics concepts, they are similar to the local concepts according to level one design. Despite the similarity, these studies were carried out in developed countries where economic and technology factors are advanced. There is therefore, a need to carry out a similar study in Cameroon in Mfoundi division, particularly among level one pupils, to find out the types of mathematics instructional materials available, how they are used and their influence on acquisition of mathematics competencies.

Different studies in African countries like Nigeria, Ghana, Mauritius, South Africa, and Uganda show that a variety of mathematic instructional materials are used during teaching and learning. In Ghana, for example, Yeboah (2011) in a report about learning to teach reading and mathematics and its influence on teaching practice found out that just as they had been trained on, majority (94.23%) of the student teachers and newly qualified teachers had the perception that use of concrete and practical examples was one of the best ways to help children understand basic concepts in mathematics. However, when dispersed to the field for practice and teaching, they reported otherwise. In their observation, they never saw any of the experienced teachers teaching using any teaching and learning materials (TLM), (Yeboah, 2011). Teachers used teacher centered approaches to teach reading and mathematics which are inappropriate approaches for teaching young children. Despite the study being conducted among student teachers in colleges, it did not indicate whether the student teachers were expected to observe the presence of instructional materials in the classrooms or whether the experienced teachers were using them to teach. Further, the study did not indicate the level the students were particularly referring to when the study said that the experienced teachers were using teacher-centered approaches to teach reading and mathematics.

In Uganda, Uwezo (2011) reported that one out of every five (22%) of all level three children could not correctly solve numerically written division sums of level two. More than one out of every ten (11%) of all level seven children could not correctly solve numerically written division sums of level two. Some of the reasons Uwezo (2011) gave for poor performance in arithmetic were the type of schools attended, whether government or private schools, level of education, and presence of feeding program in the school, among others. Although the report focused on performance in mathematics among lower primary school learners, it did not have screen shots on the appearance of the classrooms to show the presence of instructional materials. Neither did the report shed light on types of mathematic instructional material used during instruction. More so, the report did not mention mathematics performance among grade one learners. This gave the researcher the urge to carry out this study.

Since the inception of Free Primary Education (FPE) in Kenya in 2003 by National Rainbow Coalition (NARC) government, the Ministry of Education (MOE) has been disbursing funds to all public primary schools to ensure availability of appropriate instructional material. In the budgetary allocation, 35% is meant for textbooks and 5% for supplementary readers and reference materials per pupil. Only 0.5% is allocated for charts and wall maps (Hakijamii, 2010). These allocations are inadequate to support purchase of enough appropriate instructional materials for a full school term. Misappropriation of the funds by school heads may also lead to failure to buy appropriate instructional materials or buying less (Bunyi et al, 2012). Delay in the disbursement of the funds also may contribute to late purchase of instructional materials. Thus, there is a need to find out how learners acquire mathematical competencies amid these issues. For instant, in a study done in Butere by Wekesa (2015) on early intervention on mathematics difficulties and performance of grade three showed that, 20% of the learners with difficulties in mathematics experienced difficulties in carrying over numbers while 20% had problems borrowing numbers in subtraction and other difficulties. In addition, the study found out that 37.5% and 25% of teachers in private and public schools respectively conducted a paid tuition as an intervention to curb difficulties in mathematics. Although different intervention measures were taken to curb difficulties in mathematics, the study did not indicate whether instructional materials were among the strategies to curb these difficulties. Yet, the study did not show the impact of instructional materials on the improvement of performance of mathematics. In addition, the target population for the study was level three learners as opposed to the target population of this study which was level one learner. Therefore, there was need to conduct this study, to determine the influence of instructional materials on acquisition of mathematical competencies.

In Mombasa County, Ashiona, Mwoma and Murungi (2018) survey on whether ICT empowers teachers to teach mathematics better in lower primary schools found that ICT complemented teachers' classroom work and makes learning activities manageable. Although the study was on mathematics activities, it was a mixed survey whose participants were lower primary school teachers. Therefore, it is important to carry out this study in Mfoundi division, Nakuru East Sub County, to find out whether ICT services were available in grade one classrooms and whether these services promoted acquisition of mathematics competences.

In a survey conducted by Wambua and Murungi (2018) in Kibwezi Makueni County on teaching and learning materials, teacher pupil's ratio and its influence on pupils' performance in social studies found out that different teaching and learning materials were available for teaching and learning social studies. Among the available materials were; course books (42.86%), charts (57.14%), syllabus (71.43%), chalkboard (71.43%), pupils exercise books (71.43%) and teacher's guide (85.71%). The researchers found out that these instructional materials were not enough for the learners thus poor performance of social studies. Despite the study being conducted in Kibwezi Zone, Makueni County, the study was also conducted to find out on teaching and materials that affected social studies performance. A similar study therefore prompted the researcher to focus in Mfoundi division to find out the types of available teaching and learning materials mathematics in level one one classroom.

Jeptanui's (2011) survey on efficiency of instructional materials in public schools in Wareng Sub County, Uasin Gishu County found out that, 75% of learners had one textbook in mathematics. Jeptanui further found out that 53% of the learners borrowed textbooks they did not have, 38% reported that they used teacher notes and 8% bought the missing books. This is a clear indication of inadequacy of instructional materials. This is likely to handicap learning of mathematics in public primary schools in Wareng Sub County. However, the survey was not specific about the class or level under study. Although the survey focused on efficiency of instructional materials it did not focus on any specific discipline. It was on general efficiency of instructional materials. Therefore, there was need to carry out this study which focused on mathematics instructional materials and acquisition of mathematics competencies among level one learners.

In a survey conducted by Njenga (2014) on factors influencing pupils' performance in national examination in Nakuru North Sub County which borders Nakuru East SubCounty, showed that 78.6% and 50% of teachers in public primary schools indicated inadequacy and unavailability respectively of books, charts and learning reference books. On the other hand, teachers from private schools stated adequacy, appropriateness and availability of instructional materials. These differences affected the outcome of KCPE examination results in public and private schools in the Sub County. However, Njenga's survey focused on the general final performance in national examinations. It is therefore likely that the study was carried out among standard eight learners. Thus, need to focus on level one pupils, types of instructional materials in their classrooms and acquisition of mathematics competences.

The role of using instructional materials in mathematics education

Swan and Marshall (2010) redefines mathematics materials as "an object that an individual can handle in a sensory manner during which conscious and unconscious mathematical thinking will be fostered" (p. 14). Therefore, mathematics manipulatives are materials from our own environment that students can touch and move to learn or formalize mathematical ideas. In this context, materials are found in two groups: the physically represented form of concrete materials, and the computer produced form of digital materials (Burns & Hamm, 2011; Moyer, 2001). Educational materials are sometimes in digital environments and sometimes they are in the form of physical objects. For education, manipulative materials are used for concretize the abstract concepts to be taught. Tangrams, algebra tiles, isometric paper, colorful beads, game cards, scale, pattern blocks, unifix cubes, and caricatures are examples of physical materials that have been used in teaching mathematics for years (NCTM, 2000). Learners worked directly with these materials. Digital manipulations are computer applications and software copies of web-based applications. These computer applications can be accessed online. Once technology is widespread at schools, computer-based electronic materials are easy to access. Digital materials enable teachers to integrate pictorial, verbal, and symbolic representations of mathematics problems more easily. The main difference between physical and digital materials is that you can touch the physical materials (Karakırık & Aydın, 2016).

Teaching with digital material provides more flexibility for manipulation, whereas physical materials enable students to develop their psychomotor learning skills as they address the sense of 'touching' (Olkun, 2003). Materials in a web-based environment provide opportunities for interactivity; learner can rotate, flex and reshape the object easily in virtual environments. In addition, there is a need to use computer applications in teaching of mathematics as an instructional material (Bozkurt & Akalın, 2010; Burns & Hamm, 2011). Within this respect, it is important for students to interpret the concepts through real and concrete experiences. In Burns and Hamm's research (2011) few studies were found which support the idea that digital materials should be used more than physical materials. Similarly, according to Reimer and Moyer (2005), the advantage of using digital materials rather than physical material is that technology-based materials are easily accessible and they associate abstract symbols with visual images. Utilizing technology in mathematics has positive effects on the quality of teaching and learning. Integrating instructional activities in appropriate contexts also affects learning positively (Baki & Çakıroğlu, 2010).

There is a large volume of published studies describing the effect of using digital or physical materials in teaching of mathematics on academic achievement of students. Most of these studies have found that using instructional materials in mathematics lessons has more positive contributions to student learning compared to the lessons where none of the instructional materials are used (Aburime, 2007; Clements, 1999; Gürbüz, 2010; Ojose & Sexton, 2009; Manches et al., 2010; Olkun, 2003). Thompson (1992) reported that using materials did not have a significant effect on student success. Some researchers also found no effect or negative effects of using materials on student achievement in mathematics (McNeil & Jarvin, 2007; Moyer-Packenham & Suh, 2012). There can be several reasons for this inconsistency. For example, factors such as duration of treatment, knowledge of teachers, type of the material, age-level of the students and other characteristics of the learning environment may affect the process. For this reason, there is a need for systematic investigation of available experimental studies about the effects of using educational materials in mathematics lessons on academic achievement of students.

In Turkey, there is a considerable amount of studies about the effects of utilizing instructional materials in classroom environment and these instructional materials are also suggested in the revised curriculum. There are several other studies about the effectiveness of instructional materials. This indicates a need to combine all these individual and multiple studies and to systematically analyze them in a single study. This single study will contribute to the literature. For this reason, researchers have often attempted to compare the effectiveness of using educational materials in mathematics education with outcomes of teaching without using such materials (Aburime, 2007; Clements, 1999; Gürbüz, 2010; Kablan, 2010; Sowell, 1989; Şengül & Körükcü, 2012; Yuan et al., 2010).

Despite the fact that a large number of meta-analysis studies have been carried out in other countries, there is a limited study on meta-analyses published about the effects of using materials in mathematics education in Turkey. For example, Kablan et al. (2013) used different material types (power point, animations, cartoons...etc.) and searched for an answer to this question: Does material use in education affect academic the achievement of students? They tried to obtain the answer to this question for 11 different courses. They found that using materials in teaching positively affected academic achievement of students, but student success did not vary by education level, course type and material type. In Demir and Başol's study (2014), the effects of using computer- based materials on student success were investigated and positive effects were found, but their meta-analysis study did not include studies regarding using concrete materials.

There is a limited number of empirical evidences on comparisons of digital and physical materials to determine if teachers use digital and physical materials or do not use to teach mathematics. In addition, this study is different from the previous studies, aimed to investigate the effects of all forms of mathematics materials used as a teaching material except textbooks on academic achievements of students in different grade levels. This meta-analysis study included empirical research on using mathematics materials. This paper addresses this gap in literature by examining the relative instructional efficiency of digital and physical materials. In addition, as a result of the research, the extent to which the use of teaching materials in mathematics lessons and the moderator variables affecting the use of materials in mathematics are explained in detail in Turkey, this study will shed light on the work to be done. In this respect, it is important for researchers to investigate who gave the education to students, how long the education was, how it was applied, in which learning areas the materials were used, which type of materials were used because the results found out from this investigation are all important information for the design of learning environments.

Utilization f Instructional Materials During Mathematics Instruction

Utilization of IM in classroom instruction enables independence of learners. It also promotes creativity, critical thinking and confidence among learners (Ali et al, 2013). Omuna et al (2016) posits that, instructional material makes teaching and learning process complete and functional. As noted earlier, different mathematics instructional materials are available to facilitate mathematics instruction. Studies conducted in developed countries like USA, Europe, Turkey and Uruguay noted that instructional material utilisation during mathematics instruction was embraced. For instance, in a study on strategies for improving mathematics instruction in USA. Leone et al (2010) posited that instructional materials influenced learner's interest to engage in mathematics activities. They promoted inclusive classrooms. They added that instructional material created favorable learning conditions and classroom climate that engage learners. At the same time, Barak (2012), an American educator, emphasized that the use of instructional materials during instruction enhanced hands-on activities. However, these studies were conducted among youth in Juvenile centers. Neither did the report indicate the process of instruction among young children in the center, nor did it mention anything to do with elementary education.

In South Africa, SACMEQ III (2010) reported that instructional materials increases classroom participation in teaching and learning activities. The report added that instructional resources impact positively on the quality of teaching and learning. Although some lights were shed on presence and utilization of instructional materials, the report was exclusively based on grade six. It did not focus on other levels of learning particularly grade one mathematics instruction which is a crucial stage in formal learning. In other African countries like Uganda, UNICEF (2014) reported that for a school to be friendly, the environment should help children find joy in learning activities. The report revealed that, teaching learning resources (TLR) promoted enthusiasm in the process of teaching and learning. The report further showed that, instructional material helped both teachers and learners in self-discovery. Further, it posited that instructional material promoted child centered approaches of teaching and learning through learner participation. Although, the report was based on child friendly learning environment, it showed utilization of instructional materials through pictures of learners interacting with materials such as charts, books and other manipulative materials (UNICEF 2014). However, no specifications on the level of learning were indicated. The report focused on the general child friendly classrooms and school environment. It did not indicate anything on mathematics, neither did it specify on materials used for acquisition of mathematical competencies. This report therefore, created a need to find out more of the utilization of these instructional materials in acquisition of mathematical competencies in level one pupils in Mfoundi division.

In Kenyan schools, use of instructional materials is given a lot of importance. This gives the reason as to why the Ministry of Education has taken the sole responsibility of providing instructional materials to all public primary schools (Hakijamii Trust, 2010). Many studies have been done in Kenya to find out the utilization of instructional materials in classrooms. For example, a study in Isinya Sub County by Nsiza and Murungi (2017) on strategies that can be used to enhance teachers' use of teaching aids in teaching and learning posited that for teachers to use teaching aids during instruction, adequate teaching aids should be availed in the classrooms to avoid fighting for the few resources. They said that adequate teaching aids saved time and made learning livelier. However, their study was based on preschool teachers and general teaching among preschool children in Isinya Sub County. In Mfoundi division, more light needed to be shed on the utilization of instructional materials by level one learners that would lead to acquisition of mathematics competences.

In a survey by Ashiona, Mwoma and Murungi (2018) on whether ICT empower teachers to teach mathematics better in lower primary in Mombasa showed that teachers utilized tablets during instruction. They found out that due to utilization of ICT during instruction, lesson was more interactive and broke monotony brought about by rote instructions. Despite the study being conducted in lower primary school, still, there was need to focus on grade one and acquisition of mathematics competences. Thus, the researcher was prompted to conduct this study in Mfoundi division to find out whether teachers in level one utilized instructional during instruction to enhance acquisition of mathematics competences.

In a study in Nairobi by Magoma (2016) on readiness to learn mathematics by grade one learners showed that 68.3% of the learners studied were able to write dictated numbers, 85.4% were able to put together objects, 69.9% were able to take way operations with simple numbers, while 52.8% were able to recognize provided Kenyan currency. This study however did not show whether the objects provided for calculation were provided by the researcher or they were available in the classroom before the study. Although the study focused on readiness to learn mathematics among grade one learners, the purpose of the study was to establish grade one learners' readiness to learn mathematics at the start of primary school education. The study also aimed at exploring the influence of the learners' family economic class,' level of education among others in Kasarani Sub County, while this study wishes to find out the influence of instructional materials on acquisition of mathematical competencies among level one pupils in Mfoundi division.

Another study by Wanjiru (2015) in Murang'a, posited that instructional materials were used to teach and learn mathematics vocabulary. As a result, performance of mathematics improved. However, the study used a non-equivalent control group pretest-posttest quasi experimental design which was suitable for experiment. This study however employed correlation research design which will enable comparisons between two competency checklists to examine progress in mathematics competencies. In Nakuru North Sub County, Njenga (2014) noted that, instructional materials enable learners to perform better in national examinations. The study noted that, resources make teaching and learning easier by complementing the teachers' role as a guide. It continued to show that, lack of resources makes the process of teaching and learning rigid. Due to this, teachers might result to rote methods of teaching which places pupils in a passive role. However, the purpose of the study was to investigate the factors influencing pupils' KCPE performance, where instructional materials were among the findings. Nevertheless, the study did not focus on the performance of mathematics but on general performance on national examinations. In addition, the study did not show findings on the influence of instructional materials on acquisition of mathematical competencies. Furthermore, the study's target population was grade eight learners compared to the grade one learners, who formed the target population of this study. This prompted the researcher to conduct this study on the influence of IM on acquisition of mathematics competences.

Influence of Utilization of Mathematics Instructional Materials

The utilisation of instructional materials during any learning activity enables learners to understand, enjoy and manipulate abstract concepts (Adipo 2015). The ultimate goal of using instructional material during teaching and learning is to enable learners to make abstract concepts a reality. Studies conducted in Germany, England and United States showed that use of teaching/learning materials supported instructional practices. A study by Mischo & Maab (2013) in Germany found that instructional materials affected teaching and learning of mathematics. In addition, they noted that instructional materials aided in improving performance in mathematics by 85.3%. Although instructional materials had a relationship with performance of low achieving grade six learners who were the target population of the study, the target population of this study was grade one learner in Nakuru East Sub County. In addition, the purpose of the study was focused on the modeling performance of low achieving students from families with a low socio-economic status as compared to the purpose of this study which was to find out the effects of instructional materials on acquisition of mathematical competencies among level one pupil in Mfoundi division.

In African countries, studies have shown that, use of mathematics instructional materials has been embraced. A paper by Iji, Ogbole & Uka (2013) in Nigeria reported that due to utilization of improvised instructional materials, learners taught in geometry improved their mean achievement scores. This was because the improvised instructional material brought about competitiveness and enlivened learning for students. This paper showed that acquisition of the intended skill was achieved, but the focus was only one concept, geometry. It did not cover other areas in mathematics. Further, the study was carried out among upper basic education level students in Nigeria. Thus, there was a need to carry out this study to find out the influence of instructional materials on acquisition of mathematics skills as per the syllabus among grade one pupils in Nakuru East Sub County. In South Africa, Smith & Hardman (2014) noted that, use of computer-based software had helped pupils develop higher levels of geometric thinking and to learn geometric concepts and skills. They also showed that sixth grade learners who were taught concepts of area and volume using a computer-based program improved overall performance than eighth grade learners taught traditionally. According to this study, only one type of teaching aid was focused on, that is, computer software loaded with teaching programs. In addition, the population under study was grade six learners as compared to grade one learners, the target population of this study. This study focused on the influence of utilization of all mathematic instructional materials on acquisition of mathematical competencies among level one pupils.

Guloba, Wokadala & Bategeka (2010) in Uganda found that inadequate teaching resources resulted in teacher-centred teaching approaches. This contributed to low quality of education. The findings also showed that availability of instructional materials provided motivating conditions for teaching and learning thus promoting better outcomes. However, the study was carried out in Uganda among grade three and grade six learners in their performance in literacy and numeracy. This study was carried out among grade one learners. In addition, the study employed the baseline survey conducted between July and August in the districts under study. All these studies were carried out in areas outside Cameroon. Therefore, there was a need to focus on Mfoundi division and determine the influence of instructional materials on acquisition of mathematics competencies.

In Kenya, most studies on the relationship between instructional materials and acquisition of mathematics competences show that instructional materials greatly impact mathematics performance. For example, a study done in Masaba by Nyamongo, Sang, Nyaoga & Matoke (2014) on the relationship between school-based factors and students' performance showed that inadequate resources and irregular training led to poor student performance. They added that textbooks are a major input for performance in examinations. Inadequate teaching and learning materials led to teachers using other methods of teaching leading to inactive learners. This study was carried out at secondary school level unlike this study which focused on primary school level of education particularly level one pupils. In addition, their study was based on overall performance in the final secondary school examination unlike this study which focused on acquisition of mathematical competencies among level one pupils.

A study conducted in Bondo by Otieno (2010) reported that, instructional material strengthens learning. He also noted that, academic achievements were realized through appropriate use of instructional material. He found that instructional materials help teachers enjoy the process of teaching while learners find it exciting. This encourages exploration and manipulation, bringing forth improved performance in mathematics. Although Otieno's study focused on the effects of teaching/learning resources on mathematics performance, his target population was senior four learners, teachers and head teachers in secondary school. In another study carried out in Nakuru North Sub County, Gichohi (2014) found out that 53% of the teachers agreed that inadequate instructional materials affects teaching and learning processes as well as pupils' concentration. Njenga (2014) agrees with Gichohi's findings by confirming that 78.6% of teachers indicated inadequacy of instructional materials. Their studies established that inadequate instructional materials affected performance of primary national examination because instructional materials promoted better understanding of concepts thus better performance in examination. Nevertheless, Gichohi's purpose was to investigate the institutional factors affecting pupils' retention in public primary schools as compared to the purpose of this study which was to find out the influence of instructional materials on acquisition of mathematical competencies among level one pupils. In addition, the study adopted a survey research design owing to its versatility and generalization as contrasted to correlation research design which this study adopted. As Gichohi's study focused on secondary school final national examinations, this study focused on level one acquisition of mathematical competencies. Therefore, there was a gap to be filled to determine whether instructional materials' utilisation influenced acquisition of mathematics competencies.

National Core Skills and Competences

The Prime Minister of Cameroon, appointed a committee from the five ministries in charge of education (ministries of Basic, Secondary and Higher education, ministries of Employment and Vocational Training and of Labour and Social Insurance) to develop national core competences that will suffuse national curricula and meet the needs of the labour market. The core national skills and competences show clearly the skills and competences to be developed by learners by the end of the school program. They constitute the knowledge, skills and attitudes related to Cameroon reality and selected to enable all participants involved in pedagogy to successfully accomplish their teaching effectively. The seven National Core Skills and four broad-based competencies to be acquired by the end of the primary school program are:

1. Communicate in the two official languages (English and French) and using at least one national language
2. Use basic notions in mathematics, science and technology
3. Practice social and citizenship values (Morality, good governance and budgetary transparency)
4. Demonstrate a spirit of autonomy, a sense of initiative, creativity, and
5. Entrepreneurship
6. Use basic information and communication technology concepts and tools
7. Lifelong learning
8. Practice physical, sport and artistic activities

Broad-Based Competences

1. Intellectual competences
2. Methodological competence
3. Personal and interpersonal competences
4. Communication competences" (Socle National de competence)

The curriculum field is currently going through an interesting development in the way curricula are recently being organized. The field is witnessing a shift in curriculum design away from the traditional subject driven; learner centered and society-based models to one increasingly based on the principles of competency-based education (CBE). Grant et all. (1979) define competency-based education as a form of education that derives the curriculum from an analysis of a prospective or actual role in contemporary society and that attempts to certify student progress on the basis of demonstrated performance in some or all aspects of that role. In the same light Jones (2002, as cited in Saore 2015) proposes three methodological landmarks that should characterize a competence-based curriculum (CBC):

- A description of the competence;
- A means of assessing competence;
- A standard by which the student is judged to be competent.

Therefore, to design a competence-based curriculum, a common vision on the competencies that students will acquire must be adopted, and that is because it will determine a shared point of view on the learning that must take place and of the organizing of the context in this respect. The design of the instructional strategies will be linked with the type and structure of the competence and will depend on the way the learning context is shaped, and that must reflect both the work market requests and the lifelong learning principles (Saore 2015).

According to Roegiers, (2001), an education which has as its focus the learning of competences is a prerequisite for the implementation of a pedagogy of integration which aims to enable the learner to master those situations, he/she will have to deal with in his/her professional and/or private life. In this connection the pedagogy of integration has four objectives, that of process, relevance, application and association.

Two major schools of thought – the Anglo-Saxon and French- Speaking - can be perceived in the arena of a pedagogy of integration separated by the accent placed on the vertical and horizontal transfer of achievement. First proposed and developed by Gagné in 1962, vertical transfer proposes that a student is able to learn higher-order skills only if s/he has previous mastery of their elements (Gagné, 1962; White & Gagné, 1974), while horizontal transfer, proposes that by solving several similar-level complex situations, provided they are presented in different contexts, the students learn to transfer.

The competence-based curriculum for Basic Education in Cameroon appears to be underpinned by the French-speaking pedagogical view, which places the development of competences on teaching the student to learn through a complexity of ongoing "active" methods. The transfer effort here is achieved in a global way and needs little structuring (Fourez, 1999; Jonnaert, 2002; Jonnaert & Masciotra, 2004; Legendre, 2004; Meirieu, 2005; Meirieu & Develay, 1992). The focus is on the learning process and applying the know-how, i.e., search for information, analyze information, and explain information.

Mathematical Competency

At the most general level, mathematics competency is characterised in terms of content (what mathematics students should know) and process (how students should go about doing and understanding mathematics). Education for 21st-century skills has stimulated researchers to suggest competencies that can promote talents development [Ambrose and Sternberg 2016]. Among these competences, mathematical competence learning plays an important role in education. Mathematical Competence is defined in the European Recommendations for learning [Perso, 2011] as "the ability to develop and apply mathematical thinking to solve a range of problems in everyday situations" and is considered to be of key importance for lifelong learning within European countries. Numeracy, the basic mathematical skill [Perso, 2011], is the ability and disposition to use and apply mathematics in a range of context outside the mathematics classroom. In building a sound mastery of numeracy, process and activity are relevant as knowledge as well. In the European Recommendations for learning [European Parliament 2006], mathematical competence involves the ability and willingness to use mathematical models of thought (logical and spatial thinking) and presentation (i.e., formulas, models, constructs, graphs, and charts). Counting competencies have been emphasised internationally as of primary importance for children's development of mathematical proficiency.

Competence in mathematics is something complex, hard to define which requires the students not only knowledge and skills, but at least some measurable abilities, which Niss names competencies (Niss, 2003). He has distinguished eight characteristic cognitive mathematical competencies. The following table lists them in two clusters:

Table 1: Mathematics competences

The ability to ask and answer questions in and with mathematics	The ability to deal with mathematical language and tools
Mathematical thinking competency	Representation competency
Problem handling competency	Symbols and formalism competency
Modelling competency	Communication competency
Reasoning competency	Tools and aids competency

Mathematical thinking competency:

Includes understanding and handling of the scope and limitations of a given concept; posing questions that are characteristic of mathematics and knowing the kinds of answers that mathematics may offer; extending the scope of a concept by abstracting and generalizing results; distinguishing between different types of mathematical statements (theorems, conjectures, definitions, conditional and quantified statements).

Problem-handling competency includes the ability to solve problems in different ways, delimitating, formulating and specifying mathematical problems.

Modelling competency: includes analyzing the foundations and properties of existing models, assessing their range and validity; decoding existing models; performing active modelling in given contexts.

Reasoning competency: includes understanding the logic of a proof or of a counter-example; uncovering the main ideas in a proof; following and assessing other's mathematical reasoning; devising and carrying out informal and formal arguments.

Representation competency: includes understanding and utilizing different kinds of representations of mathematical entities; understanding the relations between different representation of the same object; choosing, making use of and switching between different representations.

Symbols and formalism competency: include decoding symbolic and formal language; understanding the nature of forma mathematical systems; translating back and forth between symbolic language and verbal language; handling and manipulating statements and expressions containing symbols and formulas.

Communication competency: includes understanding other's mathematical texts in different linguistic registers; expressing oneself at different levels of theoretical and technical precision.

Tools and aids competency: include knowing and reflectively using different tools and aids for mathematical activity.

Factors Affecting the Development of Mathematics Competency

In an effort to understand the factors associated with mathematics competency, researchers have focused on many factors. (Beaton & Dwyer, 2002; Kellaghan & Madaus, 2002; Kifer, 2002). The impact of various demographic, social, economic and educational factors on students' math competency continues to be of great interest to the educators and researchers. For instance, Israel et al. (2001) concluded that parents' socioeconomic status is correlated with a child's educational achievement. Another study by Jensen and Seltzer (2000) showed that factors such as individual study, parents' role, and social environment had a significant influence on "further education" decisions and achievements of young students'. In another study, Meece, Wigfield & Eccles (1990) investigated cognitive motivational variables that influence high school students' decisions to enroll in advanced math courses. Their findings revealed that math ability perceptions affect students' valuing of math and their expectations for achievement.

A growing body of research provides additional factors which could have an impact on students' competency, such as gender, family structure, parents' educational level, socio-economic status, parent and student attitudes toward school, and parent involvement (Campbell et al. 2000; Epstein, 1991; Fennema & Sherman, 1976, 1986; Fluty, 1997). Three factors or predictors in math competency are divided into sub factors:

- Demographic Factors (gender, socio-economic status, parent's educational level),
- Instructional Factors (teacher competency, instructional strategies and techniques, curriculum, school context and facilities).
- Individual Factors (self-directed learning, arithmetic ability, motivation). These are examined in the literature review below.

Demographic Factors

Various demographic factors are known to be related to mathematics competency. Gender, socio-economic status, and parents' educational level are factors that have been analyzed in this study as predictors of math competency.

Gender

Many variables have long been studied as predictors of mathematics competency. However, gender issues on math achievement are studied most frequently by researchers. For instance, a study through a meta-analysis reveals that males tend to do better on mathematics tests that involve problem-solving (Hyde, Fennema, and Lamon 1990). Females tend to do better in computation, and there is no significant gender difference in understanding math concepts. Another study shows that females tend to earn better grades than males in mathematics (Kimball, 1989).

Some recent studies have revealed that gender differences in mathematics education seem to be narrowing in many countries. However, studies indicate that as students reach higher grades, gender differences favor increase in math achievement by males (Campbell, 1995; Gray, 1996; Mullis, Martin, Fierros, Goldberg, & Stemler, 2000). For instance, the results from the Third International Mathematics and Science Study showed that mathematics achievement scores of each gender group were close to each other at the primary and middle school years (Beaton et al., 1996; Mullis et al., 1997). However, in the final year of secondary school, evidence was found for gender differences in mathematics achievement. Another study, which was conducted to analyze factors that affect math achievement of 11th-graders in math classes with an identified gender gap, also showed that males scored higher than females on 11th grade math achievement test, but this difference decreased from 10th grade (Campbell & Beaudry, 1998).

In addition, gender differences in attitudes and perceptions of the usefulness of mathematics for middle school students were found statistically important (Lockheed, Thorpe, Brooks-Gunn, Casserly, and McAloon 1985; Oakes 1990). For example, female students show less interest in mathematics and have negative attitude toward mathematics. It is also reported that girls tend to learn mathematical concepts by means of rules or cooperative activities, while boys tend to be in a competition to master mathematical concepts (Fennema & Peterson, 1985; Hopkins, McGillicuddy-De Lisi, & De Lisi, 1997).

The literature on gender differences provides evidences that gender issues impact competency in mathematics. Hence, it is crucial for educators and researchers to pay attention to gender differences in the design of mathematics instruction.

Socio-Economic Status

Socio-economic status is determined to be a predictor of mathematics competency. Studies repeatedly discovered that the parents' annual level of income is correlated with students' math achievement scores (Eamon, 2005; Jeynes, 2002; Hochschild, 2003; McNeal, 2001). Socio-economic status was found significant in primary math and science achievement scores (Ma & Klinger, 2000). Another study found poor academic achievement of Canadian students to be attributable to their low socio-economic status (Hull, 1990). Socio-economic status was examined and found to be one of the four most important predictors of discrepancy in academic achievement of Canadian students (aged 15) in reading, mathematics, and science by the Program for International Student Assessment (Human Resources Development Canada, Statistics Canada, & Council of Ministers of Education Canada, 2001).

A number of studies showed that parents with higher socio-economic status are more involved in their children's education than parents of lower socio-economic status. This greater involvement results in development of positive attitudes of children toward school, classes, and enhancement of academic achievement (Epstein, 1987; Lareau, 1987; Stevenson & Baker, 1987). It is believed that low socio-economic status negatively influences academic achievement, in part, because it prevents students from accessing various educational materials and resources, and creates a distressing atmosphere at home (possible disruptions in parenting or an increased likelihood family conflicts) (Majoribank, 1996; Jeynes, 2002). For these reasons, a student's socio-economic status is a common factor determining academic achievement.

Parents' Educational Level

Parents' educational level has been shown to be a factor in academic achievement. Parents serve as role models and guides in encouraging their children to pursue high educational goals and desires by establishing the educational resources on hand in the home and holding particular attitudes and values towards their children's learning. In this case, parents' educational attainment serves as an indicator of attitudes and values that parents use to create a home environment that can affect children's learning and achievement.

A number of studies indicated that student achievement correlates highly with parents' educational attainment (Coleman, 1966). For instance, students whose parents had less than high school education obtained lower grades in mathematics than those whose parents had higher levels of education (Campbell, Hombo, & Mazzeo, 2000). Research has shown that parents' educational level impacts student attitudes toward learning and their mathematic competency.

Instructional Factors

Curriculum

Many concerns have been emphasized in the literature about the existing math curricula. The concerns here are not that students should never learn to compute, but that students must learn how to critically analyze mathematical problems and produce effective solutions. This requires them to learn, how to make sense of complex math concepts and how to think mathematically (Cobb et al., 1992). Many mathematics curricula overemphasize memorization of facts and underemphasize understanding and application of these facts to discover, make connections, and test math concepts. Memorization must be raised to conceptualization, application and problem-solving for students to successfully apply what they learn. An impressive body of research suggests that curriculum that considers students to be incapable of metacognitive actions (e.g., complex reasoning) should be replaced with the one that sees students who are capable of higher-order thinking and reasoning when supported with necessary and relevant knowledge and activities (Bransford et al., 1994; Schauble et al., 1995; Warren & Rosebery, 1996). Research has also revealed evidence that curricula in which students' knowledge and skills grow is significantly connected to their learning, and therefore their achievement (Brown & Campione, 1994; Lehrer & Chazan, 1998).

Instructional Strategies and Methods

Being successful in math involves the ability to understanding one's current state of knowledge, build on it, improve it, and make changes or decisions in the face of conflicts. To do this requires problem solving, abstracting, inventing, and proving (Romberg, 1983). These are fundamental cognitive operations that students need to develop and use it in math classes. Therefore, instructional strategies and methods that provide students with learning situations where they can develop and apply higher-order operations are critical for mathematics achievement.

In the literature, it is pointed out that for students to accomplish learning, teachers should provide meaningful and authentic learning activities to enable students to construct their understanding and knowledge of this subject domain (Wilson, 1996). In addition, it is emphasized that instructional strategies where students actively participate in their own learning is critical for success (Bloom, B. 1976). Instructional strategies shape the progress of students' learning and accomplishment.

Teacher Competency in Mathematics Education

Many studies report that what teachers know and believe about mathematics is directly connected to their instructional choices and procedures (Brophy, 1990; Brown, 1985; National Council of Teachers of Mathematics, 1989; Thompson, 1992; Wilson, 1990aGeliert (1999) also reported that "in mathematics education research, it seems to be undisputed that the teacher's philosophy of mathematics has a significant influence on the structure of mathematics classes". Teachers need to have skills and knowledge to apply their philosophy of teaching and instructional decisions.

In the 21st century, one shifting paradigm in education is about teachers' roles and competencies. Findings from research on teacher competency point out that If teachers are to prepare an ever more diverse group of students for much more challenging work--for framing problems; finding, integrating and synthesizing information; creating new solutions; learning on their own; and working cooperatively--they will need substantially more knowledge and radically different skills than most now have and most schools of education now develop (Darling-Hammond, 1997).

Teachers need not only knowledge of a particular subject matter but also pedagogical knowledge and knowledge of their students (Bransford et al., 2000). Teacher competency in these areas is closely linked to student thinking, understanding and learning in math education. There is no doubt that student achievement in math education requires teachers to have a firm understanding of the subject domain and the epistemology that guides math education (Ball, 1993; Grossman et al., 1989; Rosebery et al., 1992) as well as an equally meticulous understanding of different kinds of instructional activities that promote student achievement. Competent math teachers provide a roadmap to guide students to an organized understanding of mathematical concepts, to reflective learning, to critical thinking, and ultimately to mathematical competency.

School Context and Facilities

School context and its facilities could be an important factor in student achievement. In fact, identifying factors related to the school environment has become a research focus among educational practitioners. For instance, research suggests that student achievement is associated with a safe and orderly school climate (Reyonds et al., 1996). Researchers also found a negative impact on student achievement where deficiencies of school features or components such as temperature, lighting, and age exist. In a study by Harner (1974), temperatures above 23° C (74° F) adversely affected mathematics skills. In terms of the condition of school building, Cash (1993) found student achievement scores in standard buildings to be lower than the scores of students in above standard buildings. In addition, Rivera-Batiz and Marti (1995) conducted multiple regression statistical analysis to examine the relationship between overcrowded school buildings and student achievement. The findings indicated that a high population of students had a negative effect on student achievement.

Individual Factors

Self-Directed Learning

Self-directed learning could be a factor in students' math achievement. Mathematics learning requires a deep understanding of mathematical concepts, making connections between them, and producing effective solutions to ill-structured domains. No perfect, well-structured, planned or prescribed system lets students think and act mathematically. This can be done if, and only if, students play their assigned roles in their learning progress. Self-directed learning has an important place in successful math learning. Self-directed students can take the initiative in their learning by diagnosing their needs, formulating goals, identifying resources for learning, and evaluating or monitoring learning outcomes (Knowles 1975). The teacher's role is to engage students by helping to organize and assist them as they take the initiative in their own self-directed explorations, instead of directing their learning autocratically (Strommen & Lincoln, 1992).

Arithmetic Ability

Arithmetic ability could also be another predictor of math achievement. Arithmetic ability includes the skills such as manipulating mathematical knowledge and concepts in ways that transform their meaning and implications. It allows students to interpret, analyze, synthesize, generalize, or hypothesize the facts and ideas of mathematics. Students with high arithmetic ability or mathematical reasoning can engage in tasks such as solving complex problems, discovering new meanings and understanding, and arriving at logical conclusions.

Arithmetic ability was determined by various studies as a critical factor on students' math achievement. For instance, in a study by Kaeley (1993), arithmetic ability gave the highest correlation coefficient with mathematics achievement. Similarly, student achievement scores were found to be most strongly predicted by level of ability (Schiefele & Csikszentmihalyi, 1995). Some other researchers have also investigated the relationship of gender issues and arithmetic ability on math achievement. For instance, Mills (1997) conducted a study to investigate longitudinal data gathered over 10 years to ask whether personality traits were related to gender differences in long-term achievement in mathematics and the sciences. The study revealed that math ability was the most significant predictor of long-term achievement in math for young women. However, the level of math ability did not seem to be a factor of long-term math achievement for young men.

Motivation or Concentration

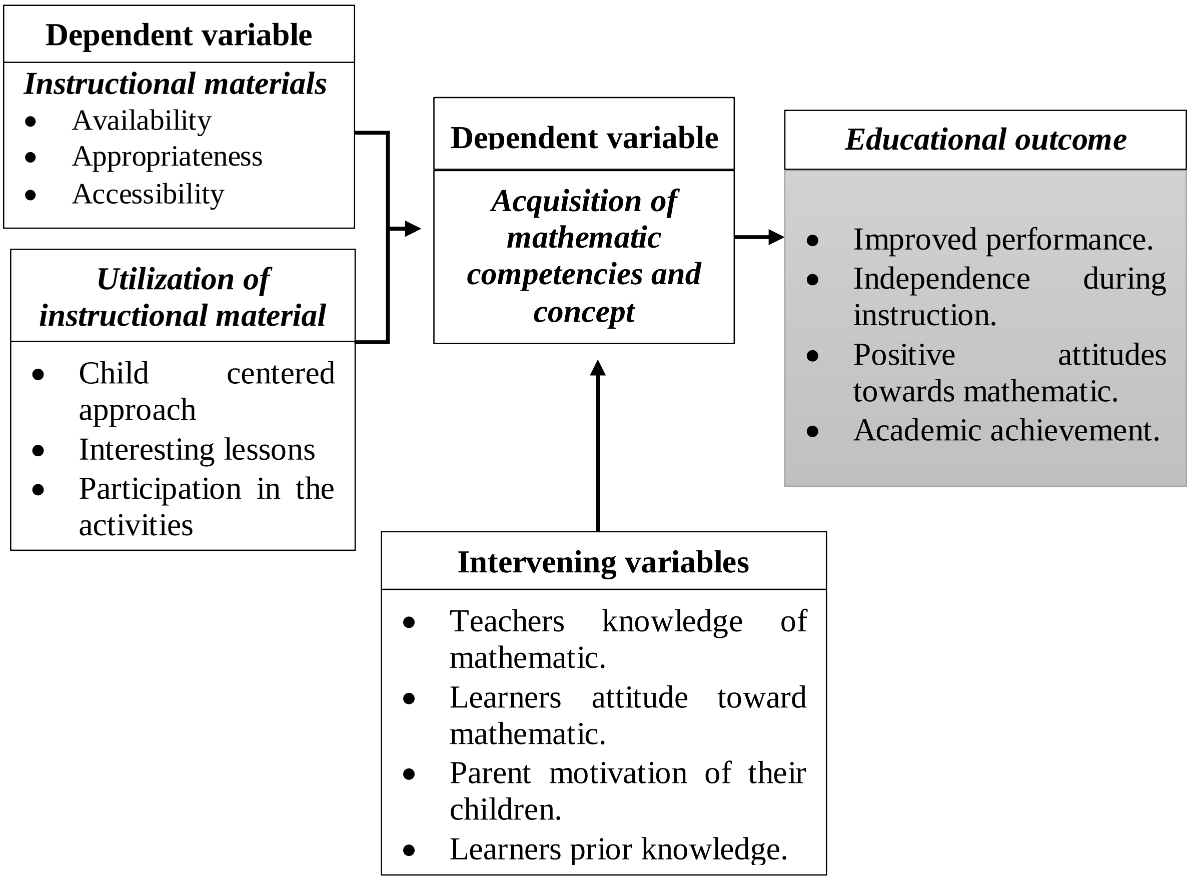
Mathematics education requires highly motivated students because it requires reasoning, making interpretations, and solving mathematical issues, and concepts. The challenges of mathematics learning for today's education is that it requires disciplined study, concentration and motivation. To meet these challenges, learners must be focused and motivated to progress. Broussard and Garrison (2004) examined the relationship between classroom motivation and academic achievement in elementary-school-aged children (122-first grade and 129-third grade participants). Consistent with previous studies, they found that for a higher level of mastery, motivation was related to higher math grades.

The teacher's role in students' motivation to learn should not be underestimated. In helping students become motivated learners and producers of mathematical knowledge successfully, the teacher's main instructional task is to create a learning environment where students can engage in mathematical thinking activities and see mathematics as something requiring "exploration, conjecture, representation, generalization, verification, and reflection" (Carr, 1996, p.58)

Conceptual Framework

The conceptual framework shows the influence of instructional materials in the acquisition of mathematics in level one pupils and teachers. The conceptualized variables likely to influence acquisition of mathematical competencies among preschool learners include the availability and appropriate use of mathematics instructional materials available in level one classrooms, utilization of instructional materials and their effects on mathematics performance. When these factors are considered, the possible outcomes include improved performance in mathematics, learners' independence during instruction and thus a positive attitude towards mathematics. This leads to overall academic achievements.

Figure 1: Factors influencing the use of Instructional Materials on Acquisition of Mathematical Competencies.



Source: Researcher (2022) Key

Study variables

Non-study variables

The above conceptual framework shows the relationship between the independent and dependent variables. Instructional materials and utilization of instructional materials constitute the independent variables while the acquisition of mathematical competencies constitutes the dependent variable. When the available instructional materials are appropriately utilized, positive educational outcomes are achieved, but when there is unavailability of instructional materials, they will be less utilization during instruction.

Theoretical Framework

Education involves the process of the development and learning of the child on multiple dimensions, facilitated by the teacher, who is guided by a curriculum. Effective education is a process where the teacher, children and schools involved and participate actively. An important restriction of education is that teachers cannot simply transmit knowledge to students, but students must actively construct knowledge in their minds. They discover and transform information, check new information against old, and revise rules when they no longer apply. This constructivist view of learning considers the learner an active agent in the knowledge acquisition process. Constructivist conceptions of learning have their historical roots in the work of Dewey (192 9), Bruner (1961), Vygotsky (1962), and Piaget (1980). Bednar, Cunningham, Duffy, and Perry (1992) and von Glasersfeld (1995) have proposed several implications of constructivist theory for instructional developers stressing that learning outcomes should focus on the knowledge construction process and that learning goals should be determined from authentic tasks with specific objectives.

Constructivist learning theory

Constructivism is basically a theory which is based on observation and scientific study, about how people learn. It says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences (Bereiter, 1994). When we encounter something new, we have to reconcile it with our previous ideas and experience, maybe changing what we believe or discarding the new information as irrelevant. In any case, we are active creators of our own knowledge. We must ask questions, explore, and assess what we know to do this. In the classroom, the constructivist view of learning can point towards a number of different teaching practices. In the most general sense, it usually means encouraging students to use active techniques (experiments, real-world problem solving) to create more knowledge and then to reflect on and talk about what they are doing and h ow their understanding is changing. The teacher makes sure he/she understands the students' preexisting conceptions, and guides the activity to address them and then build on them (Oliver, 2000).

Constructivism has roots in philosophy, psychology, sociology, and education. But while it is important for educators to understand constructivism, it is equally important to understand the implications this view of learning has for teaching and teacher professional development (Tam, 2000). Constructivism’s central idea is that human learning is constructed, that learners build new knowledge upon the foundation of previous learning. This view of learning sharply contrasts with one in which learning is the passive transmission of information from one individual to another, a view in which reception, not construction, is key. Two important notions orbit around the simple idea of constructed knowledge. The first is that learners construct new understandings using what they already know. There is no tabula rasa on which new knowledge is etched. Rather, learners come to learning situations with knowledge gained from previous experience, and that prior knowledge influences what new or modified knowledge they will construct from new learning experiences (Phillips, 1995).

The second notion is that learning is active rather than passive. Learners confront their understanding in light of what they encounter in the new learning situation. If what learners encounter is inconsistent with their current understanding, their understanding can change to accommodate new experience. Learners remain active throughout this process: they apply current understandings, note relevant elements in new learning experiences, judge the consistency of prior and emerging knowledge, and based on that judgment, they can modify knowledge (Phillips, 1995).

According to Driscoll (2000), constructivism learning theory is a philosophy which enhances students' logical and conceptual growth. The underlying concept within the constructivism learning theory is the role which experiences-or connections with the adjoining atmosphere-play in student education. The constructivism learning theory argues that people produce knowledge and form meaning based upon their experiences. Two of the key concepts within the constructivism learning theory which create the construction of an individual's new knowledge are accommodation and assimilation. Assimilating causes an individual to incorporate new experiences into the old experiences. This causes the individual to develop new outlooks, rethink what were once misunderstandings, and evaluate what is important, ultimately altering their perceptions. Accommodation, on the other hand, is reframing the world and new experiences into the mental capacity already present. Individuals conceive a particular fashion in which the world operates. When things do not operate within that context, they must accommodate and reframing the expectations with the outcomes.

Constructivism is often compared to objectivism, which is usually quoted as being the counter point or direct opposite of constructivism. Much of objectivist theory is based on the work of behaviorists such as Skinner (1953.) Objectivists believe that information itself is knowable outside the bounds of any human mind, and that any individual interpretation of knowledge can be said to be either correct or incorrect. Objectivists view individual pieces of information as symbols or currency that can be acquired by humans, and can be transferred from human to human should the correct learning conditions exist. (Jonassen, 1991)

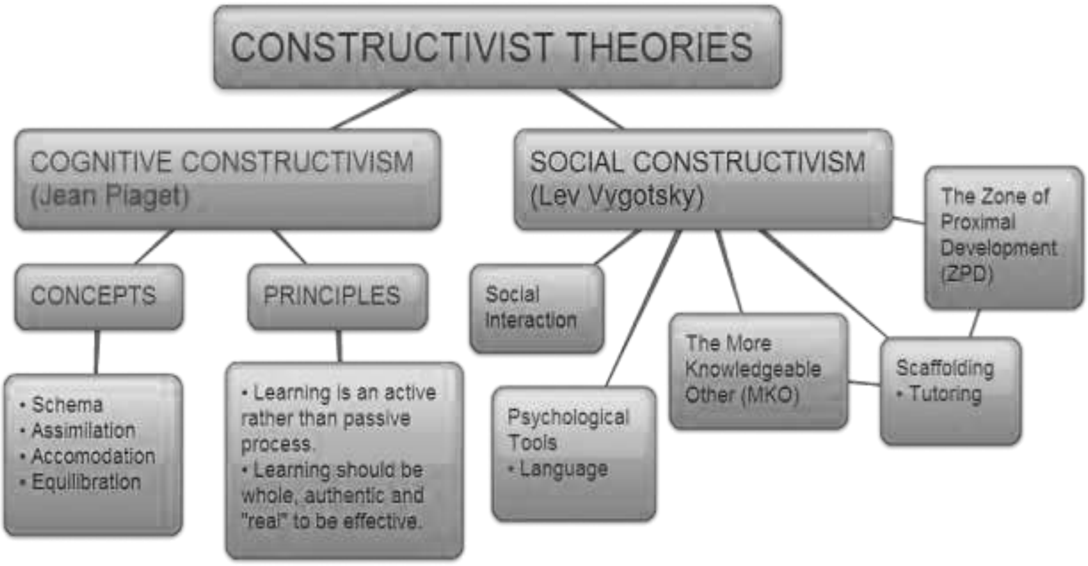
While much of the early work in formal instructional design derived from objectivist theory, modern academic minds have come to accept that learning environments which more closely match the needs of constructivist learning may be more effective. The perceived benefits of constructivist learning may be particularly valuable where the teaching of complex skills, such as problem solving or critical thinking skills are concerned (Tam, 2000.)

If we accept that constructivist theory is the best way to define learning, then it follows that in order to promote student learning it is necessary to create learning environments that directly expose the learner to the material being studied. For only by experiencing the world directly can the learner derive meaning from them. This gives rise to the view that constructivist learning must take place within a suitable constructivist learning environment. One of the central tenants of all constructivist learning is that it has to be an active process (Tam, 2000); therefore, any constructivist learning environment must provide the opportunity for active learning.

As earlier indicated, Jean Piaget and Lev Vygotsky are widely recognized as the most influential developmental psychologists in the 20th Century. Their study of cognitive development has provided the foundation for constructivist learning theory. Constructivists‟ theory believes that people develop their knowledge through active participation during learning. However, Piaget (1970, 1977) tells us that cognitive development is a product of the mind achieved through observation and experimentation, whereas Vygotsky (1978) views cognitive

development as a social process, achieved through interactions with other knowledgeable members of the culture. Piaget refers to his work as „cognitive‟ constructivism. Piaget's theory comprises two major elements: „ages‟ and „stages‟. According to him, these elements help predict what learners can and cannot understand at different ages and stages. Piaget's theory of cognitive development suggests that human beings are unable to automatically understand and utilize information that they have been given, because they need to „construct‟ their own knowledge through prior personal experiences so as to enable them create mental images. The primary role of the teacher in a constructivist environment, therefore, should be to provide the setting, pose the challenges, and offer the support that will motivate or encourage learners to create their own knowledge through their personal experiences (Lunenburg & Ornsteing, 2008; Rummel, 2008).

Figure 2: Constructivist theories



Vygotsky refers to his work as „social" constructivism. Vygotsky's theory is very similar to Paget's assumptions about how knowledge is created as well as how people learn, but Vygotsky places more importance on the social context of learning. In Paget's theory, the teacher plays a limited role, whereas in Vygotsky's theory, the teacher plays an important role in learning. Learning activities in constructivist settings are characterized by active engagement, experiential learning, inquiry-based, problem–based learning, and collaboration with others. As a dispenser of knowledge, the teacher's role is to guide, facilitate, coach, provoke, and co-explore in ways that allow the learner to engage in critical and creative thinking, analysis and synthesis of ideas during the learning process as the teacher assumes the role of co-learner who encourage learners to question, challenge, and formulate their own ideas, opinions, and conclusions.

Basic characteristics of constructivist learning:

Tam (2000) lists the following four basic characteristics of constructivist learning environments, which must be considered when implementing constructivist instructional strategies:

- Knowledge will be shared between teachers and students.
- Teachers and students will share authority.
- The teacher's role is one of a facilitator or guides.
- Learning groups will consist of small numbers of heterogeneous students.

According to Audrey Gray, the characteristics of a constructivist classroom are as follows:

- The learners are actively involved
- The environment is democratic
- The activities are interactive and student-centered
- The teacher facilitates a process of learning in which
- Students are encouraged to be responsible and autonomous.

Implications of constructivism for teaching and learning

Central to the tenet of constructivism is that learning is an active process. Information may be imposed, but understanding cannot be, for it must come from within. Constructivism requires a teacher to act as a facilitator whose main function is to help students become active participants in their learning and make meaningful connections between prior knowledge, new knowledge, and the processes involved in learning. Brooks and Brooks (1993) summarize a large segment of the literature on „constructivist teachers" descriptions. They conceive of a constructivist teacher as someone who will:

- Encourage and accept student autonomy and initiative;
- Use a wide variety of materials, including raw data.
- Primary sources, and interactive materials and encourage students to use them; Inquire about students' understandings of concepts.
- Before sharing his/her own understanding of those concepts; Encourage students to engage in dialogue.
- Teacher and one another; Encourage student inquiry by asking thoughtful, open-ended questions.
- Questions and encourage students to ask questions to each other and seek elaboration of students" initial responses; Engage students in experiences that show contradictions
- To initial understandings and then encourage discussion; Provide time for students to construct relationships.

- Create metaphors; Assess students‟ understanding through application.
- Performance of open-structured tasks. Hence, from a constructivist perspective, the teacher's primary responsibility is to create and maintain a collaborative problem-solving environment, where students are allowed to construct their own knowledge, and the teacher acts as a facilitator and guide.

Role of teachers

In the constructivist classroom, the teacher's role is to prompt and facilitate discussion. Thus, the teacher's main focus should be on guiding students by asking questions that will lead them to develop their own conclusions on the subject.

- Encourage and accept student autonomy and initiative.
- Use a wide variety of materials, including raw data, primary sources, and interactive materials and encourage students to use them.
- Inquire about students‟ understandings of concepts before sharing his/her own understanding of those concepts.
- Engage students in experiences that show contradictions to initial understandings and then encourage discussion.
- Provide time for students to construct relationships and create metaphors.
- Assess students‟ understanding through application and performance of open-structured tasks.

Following learning strategies can be used by the teachers to create constructivist learning environment:

- Use of multimedia/teaching aids
- Scaffolding
- Case studies
- Role playing
- Story telling
- Group discussions/Group activities
- Probing questions
- Project based learning
- Use of learning strategies for social and emotional learning of students.

Difference Between Traditional Classroom and Constructivist Classroom

In the constructivist classroom, the focus tends to shift from the teacher to the students. The classroom is no longer a place where the teacher ("expert") pours knowledge into passive students, who wait like empty vessels to be filled. In the constructivist model, the students are urged to be actively involved in their own process of learning. The teacher functions more as a facilitator who coaches, mediates, prompts, and helps students develop and assess their understanding, and thereby their learning. And, in the constructivist classroom, both teacher and students think of knowledge not as inert factoids to be memorized, but as a dynamic, ever-changing view of the world we live in and the ability to successfully stretch and explore that view.

The chart below compares the traditional classroom to the constructivist one. One can see significant differences in basic assumptions about knowledge, students, and learning.

Table 2: Difference between traditional classroom and constructivist classroom

Traditional Classroom	Constructivist Classroom
The curriculum begins with the parts of the whole. Emphasizes basic skills.	The curriculum emphasizes big concepts, beginning with the whole and expanding to include the parts.
Materials are primarily textbooks and workbooks.	Materials include primary sources of material and manipulative materials
Strict adherence to a fixed curriculum is highly valued.	The pursuit of student questions and interests is valued.
Assessment is through testing, correct answers.	Assessment includes student works, observations, points of view, and tests. Process is as important as product.
Knowledge is seen as inert	Knowledge is seen as dynamic, ever-changing with our experiences
Students work primarily alone.	Students work primarily in groups.
Learning is based on repetition	Learning is interactive, building on what the student already knows.
Teacher's role is directive, rooted in authority.	Teacher's role is interactive, rooted in negotiation.

Principles of Constructivism

Constructivist teaching is based on recent research about the human brain and what is known about how learning occurs. Caine and Caine (1991) suggest that brain-compatible teaching is based on 12 principles:

1. The brain is a parallel processor. It simultaneously processes many different types of information, including thoughts, emotions, and cultural knowledge. Effective teaching employs a variety of learning strategies.

2. Learning engages the entire physiology. Teachers can't address just the intellect.

3. The search for meaning is innate. Effective teaching recognizes that meaning is personal and unique, and that students' understandings are based on their own unique experiences.

4. The search for meaning occurs through 'patterning'. Effective teaching connects isolated ideas and information with global concepts and themes.

5. Emotions are critical to patterning. Emotions, feelings, and attitudes influence learning.

6. The brain processes parts and wholes simultaneously. People have difficulty learning when either parts or wholes are overlooked.

7. Learning involves both focused attention and peripheral perception. The environment, culture, and climate influence learning.

8. Learning always involves conscious and unconscious processes. Students need time to process 'how' as well as 'what' they've learned.

9. We have at least two different types of memory: a spatial memory system, and a set of systems for rote learning. Teaching that heavily emphasizes rote learning does not promote spatial, experienced learning and can inhibit understanding.

10. We understand and remember best when facts and skills are embedded in natural, spatial memory. Experiential learning is most effective.

11. Learning is enhanced by challenge and inhibited by threat. The classroom climate should be challenging but not threatening to students.

12. Each brain is unique. Teaching must be multifaceted to allow students to express preferences.

Pedagogical Goals of Constructivist Learning Environments

Honebein (1996) summarizes what he describes as the seven pedagogical goals of constructivist learning environments as:

- To provide experience with the knowledge construction process (students determine how they will learn).
- To provide experience in and appreciation for multiple perspectives (evaluation of alternative solutions).
- To embed learning in realistic contexts (authentic tasks).
- To encourage ownership and a voice in the learning process (student centered learning).
- To embed learning in social experience (collaboration).
- To encourage the use of multiple modes of representation, (video, audio text, etc.)
- To encourage awareness of the knowledge construction process (reflection, metacognition).

Benefits of Constructivism

1. Children learn more, and enjoy learning more when they are actively involved, rather than passive listeners.

2. Education works best when it concentrates on thinking and understanding, rather than on rote memorization. Constructivism concentrates on learning how to think and understand.

3. Constructivist learning is transferable. In constructivist classrooms, students create organizing principles

that they can take with them to other learning settings.

4. Constructivism gives students ownership of what they learn, since learning is based on students' questions and explorations, and often the students have a hand in designing the assessments as well.

5. By grounding learning activities in an authentic, real-world context, constructivism stimulates and engages students. Students in constructivist classrooms learn to question things and to apply their natural curiosity to the world.

6. Constructivism promotes social and communication skills by creating a classroom environment that emphasizes collaboration and exchange of ideas. Students must learn how to articulate their ideas clearly as well as to collaborate on tasks effectively by sharing in group projects. Students must therefore exchange ideas and so must learn to "negotiate" with others and to evaluate their contributions in a socially acceptable manner. This is essential to success in the real world, since they will always be exposed to a variety of experiences in which they will have to cooperate and navigate among the ideas of others.

7. Constructivist assessment engages the students' initiatives and personal investments in their journals, research reports, physical models, and artistic representations. Engaging the creative instincts develops students' abilities to express knowledge through a variety of ways. The students are also more likely to retain and transfer the new knowledge to real life.

Learning Theory of Bruner (L.T.B)

Jerome S. Bruner (1966) is a proponent of cognitive learning and a developmental psychologist who is primarily interested in developing mental abilities. Bruner selects the most useful features from the various conflicting theories available. He treats the learner as a reactive organism, who actively selects, structures, retains and transforms learning/information to achieve certain goals. Bruner suggests that people have primary needs, One of them is curiosity, which keeps an organism active even in the absence of organic states of tension. Accordingly, Bruner thinks of learning as a goal directed activity which satisfies this drive, and answers the curiosity of the learner. Because of our cognitive activity is not always dominated only by the need for such things as food or sex.

The goal of education, should be cognitive development, and the content of learning should foster the development of problem-solving skills through the processes of inquiry and discovery. According Bruner, Learning is a Cognitive Process: Bruner describes the learner as a problem solver, who interacts with his/her environment to test hypotheses and to develop generalizations. According to his view, the cognitive process encloses three almost simultaneous processes:

a) Acquisition of New Knowledge / Information;
b) Transformation of Acquired Knowledge;
c) Checking the Adequacy of the New Knowledge;

The Modes of Cognitive Development are described by Bruner in terms of Three (3) Hierarchical Levels / Modes:

1. First Mode: Enactive
2. Second Mode: Iconic
3. Third Mode: Symbolic Representation

Enactive

It is the representation of knowledge through actions. For example, a child who inactively knows how to ride a bicycle may not be able to describe the procedure. Sometimes It is called the concrete stage. It involves encoding action-based information and storing it in our memory. For example, a baby might remember the action of shaking a rattle in the form of movement as a muscle memory. Examples of manipulative used in this stage in math's education are paper, coins, etc. anything tangible.

Iconic

It is based upon internal imagery. Knowledge is represented by a set of images /graphics/ drawings that stand for a concept but do not fully define it. For example, drawing can represent the 'triangle' diagrammatically, without explaining the concept of 'Triangularity'. The iconic mode is also called the pictorial stage (photographic memory). This stage involves images or other visuals to represent the concrete situation. This stage represents by showing images of the objects on paper or to picture them in one's head. Other ways could be through the use of shapes, diagrams, and graphs.

Symbolic Representation

It is most advance mode. It is the use of words and other symbols to describe a concept or an experience. Symbolic representation is based upon an abstract, arbitrary and more flexible system of thought. At this stage, language becomes more important as a medium of both of the reception and the expression of ideas. For example, at this stage the child can explain the concept of 'Triangularity' or the concept behind the operation of a bicycle.

The Symbolic Representation Mode/Level is also called the Abstract Stage. This last stage takes the images from the second stage and represents them using words and symbols. The use of words and symbols "allows a student to organize information" in the mind by relating concepts together. The words and symbols are abstractions, they do not necessarily have a direct connection to the information. For example, a number is a symbol used to describe how many of something there are, but the number in itself has little meaning without the understanding of it means for there to be that number of something. Other examples would be variables such as x or y, or mathematical symbols such as +, -, /, etc. Finally, language and words are another way to abstractly represent the idea. In the context of math, this could be the use of words such as addition, infinite, the number three, etc.

Autonomy in learning, i.e. Bruner's discovery learning

Bruner advocates autonomy in learning. He suggests that when the learner is allowed to approach learning as an act of discovery, s/he will increasingly engage him/her-self in learning, with the autonomy of self-reward. In other words, the learner provides for his/her own stimulation and in this way, arouses his/her own curiosity.

- Learners can be taught to generate their own instructional method and strategy for learning. A learner learns to study independently and acquires skills to establish his/her own standard;
- The feedback needed from the teacher is at a minimum and the teacher's role here must be to create an environment in which learners can learn on their own without the help of any prepackaged information;
- Learners should always learn through their active involvement with content and his work was thus influential in the open school movement and other humanistic approaches to learning.
- Teach learners how to value learning for its own sake, enabling them to acquire on their own the knowledge they need.
- According to Bruner, learning should be flexible and exploratory and Institutions should arouse learners' curiosity, minimize the risk of failure and make the activities relevant to them.

Bruner's Theory of Instruction (B.T.I)

Bruner defines learning as a process in which a learner achieves instructional objectives with little or no help from the teacher. He emphasizes 'the training of students in the use of mind' with confidence, energy and honesty. A Theory of Instruction should consider:

- The Ways of Structuring Knowledge;
- The Presentation Sequence;
- The Motivating Experience;
- The Nature of Pacing of Rewards and Punishment;

In his theory of instruction, Bruner puts forth his original ideas concerning the most effective way of achieving knowledge and skills.

- The emphasis should be placed upon the learners' skills in handling things, and in perceiving and grasping the subject. The learner's approach to learning should be such that she should be able to use the acquired knowledge in solving problems.
- The subject matter should be presented Enactively, Iconically and Symbolically so that learners can acquire optimal comprehension and a generalized set of basic ideas or principles.
- Bruner recognizes the role of extrinsic and intrinsic rewards in promoting learning, but he thinks that intrinsic rewards are more important. Intrinsic rewards in the form of the satisfaction gained from solving problems quickly, the interest and involvement in learning, the pleasure received from the intellectual mastery of it.
- Discovery learning increases motivation and strengthens the learner's tendency to carry out his/her learning activities with the autonomy that goes along with self-reward.
- Discovery learning teaches the learner the techniques of problem solving and results in a better retention of what is learned because the learner acquires the knowledge through his/her own efforts.
- Intellectual honesty, i.e. willingness to check and correct one's ideas and notions, or one's adopted solutions to problems, should be cultivated.

Role of teacher

- Classroom Teaching-Learning should organized from specific to general.
- Subject matter is made up of concepts. Concept attributes is an important feature. Example: lake, human beings. Attributes are its depth water, male, female etc.

- Subject must be Taught when the Teacher believes the child has reached the appropriate state of Cognitive Maturity.
- Bruner opposed Piaget's notion of readiness. He argued that schools waste time trying to match the complexity of subject material to a child's cognitive stage of development.

Best Application Process Of Bruner's Theory Of Instruction

- Instruction involves guiding the learner through a series of Statements and Re-Statements in a Subject;
- Bruner said that Classroom Learning should take place Inductively (Specific to Generalization).
- An optimum sequence is from Enactive Iconic Symbolic;
- Reinforcement: Extrinsic Rewards must be replaced by Intrinsic Rewards;
- Complex Ideas can be Taught at a Simplified Level First, and Complex Levels later on. Subjects would be Taught at Levels of gradually Increasing Difficultly.

Classroom Implication

- Motivate Learners to participate
- Actively Engages Learners in Learning Process
- Encourages Autonomy & Independence
- Promote the Development of Creativity & Problem-Solving Skills
- Provides an Individualized Learning Experience

Summary of Literature Review

Mathematics is a key aspect in life. Competences in mathematics can lead to greater academic achievements. The area on influence of instructional materials on acquisition of mathematics competences has not been widely explored. Most of the available studies have focused on the general academic performance and achievement most especially in the final level examination other than grade one. Some studies have been based in pre-primary and primary level while others on secondary school level and tertiary institutions of a country. Furthermore, other studies have focused on effects of instructional material on final examinations, influence of instructional material on learner retention in school, teachers' attitude on mathematics at different levels, among others. Although much literature has been reviewed, there is a limitation on the utilization of instructional materials to acquire mathematics competences and particularly among grade one learners. More study is needed to focus on grade one classroom where formal education begins.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

This chapter presents the study's methodology, including research design, location, target population, sampling techniques, and sample size. Research instruments, pilot study, data collection, procedure, data analysis, and logistical and ethical considerations are also explored in this chapter.

Research Design

This study adopted descriptive research design. This design was appropriate because it allowed testing the relationship between variables and making predictions. Thus, the design allowed the researcher to check the relationship between influences of instructional materials on acquisition of mathematics competencies. This was through an observation between a checklist before and after the utilization of instructional materials among level one pupils.

Area of the Study

This study was conducted in Mfoundi division of the Centre region of Cameroon. The division is one of the ten regional divisions with Yaoundé as the division's capital. It is made up of seven sub - divisions which are, Yaoundé 1, 2, 3,4,5,6 and 7. It is the seat of the government of Cameroon. That is, it is the political capital of Cameroon. Most administrative issues in the country are handled in the Mfoundi. Apart from the administrative activities mentioned, there are three means of transport: air, land and by rail. The division also have other economic activities like Lumbering, trade in markets like the Mfoundi, Mokolo,marche central and many other local small markets like the Nsam market etc., fishing in the river mfoundi,agriculture, with majority practicing subsistence agriculture with products like cassava, plantains, cocoyam, tomatoes, corn etc. The division is the main road junction town with roads from other divisions within and other regions like the south, east, west and littoral links passing through it The region was selected because a study by the results of the government common entrance results for the past seven (07) years showed that Centre region had an outstanding performance than other regions in the country. This performance could have been because of the utilization of Instructional Materials. However, the report was on level three (class 6) performance. It was therefore necessary to carry out this study among the class one learners to investigate whether they were performing the same and if so, find out whether the performance was because of the influence of instructional materials on acquisition of mathematics competencies.

Figure 3: Map of Mfoundi division

Source: Divisional Delagation (Basic Education)

Variables

This study has two categories of variables: independent and dependent variables.

Independent Variables: There are three independent variables. They include;

a) **Types of materials available for teaching and learning mathematics**. This considered the availability of different types of resources used in the instruction process. This included instructional materials like concrete materials, and printed and non-print resources. It was measured on whether it was available or not available. The frequency of availability was given and compared against each type available.

b) **Utilization of mathematics instructional materials**. The consideration on this variable was whether the available instructional materials were used during the instruction of mathematics. It was measured on whether often used, less often used or not. Frequencies on often used, less often used and not used at all were given.

c) **Influence of utilization of instructional materials.** This was considered based on the pupil's ability to perform a skill at hand. A tick was used to show the ability to perform, and a cross was used to show the inability to perform a skill in mathematics.

Dependent Variable

The dependent variable of this study was the acquisition of mathematical competencies. The researcher prepared a checklist of mathematics concepts taught in level one. Each pupil's ability was ticked or crossed upon observation of the pupil's ability. The similar checklist was prepared for observation of pupil's ability three weeks later. A tick was used for those who were able and a cross was used for those not able. The three week's observations were compared with the earlier on observation.

Population

The population of this study all pupils and teachers of level one in primary schools in the Mfoundi division. Table III presents the target population.

Table 3: Target Population of the Study

Population Category	Total Number
Public primary schools	62
Private primary schools	72
Learners in public primary schools (level one)	3630
Learners in private primary schools (level one)	3721
Teachers in public primary schools (level one)	66
Teachers in private primary schools (level one)	74

(Divisioal delegation for basic education Mfoundi)

As shown by the Table, the targeted population was level one learner in both private and public primary schools. There are 62 public primary schools and 72 private primary schools in the Mfoundi division. As shown in the table above, public primary schools have 3630 level one learners while private primary schools have 3721 learners. Since most of the primary school teachers teach all the activity areas, all the level one teachers were targeted. Mfoundi division has 66 teachers in public primary schools level one and 74 teachers in private primary schools level one.

The choice of this population was due to the fact that, strong foundation and positive attitude towards mathematics is laid in early classes of formal education. Failure to lay strong foundational skills in mathematics early enough, may lead to negative attitude towards the academic area. Therefore, for a strong foundation to be laid, teachers should be fully involved in the affairs of the learners. Thus, the researcher preferred to choose grade one learners and the grade one teachers.

Sampling Techniques and Sample Size

The sampling techniques and sample size are described in the following sub-sections.

Sampling Techniques

This study used three sampling techniques; purposive, stratified sampling and random sampling techniques. Mfoundi division was purposively selected because the researcher has lived and thought in the Mfoundi division for more than a decade. (Uwezo, 2011). Stratified and random sampling was used to sample the schools. Therefore, public and private schools formed the two strata. Randomly, proportional sample size was drawn from both the private and public primary schools. Random sampling was used to select a class for schools with more than a stream. Teachers in the selected level one class were automatically part of the sampled population. This is because teachers in level one teaches all the activity areas in the assigned classes.

Sample Size

Table 4: Sampling Frame

Primary School Category	Total No. of Schools	Sample Size of Schools (25%)	Sample Size of Learners (25%)	Sample Size of Teachers (25%)
Public	62	10	545	10
Private	72	11	559	11
Total	**134**	**21**	**1104**	**21**

Source: Divisional Delegation of Basic education for Mfoundi

Table 4 indicates that the sampled schools were 21 public and private primary schools. Sampled learners were 1104 in both categories of schools. Sampled level one teacher were 21 in both public and private schools.

Research Instruments

Data was gathered using a classroom observation schedule, interview guide pupil's competencies checklist. These instruments were considered the most appropriate in collecting data which enabled the investigation of the influence of instructional material on acquisition of mathematical competencies among level one pupils. The use of the instruments is described below:

Classroom Observation Schedule

The classroom observation schedule was used to collect data during lesson delivery. It consisted of three sections. Section A was on general information about the type of the school and number of streams of level one. Section B consisted of specific observation on availability and utilization of instructional materials during lesson delivery.

Interview quide

Interview guide for the teacher – It consisted of two sections. Section A focused on teacher's background information like name, gender and other personal information. Section B consisted of semi-structured questions on availability and utilization of instructional materials in their classroom. The questions in the interview schedule acted as a guide to make the discussion between the researcher and the teacher to continue.

pupil's Competency Checklist

Competence checklist was used to assess development of mathematics skills and competences among the pupils. It consisted of two parts. Section A consisted of background information of the pupil's and section B consisted of mathematics skills to be observed from the pupils.

Pilot Study

The instruments were pre-tested to allow for necessary adjustments and corrections.

Two private schools and two public schools from the study location were selected. level one pupil's in these schools were observed for different competences in mathematics skills. Teachers in the selected schools were also observed during mathematics lessons. Afterwards, these teachers were interviewed. The pilot study schools were excluded from the actual study. After the pilot study, views which came up during piloting were considered for addition or subtraction or alteration on the instruments.

Validity

Content validity was established through administration of the instruments during pilot study. Views from other researchers (peer review) also established content validity. Further, advice sought from my supervisor established content validity. This enabled the researcher to identify items that needed to be included and those that needed adjustment or replacement. Thus, accurate and adequate information of the variables, methods and objectives under this study was collected.

Reliability

Reliability of this study was established through various activities. This ensured classroom observation schedules, teachers' interview schedules and pupils' competence checklist addressed the same issues. Test-retest was done during the pilot study. The pilot study was repeated in the sampled schools and later after a time interval of three weeks to check whether they produced the same results. Pearson Product Moment Correlation coefficient was used to compute the correlation between two competency checklist scores of the pupils. The reliability results were a positive correlation coefficient of +0.77.

Data collected and methods used to collect the data were also compared and contrasted. More so, the researcher considered specialists', peer reviews and supervisor's comments. They helped in establishing gaps in the data collection methods. Their critiques helped in modifying the instruments to ensure reliability.

Participants' feedback was also used to add left out items and remove ambiguity from the instruments.

Data Collection Techniques

This was done in two phases.

Pre-visit to Study Schools

The researcher pre-visited every sampled school and took time to familiarize himself with level one teachers and pupils. This helped in removing any anxiety and developing trust among the participants. The researcher participated in activities done by participants to make them feel free even during the actual study. The researcher helped teachers in their activities especially in assisting pupils when working with instructional material during mathematics lessons. Furthermore, the researcher helped in guiding pupils when handling mathematics problems.

Actual Data Collection Procedure

After obtaining permission from the regional delegation of basic education the researcher visited the sampled schools and introduced himself to the head teachers. The researcher explained the purpose of the study and requested the head teachers to allow entry to level one classroom for observations and administration of competency checklist to pupils. Data was collected in three stages:

Stage One: Classroom Observation Schedule

Data on the types of instructional materials available and the utilization of the mathematics instructional materials was collected using an observation schedule. According to the timetable, lesson observation on whether the teacher utilized instructional materials during teaching and learning was done in the morning during the normal mathematics lesson. As observations on utilization of materials was being made, observations on available types of instructional materials were done and notes taken. At the same time, voice recording was taking place. Short responses were also made in the observation schedule.

Stage Two: Conducting Interview Schedule with level one Teachers

Teachers' interviews were conducted during break time. Level one teachers observed during lesson delivery were automatically chosen for interviews. Interviews were conducted as face-to-face discussions between the researcher and the teachers. The discussions took duration of at most thirty minutes. The researcher was not to ask questions sequentially as they appear in the interview schedule, rather, questioning was carried out in such a way as to enhance discussion. Short responses were filled in the schedule where necessary, but mostly note taking was used so as to take note of other issues arising during the discussion on availability, utilization and acquisition of mathematical competencies.

Stage Three: Administration of Pupils' Mathematics Competency Checklist

Data on pupil's mathematics competencies was obtained from level one pupils using a competency checklist. A mathematics competence checklist was prepared by the researcher with the help of level one teachers during the pre-visit to the chosen schools. The then prepared competency checklist was used during the first visit to the sampled schools to assess the learner's mathematics competencies in the beginning of actual data collection procedure. A similar competency checklist was administered three weeks later to assess whether there was any improvement in the development of mathematics competencies.

Data Analysis

Data was sorted out, coded and summarized for easy analysis. Data was organized according to the objectives that guided the study. Themes formed the bases of analysis. An extensive data was obtained through the observation schedule, interview schedule and the pupils mathematics competency. It was sorted and grouped according to the themes. Both qualitative and quantitative data was collected. This data was then entered into the Statistical Product for Service Solution (SPSS) computer program for analysis. Data on the availability of different instructional materials was presented using a table, figures of frequency and percentages. Data on the utilization of mathematics instructional materials was presented using a table, figures of frequency and percentages. Data collected pupil's mathematics competency checklist was presented in tables, figures of frequencies and percentages.

Logistical Considerations

The researcher was authorized by the University of Yaounde 1 to carry out this study. This enabled the researcher seek a research permit from the Divisional delegate of basic Education through the secretary of the divisional delegate of basic education for Mfoundi. The permit was presented to the Divisional Delegate of basic education for Mfoundi who offered a letter granting permission to visit the statistics office for detail information and an introduction letter to the person in charge of the office on behalf of the Divisional delegate. The researcher then the permission signed by the divisional to the person in charge of the statistic office to treat the application and feed the researcher with the needed information.

Ethical considerations

During the collection of data for the study, informed consent of the parents of level one learner was sought. Participants' anonymity and confidentiality was assured. Therefore, codes were used for the schools, teachers and pupils. The teachers were informed that the information gathered was for the purpose of this study and not for any other motive.

Further, the researcher ensured minimal interference with the sampled schools' routine during the period of the study. Lessons were not re-scheduled to fit the interests of the researcher. Rather, observations were made during the scheduled time in the time table. In addition, special meetings for teachers were not called to inform them about the purpose of the study, rather, the researcher explained individually to every teacher. Finally, permission to use the audio tape recorder was sought from the teachers.

CHAPTER FOUR: FINDINGS, INTERPRETATION AND DISCUSSION

In this chapter, findings, interpretations and discussions are presented. The findings and the interpretations are based on the objectives of the study. The discussions are related to the literature reviewed. The study sought to achieve the following objectives:

- **i.** To find out the types of instructional materials available for teaching mathematics in level one classrooms.
- **ii.** To find out whether instructional materials are utilized during mathematics instruction in level one.
- **iii.** To establish the influence of using mathematics instructional materials on the development of mathematics competencies.

General and Demographic Information

The general and demographic information on the respondents was as discussed below.

General Information on the Respondents

Teachers' general information is summarized in Table V: below.

Table 5: General information of teachers

Type of school/age of teachers	Professional Level Certificate	Diploma	Degree and above	Total	Percent%
Private {25-35}	4	3	0	7	33
{36-45}	2	2	0	4	19
{46-55}	0	0	0	0	0
Public {25-35}	0	1	1	2	9.5
{36-45}	2	1	3	6	29
{46-55}	1	1	0	2	9.5
Total	**9**	**8**	**4**	21	100

As indicated in Table 5, most sampled teachers were below 45 years of age. This was a clear indication that level-one teachers are young and active in teaching. In addition, it was an indication that they were recently trained and could remember what was expected of them during instruction. It was also an indication that they were energetic to engage in sourcing more instructional materials to be utilized during instruction. The few teachers above 45 years of age could have been trained in the old teaching systems though they could have been more experienced in teaching level one pupil. On the professional level, all the sampled teachers had been trained and owned Certificates, Diplomas and Degrees. This implied that all the sampled teachers went through colleges and were not quacks. They were aware of the appropriate teaching approaches, that is, teaching using instructional materials, which enabled the development of learning skills.

Teachers' Teaching Experience in Level One

Table 6: Teachers' Experience in level One

	Category	**Teaching Experience**
Private schools	1-5 years	4
	6-10 years	2
	11 years and above	0
Public schools	1-5 years	4
	6-10 years	7
	11 years and above	4

Table indicates that, all the sampled teachers had experience in teaching level one pupils. This implied that all the sampled teachers were not new in level one classrooms and they were aware how young pupils learn and create knowledge.

Demographic Information on Sampled Schools

Table 7: The Sampled Schools

Type of school	**Number of schools**	**Sample size of the schools (15%)**
Private	72	11 (A-K)
Public	62	10 (I-X)
Total	**134**	**21**

Eleven (11 labeled as A to K) private schools while ten (10 labeled as I to X) were visited for data collection. Random sampling was used to select a class in cases of more than one streams in level one.

pupils' Gender and Age

The gender and age of pupils who participated in the study are presented in Table 8 below.

Table 8: pupils' Gender and Age for both private and public schools

Learners' Gender	Frequency	Percentage
Girls	579	52
Boys	525	48
Total	**1104**	**100**
pupils' Age Below age (below 6 years)	121	11
Right age (6 years)	632	57
Above age (7 years and above)	351	32
Total	**1104**	**100**

As shown in Table 8, boys and girls were almost the same proportion (48 % and 52% respectively). This implied that more girls participated in the study. The table has also showed the ages of the pupils. The ages were categorized into three groups. As shown by the table, most of the pupils (89%) were of the right age (six years and above) for level one, as recommended by the Ministry of Basic Education in Cameroon.

Types of Instructional Materials Available in Level One Classroom

The study sought to find out the types of instructional materials available in level one classrooms. The objective was stated as:

Objective one: To find out the types of instructional materials available for teaching mathematics in level one classrooms.

To achieve this objective, the researcher used the classroom observation checklist. Different instructional materials available in the classrooms were noted in the checklist and on the notebook. Classification on the available instructional materials was done to identify mathematics instructional materials and the results presented in Table 9.

Table 9: Shows Types of Mathematics Instructional Materials

School type	Type of materials	Category	Available Frequency (f)	Available %	Not available Frequency a	Not available %
Private	Concrete/ Realia	Counters (bottle tops, sticks, corks, stones, feathers, etc.)	11	**100**	0	**00**
	Printed	Abacus	3	**27.3**	8	**72.7**
		Models	8	**72.7**	3	**27.3**
		Shape board	2	**18.2**	9	**81.8**
		Flash cards	9	**81.8**	2	**18.2**
		Number cut outs	10	**90.9**	1	**9.1**
		Shape cut outs	10	**90.9**	1	**9.1**
		Mathematics textbooks	11	**100**	0	**00**
		Wall charts	11	**100**	0	**00**
	Audiovisual	IPAD tablets DVD players	0 5	**00** **45.5**	11 6	**100** **54.5**
		Computers	5	**45.5**	6	**54.5**
		TV	8	**72.7**	3	**27.3**
		Calculators	0	**00**	11	**100**
Public	Concrete	Counters (bottle tops, sticks, corks, stones, feathers etc.)	10	**100**	0	**00**
	Printed	Abacus	3	**30**	7	**70**
		Models	2	**20**	8	**80**
		Shape board	0	**00**	10	**100**
		Flash cards	4	**40**	6	**60**
		Number cut outs	4	**40**	6	**60**
		Shape cut outs	3	**30**	7	**70**
		Mathematics textbooks	7	**70**	3	**30**
		Wall charts	9	**90**	1	**10**
	Audiovisual	IPAD tablets DVD players	10 2	**100 20**	0 8	**00** **80**
		Computers	2	**20**	8	**80**
		TV	1	**10**	9	**90**
		Calculators	0	**00**	10	**100**

As it can be seen in Table 9 on the types of instructional materials available in level one classrooms, the results showed that there were different types of instructional materials in level one for teaching and learning mathematics. The results also showed that some instructional materials were unavailable or inadequate in some schools.

These current study findings were consistent with the findings of Leone, Wilson & Mulcahy, (2010) in Washington DC which revealed that different types of instructional materials were available in classrooms which promoted active participation of learners in learning, thus inclusive classrooms. These findings also supported the findings of Cetin & Neslihan (2015) in USA who also noted that different types of instructional materials were available in mathematics classrooms. According to their findings, availability of different types of instructional materials promote development of different mathematics skills. Njenga's (2014) findings and Bunyi's (2012) findings agreed with the findings of this study, that in some schools, instructional materials like mathematics textbooks were inadequate and learners were forced to share the resource when required to refer to them for some activities. The findings of this study also agree with the findings of Wambua and Murungi (2018) in Kibwezi Makueni County which revealed that different teaching and learning materials were available for teaching and learning social studies. The findings of this study partly agreed with Raven's (2016) findings in USA, that, programmed computers and calculators were availed to learners for use in their classroom activities. This study found out that, although some schools availed programmed computers for use, no calculators were available for level one learners.

The unavailability could be as a result of lack of guidelines by the Ministry of Education to utilize the resource in level one. The findings of this study also partly agree with the findings of Jeptanui (2011) in Wareng Sub County, Uasin Gishu County, which revealed that there were no available mathematics textbooks and mathematics wall charts in some sampled schools. The study revealed that teachers and learners borrowed the resource from friends, others were bought by individual parents. The reasons for the differences in findings could be attributed to differences in the study settings and purposes.

Instructional Materials Utilized During Mathematics Instruction

This study also sought to find out whether instructional materials were utilized during mathematics instruction in level one. The objective was stated as below:

Objective two: To find out whether instructional materials are utilized during mathematics instruction in level one.

To achieve this objective both classroom observation checklist and teachers' interview schedule were used. During classroom observation, the researcher observed whether the teacher utilized or did not use instructional materials during instruction and noted down. During the teacher's interview, notes were taken on whether the teacher utilized instructional materials during instruction. The types of instructional materials often utilized, less often utilized and not utilized at all were also noted on a notebook. As the interview was being carried out, audio recording was also being done which was listened to later on to get clear results. Table X presents the results on the utilization of instructional materials during instruction.

Table 10 : Utilization of Mathematics Instructional Materials during Instruction

Type of resource	**Private primary schools**						**Public primary schools**					
	Often		**Less often**		**Not all at**		**Often**		**Less often**		**Not at all**	
	f	%	f	%	f	%	f	%	f	%	f	%
Realia (real money and counters)	11	**100**	0	**00**	0	**00**	8	**80**	1	**10**	1	**10**
Learning Corner	9	**82**	2	**18**	0	**00**	4	**40**	4	**40**	2	**20**
Text Books	10	**91**	1	**9**	0	**00**	7	**70**	2	**20**	1	**10**
Charts	9	**82**	2	**18**	0	**00**	5	**50**	2	**20**	3	**30**
Cutouts	8	**73**	2	**18**	1	**9**	3	**30**	4	**40**	3	**30**
Computer-based software	2	**18**	4	**36**	5	**45**	1	**10**	1	**10**	8	**80**
Downloaded education apps	1	**09**	2	**18**	8	**73**	1	**10**	0	**00**	9	**90**

Table 10 above indicates the utilization of instructional materials during mathematics instructions. The results showed that some materials were often utilized while others were less. The results also show that some mathematics instructional materials were not at all utilized in some sampled schools.

These findings confirmed Magoma's (2016) findings in Yaounde IV, In Mfoundi that revealed that real and concrete materials were often utilized to enhanced development of mathematics skills like putting together objects, taking away operations in mathematics and recognizing

Cameroon currency. Njenga's (2016) findings in Yaounde III sub-division also confirmed the findings of this study. The study revealed that teachers in Yaounde III Sub-division utilized textbooks and charts more often to influence performance in the national examinations. The findings of this study also agree with Jepanui's (2011) which revealed that, textbooks in Yaounde I Sub-division were often utilized during instruction in some schools and less often utilized in some schools due to their unavailability.

The findings of this study disagred with the findings of a study in South Africa by Smith & Hardman (2014) which revealed that, computer-based software helped level six learners in geometry. This study found out that computer-based software was less often used and others did not use them at all. Interviewed teachers revealed that they used computer-based software in teaching concepts such as colour, elements of weather and animals. However, these skills are not available among mathematics skills in level one designed concepts. This disagreement could be as a result of reasons attributed to undeveloped computer-based software. Another reason for less utilizatiown and not using them at all could be as a result of unavailability of the resources in the sampled schools.

Objective three: To establish the influence of using mathematics instructional materials on the development of mathematics competencies.

To achieve this objective, a pupils' competency checklist was prepared during piloting. With the help of the teachers in the piloted schools and level one curriculum design, different skills were included in the pupils' competency checklist, including rote counting, number recognition, geometry/shape recognition, among others. The checklist prepared during piloting was used in the sampled schools during the first visit to schools to check pupils' competency at the beginning of the study. To establish whether there was the development of mathematics competencies, a similar competency checklist with little alterations was prepared and used to check pupils' competency three weeks after the first one. The table below presents the results of pupils' competency during the first visit to the sampled schools.

Table 11: pupils' Mathematics Competency Checklist at the Beginning of the Study

Those Capable	Not Capable School Category				Public		private	
Private public skills	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Rote counting	489	**89**	513	**91**	56	**11**	46	**9**
Geometry/Shape recognition	462	**83**	492	**88**	83	**17**	67	**12**
Number arrangement	412	**76**	463	**83**	133	**24**	96	**17**
Addition	401	**74**	441	**79**	144	**26**	118	**21**
Take-away	345	**63**	445	**80**	200	**37**	114	**20**
Recognition of Cameroon currency	413	**76**	485	**87**	132	**24**	74	**13**
Recognition of numbers	382	**70**	474	**85**	163	**30**	85	**15**
Filling in missing numbers	361	**66**	478	**86**	184	**34**	81	**14**
Putting together objects	404	**74**	494	**88**	141	**26**	65	**12**
Counting shaded parts	410	**75**	503	**90**	135	**25**	56	**10**

Table 11 above was a pupils' checklist prepared during piloting by the researcher with the help of teachers in the piloted schools. The skills included in the competency checklist were derived from level one curriculum design. The results in this competency checklist were compared with those in a similar competency checklist done by level one pupils three weeks after the first one. The skills in the latter competency checklist were similar to those in the first one but with little alterations.

Table 12: Pupils' Mathematics Checklist 3 weeks after the first

Those capable	Not capable school category				Public		private	
Private, public school	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Rote counting	513	**94**	532	95	32	**6**	27	**5**
Geometry/Shape recognition	506	**93**	519	93	39	**7**	40	**7**
Number arrangement	422	**77**	515	92	123	**23**	44	**8**
Addition	479	**88**	509	91	66	**12**	50	**9**
Subtraction	424	**78**	499	89	121	**22**	60	**11**
Recognition of Cameroon currency	482	**88**	517	92	63	**12**	42	**8**
Recognition of numbers	459	**84**	515	92	86	**16**	86	**8**
Filling in missing numbers	420	**77**	524	94	125	**23**	35	**6**
Putting together objects	492	**90**	537	96	53	**10**	22	**4**
Counting shaded parts	471	**86**	539	96	74	**14**	20	**4**

Table 12 presents results of a pupils competency checklist carried out three weeks after the first one. Capability in the skill was measured using points the learner got correctly. If a learner was capable of scoring six points and above, he was considered having acquired mathematics competence. Another way in which acquisition of pupil's mathematics competencies were measured was by comparing the number of pupils who are capable of performing skills in both competency checklists. The results, as it can be seen from Table 11 and Table 12 showed that, the number of pupils capable in the latter competency checklist was bigger than the number of pupils in the first competency checklist. The results were shown by comparing the scores of pupils in both competency checklists. Pearson's product moment co-efficient was used to tabulate the correlation between utilization of instructional materials and development of mathematics skills. Table 4.9 below presents the results.

Table 13: Mean, Standard Deviation and Correlation Coefficient of Mathematics Competencies

Mean in the first checklist (N)	443.4
Mean in the second checklist(N)	488.7
Standard deviation from means of the first checklist	28.9
Standard deviation from means of the second checklist	23.7
Correlation coefficient	**+0.77**

Table 13 presents the relationship between utilization of instructional materials and development of mathematics skills. The results show that there was increased mean in the second competency checklist. This implied that pupils in the second competency checklist improved in the scores. The results also showed a positive correlation coefficient of +0.77 which implied that there was a relationship between utilization of instructional materials and development of mathematics skills.

The findings of this study agrees with findings of a study in Germany by Mischo & Maab (2013) which revealed that teaching and learning materials improved development of mathematical skills that led to acquisition of mathematics competencies. The findings of this study also confirmed the findings by Leone et al (2010) in USA who found out that, instructional materials created a favorable learning condition and a classroom climate that engaged learners in their learning. Their study revealed that a favorable classroom climate correlates to a positive attitude towards what is being engaged in, thus, positive results.

This study also revealed that there are learners with low scores and these learners added very few points in the latter competency checklist. This could have been as a result of inadequate instructional materials in the classroom which could lead to inappropriate teaching methods. This shows that scoring good points in any form of assessment correlates with proper and appropriate teaching method. Njenga's (2014) findings in Nakuru North Sub County confirmed that, private primary schools had higher scores than public primary schools that could have led to better academic performance in private schools. Njenga's findings conclude that, utilization of instructional materials during teaching and learning correlates with development of mathematics skills which promotes acquisition of mathematics competencies.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the findings of this study. In addition, conclusions and recommendations for further research are also presented.

Summary of the Findings

Based on the first objective, the study revealed that, there were different types of instructional materials available in level one. The results showed that, some materials were 100% available while others were less/not available. The most readily available materials were the realia/concrete materials. The printed materials like charts and textbooks were also available although not available in some schools. The less available were the audio-visual materials.

On the second objective, the study also revealed that various instructional materials were utilized during mathematics instruction. The results of the study showed that some materials were often utilized while others were less utilized or not utilized at all. Those often utilized were; concrete/realia, textbooks and charts. The less often utilized or not used at all in some schools were computer-based software and downloaded apps. Among those which could be improvised and be used during instruction were charts and cut outs. Unfortunately, some schools observed did not utilize any of the materials at all. Some sc

hools had blank walls and no material existed in the mathematics learning corner.

The third objective of the study revealed that, utilization of instructional materials had influences on the acquisition of mathematical competencies. As revealed by the increased mean score in the second competency checklist, utilization of instructional materials influence acquisition of mathematics competencies. A positive correlation of +0.77 showed that instructional materials influence acquisition of mathematics. Therefore, as revealed by the findings of this study, it can be concluded that utilization of instructional materials influence acquisition of instructional materials.

Conclusions

From the findings above in level one in the primary school,the most used instructional materials in the teaching of mathematics are, charts, text books and concret materials.While the less used instructional materials in level one primary school is audio visual. Also from the findings, the utilization of instructional material in level one in mathematics influence the acquisition of mathematic competences.

Recommendations

Based on the findings and conclusions, the researcher made the following recommendations:

Ministry of Education

Through the Ministry of Education, the government should ensure early disbursement of funds meant for the provision of instructional materials in public primary schools. This would ensure the purchase of enough instructional materials and avail them to learners as early as the term begins. The results from this study revealed that some public primary schools had inadequate instructional materials due to the late disbursement of government resources meant for the purchase of instructional resources.

The Ministry of Education, through the District Quality Assurance Officers (DQASO) should also ensure that the head teachers buy the right and adequate textbooks. The results of this study revealed that inadequate textbooks could have been a result of mishandling of funds meant to purchase textbooks.

Teachers

Level one teachers and other lower primary school teachers should enroll for short courses and in-service courses to equip them on the recommended methods of lesson delivery which involve utilization of instructional materials during instruction. This study revealed some materials were available in the environment like the realia/concrete materials yet some level one teachers did not have them in the mathematics learning corner.

Parents and the Community

Parents and the community should be willing to participate in a material development day set apart for development of instructional materials. During parents meeting together with teachers, they should also come up with the best textbooks which should be bought as reference books to be used at home and school. This study revealed that some schools had inadequate textbooks and charts. Parents' and community's participation could contribute to the availability of this teaching and learning resource.

Recommendations for Further Research

Based on the objectives and findings of this study, the following recommendations were made:

Recommendations for Teachers

Objective one sought to find out the types of instructional materials available for teaching and learning in level one classrooms. The findings of this study revealed that different types of instructional materials were available in some schools and missing some schools. The study therefore recommends that:

i. Teachers together with their pupils should ensure that teaching and learning materials readily available in the school environment should be collected, sorted and well arranged in the mathematics learning corner ready to be utilized during instruction.
ii. Teachers should work hard to ensure the unavailable teaching and learning materials are sourced and put in the mathematics learning corner ready for use during instruction.

Recommendations for Parents

Based on objective one that sought to find out the types of instructional materials available for teaching and learning in level one classrooms, the study found out that different types of instructional materials were available and others not available in some schools. This study recommends that:

i. Parents should set apart a day in each term to volunteer and make teaching and learning resources in schools where their children attend.
ii. Parents with teachers' guide should purchase textbooks that would help boost the availability of this teaching and learning resource in schools.
iii. Parents if requested by teachers to purchase a type of an instructional material, they should purchase without hesitation.
iv. Parents should avail some instructional materials for their children to use at home.

Recommendations for Teachers

Teachers should always utilize instructional materials when teaching to enable pupils take part in their learning. Teachers should give time to pupils to interact with instructional materials and solve their mathematical problems during instruction.

Recommendations for School Management

The school management should ensure that there are adequate instructional materials for utilization during teaching and learning. They should ensure worn out materials are repaired and those that are completely destroyed are replaced without delay.

The school managers should ensure that funds disbursed by the government through the Ministry of Education are used to purchase the right textbooks. iii. The school management should embrace further training of teachers. They should support teachers financially to attend seminars and workshops organized by the Ministry of Education.

School managers should regularly hold meetings with teachers to hear out the challenges teachers could be facing in their teaching.

The school management should regularly hold meetings with parents of particular classes to liaise on way forward in enhancing progressive development of mathematics competencies in their schools.

Suggestions for further research

i. The study should be carried out in order divisions in the center region
ii. To meet up with competences we need to know how to use instructional materials to gain lesson objectives

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APPENDIXES

APPENDIX I: RESEARCH AUTHORISATION

REPUBLIQUE DU CAMEROUN Paix-Travail-Patrie *********** UNIVERSITE DE YAOUNDE I ************ FACULTE DES SCIENCES DE L'EDUCATION ************ DEPARTEMENT DE CURRICULA ET EVALUATION ************	REPUBLIC OF CAMEROON Peace-Work-Fatherland *********** UNIVERSITY OF YAOUNDE I ************ FACULTY OF EDUCATION ************ DEPARTEMENT OF CURRILUM AND EVALUATION ************

The Dean

N° 690 /21/UY1/FSE/VDSSE

AUTHORISATION FOR RESEARCH

I the undersigned, **Professor BELA Cyrille Bienvenu,** Dean of the Faculty of Education, University of Yaoundé I, hereby certify that **BESINGI Shadrack MEKUMBA,** Matricule **20V3757,** is a student in Masters II in the Faculty of Education, Department: ***CURRICULUM AND EVALUATION***, Specialty: ***DEVELOPER AND EVALUATOR OF CURRICULUM.***

The concerned is carrying out a research work in view of preparing a Master's Degree, under the supervision of **Pr. NDI Julius NSAMI.** His work is titled « ***Impact of the use of instructional materials on students' performance in mathmatics in Government secondary schools in the Mfoundi Division***».

I would be grateful if you provide him with every information that can be helpful in the realization of his research work.

This Authorization is to serve the concerned for whatever purpose it is intended for.

Done in Yaoundé........20 DEC 2021

For the Dean, by order

APPENDIX II: RESEARCH AUTHORISATION OF DIVISIONAL DELEGATION OF MFOUNDI

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie

MINISTERE DE L'EDUCATION DE BASE

DELEGATION REGIONALE DU CENTRE

DELEGATION DEPARTEMENTALE DU MFOUNDI

REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINISTRY OF BASIC EDUCATION

CENTRE REGIONAL DELEGATION

DIVISIONAL DELEGATION OF MFOUNDI

Yaoundé, le 08 AOUT 2022

AUTORISATION DE RECHERCHE

N° 0110/ AR/MINEDUB/DREB-C/DDEB-MFDI

Une autorisation de recherche est accordée à BESINGI SHADRACK MEKUMBA

étudiant(e) à l'université de Yaoundé 1 Faculté science of Education

Département de Curriculum and Evaluation

afin de collecter des informations dans le cadre des activités research the number of primary schools in Mfoundi division du second semestre de l'année en cours.

Cas Student.

L'intéressé(e) prendra attache avec le directeur de l'école.

Compte tenu de la pandémie à corona virus, ces activités devront être menées dans le strict respect des mesures barrières. En aucun cas l'ordre normal du déroulement des enseignements ne sera perturbé.

LE DELEGUE DEPARTEMENTAL,

Le Délégué
Mme Adjaga Marie Gertrude
épse Vitou Esala
Professeur d'Ecoles Normales d'Instituteurs
Hors Echelle

APPENDIX III: CLASSROOM OBSERVATION SCHEDULE

Section A: General Information

1. Code of the school……………………..
2. Type of school: Public ( ) Private ( )
3. Streams in level One: One ( ) Two ( ) Three ( )

Section B: Utilization of Instructional Materials

Item	**Yes**	**No**
Are there any instructional materials in the classroom		
Are any concrete instructional materials available?		
Are any printed instructional materials available?		
Are there any audio-visual materials in the classroom?		
Are the instructional materials adequate and appropriate for the pupils?		
Does the teacher use instructional materials during lesson delivery		
Does the teacher give pupils time to interact with the instructional materials during the lesson		

Any other relevant observation

____

____

____

APPENDIX IV: INTERVIEW SCHEDULE FOR THE TEACHER

Section A: Background information

1. Code of the school ………………………….
2. Teacher's code …………………………………….
3. Type of school: Public ( ) Private ( )
4. Gender: Boy ( ) Girl ( )
5. Level of education…………………………………...
6. Duration of teaching level One ……………………..
7. Number of streams…………………………………….
8. Employer ………………………………………………

Section B: Utilization of instructional materials

1. Utilization of instructional materials

- Types of instructional materials available in the classroom.
- Adequacy of instructional materials in the classroom.
- Utilization of instructional materials during lesson delivery.
- The most available instructional materials and how often utilized.
- The reaction of pupils on instruction with instructional materials.
- Comparison of instruction with instructional materials and when without

2. Sources of your instructional materials

- Sources of instructional materials in your classroom

- Ways of getting those that are not available in the surrounding
- The role of the school administration in the provision of instructional materials
- Parents' involvement in the provision of instructional materials.

3. Benefit to the pupils

- pupils reaction when instructional materials are utilized.
- pupils and participation or creation of knowledge
- Improved performance in classroom activities
- Creation of knowledge through interaction with instructional materials.

4. Benefits to the teacher

 Importance of instructional materials to you Performance and mean score

APPENDIX V: LEARNER'S MATHEMATICS COMPETENCY CHECKLIST

Section A: Background Information

Tick or write the learner's response

1. Code: …………………………………………..
2. Type of primary school: Public ( )   Private ( )
3. Gender of the learner: Boy ( )   Girl ( )
4. Learner's Date of Birth…………………………

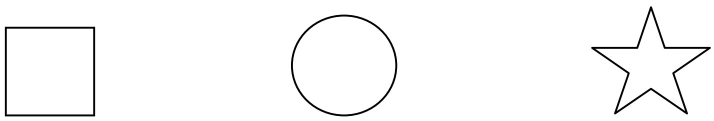
Section B: Mathematics Abilities

Cross **Yes** where the learner has abilities or **No** where the learner is not capable.

1. Rote count 1-50   Yes/No

   Notes: ____

2. Recognize shapes



Yes/No   Yes/No   Yes/No

Notes: ____

3. Shade the biggest number.   Yes/No

13   9   5   16

Notes: ____

4. Recognize the following Kenyan currency

20   40   5   100   50

Yes/No Yes/No Yes/No Yes/No Yes/No

Notes: ____

5. Add:

1 + 8 = 2 + 7 = 6 + 4 =

Yes/No Yes/No Yes/No

Notes: ____

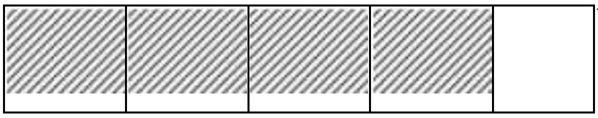
6. Take-away:

8 – 3 = 9 – 2 = 6 – 5 =

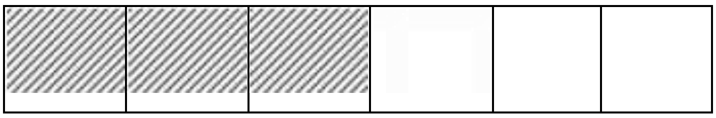
Yes/No Yes/No Yes/No

Notes: ____

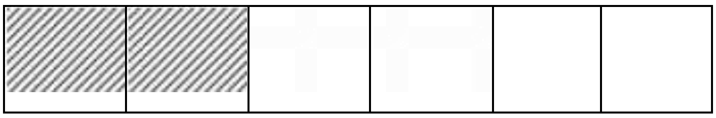
7. Count and write the number of the shaded part



Yes/No



Yes/No



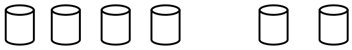
Yes/No

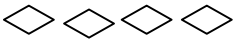
Notes: ____

8. Put together

☆☆☆☆☆☆☆ + ☆ = Yes/No

Yes/No

 = + Yes/No

 +  = Yes/No

Notes: ____

9. Read the following numbers Yes/No

13 17 4 9 20

Notes: ____

10. Fill the missing numbers

4	5				9	10

Yes/No

9				12	13	

Yes/No

Notes: ____

Appendix VI: Parent's Consent

Dear parent,

I am a post graduate student in the Department of curriculum and evaluation undergoing a Masters Degree in the university of yaounde 1. My topic of study is " The Influence of Instructional Materials on Acquisition of Mathematics Competencies among Level One pupils". The main aim of this study will be to find out whether utilization of instructional materials in teaching and learning mathematics is connected to performance.

I am therefore, requesting for your permission to involve your son/daughter in the study. Kindly, show your acceptance by signing this form in the space provided below.

I, ____ the parent/guardian of__________________________ hereby give consent for my child to participate in the study.

PARENT'S SIGNATURE______________

Yours Faithfully,

BESINGI SHADRACK MEKUMBA The Researcher.