REPUBLIQUE DU CAMEROUN
Paix – Travail – Patrie
****
UNIVERSITE DE YAOUNDE I
FACULTÉDES SCIENCES DE L'ÉDUCATION
DEPARTEMENT DE DE CURRICULA ET
ÉVALUATIONS
****
CENTRE DE RECHERCHE ET DE FORMATION DOCTORALE (CRFD) EN SCIENCES HUMAINES, SOCIALES ET ÉDUCATIVES

REPUBLIC OF CAMEROUN
Peace – Work – Fatherland
****
UNIVERSITY OF YAOUNDE I
FACULTY OF SCIENCES OF EDUCATION
DEPARTMENT OF CURRICULIM AND
EVALUATION
****
DOCTORAL RESEARCH AND TRAINING CENTRE (CRFD) IN SOCIAL
AND EDUCATIONAL SCIENCES

TEACHING PRACTICES AND HIGHER ORDER THINKING SKILLS AMONG SECONDARY SCHOOL STUDENTS IN YAOUNDE VI

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF A MASTER'S DEGREE IN CURRICULUM AND EVALUATION (M.Ed)

Par : **LYDIA MWETI AKWO**
Bachelor in Curriculum Studies and Teaching/HISTORY (B.Ed)
University of Buea

Sous la direction de
PROF. PATRICIA BISSA ENAMA
University of Yaounde I

Année Académique : 2017

CERTIFICATION

This is to certify that, the Thesis entitled "**Teaching Practices and Higher Order Thinking Skills among Secondary School Students"** was carried out by **Lydia Mwetii Akwo.**Matricule**14K3412** of the Department of Curriculum and Evaluation, Faculty of Science of Education of the University of Yaounde 1 under my supervision.

Head of department **President of jury**

Supervisor **Examiner of jury**

Date……..

DEDICATION

To my late parents,

Mr and MrsAbraham Akwo Ndiba.

ACKNOWLEDGEMENTS

My sincere thanks goes to my supervisor Pr. Patricia Bissa Enama for all her motherly and gentle directions, constructive criticisms and the patience taken to go through this work to ensure that it is well constructed. I express my heart-felt gratitude to all my lecturers in the Faculty of Science of Education specifically those in the Department of Curriculum and Evaluation who have broadened my mind and my world of knowledge in the field of education, and raised me to higher heights. My deepest appreciation goes to Mr. Chaffi for his assistance. My immense gratitude to Mr. Nangoh Divine who generated the idea of my University education, my brothers and sisters of the Akwo's family; Victor, Susan, Mercy, Charles, Martha, Emilia, Ebako and Elizabeth not forgotten my beloved children Joel and Jordan for their love, financial and material support. My hearty thanks also go to all the students who trusted and gave me the information required for this study. Mr. Gideon Tah for his financial, remarkable and tireless intellectual contributions, Mr. Sakwe Samuel, Aunty Bertha and Mukete Augustine for their immense financial and moral support. My co-workers specially Mr. Njimgou Chris for their friendship and guidance to ensure that this work is well constructed.May God Almighty abundantly bless and reward all of you and all my benefactors who have been so helpful to me during these years of my Postgraduate studies at the University of Yaounde I. Thank you, Merci, Gratias.

ABSTRACT

The study titled "Teaching Practices and Higher Order Thinking Skills among Secondary School Students in Yaounde VI" was aimed at looking at the relationship between teaching practices and higher order thinking skills. A main research question was raised to guide this study. Is there a relationship between teaching practices and higher order thinking skills? The study made use of a survey design. A sample size of one hundred and fifty (150) students was selected using a simple random sampling from the target population of the study. The instrument used to collect data was a questionnaire with the Likert scale of measurement. Data collected were analysed quantitatively with the use of frequency counting, percentages and advanced inferential tests of the Pearson moment correlation. After analysing the data, the following results were obtained;

- The first hypothesis was tested valid with r= .539 and the degree of freedom was 17. The read r value was .455. Since the r calculated is larger than the r read, therefore, there is a significant relationship between teaching method and higher order thinking skills.
- For the second hypothesis, r=.321 and the degree of freedom was 16. The r value was .468. Since the r read is larger than the r calculated, this confirms that there is no significant relationship between teaching learning materials and higher order thinking skills.
- For the third hypothesis, r= .513 and the degree of freedom was 14. The read r value was .497. Since the r calculated is larger than the r read, therefore, there is a significant relationship between assessment activities and higher order thinking skills.

It is on this background that we conclude that there is a significant relationship between teaching practices and HOTS. Some recommendations were made for the attention of students, teachers, curriculum developers and the government.

RESUME

Ce travail intitulé « pratique d'enseignement et l'ordre supérieur de réflexion et compétence entre les élèves des écoles secondaires de Yaoundé VI». A pour but d'examiner la relation entre pratique d'enseignement et l'ordre supérieur de la réflexion et de compétence. La question essentielle de recherche suscitée pour menée à bien cette étude. Y'a t'il une relation entre les méthodes d'enseignement et l'ordre supérieur de la réflexion et de compétence ?

Ce travail à fait usage d'un modèle d'enquête. Un échantillon de 150 élèves a été sélectionné utilisant au hasard un simple échantillonnage a partir de la population cible de cette étude. L'instrument utilise pour collecter les données étais un questionnaire avec pour échelle de mesure celle de Likert. Puis les données collectées ont été analysées quantitativement par les calcules de fréquences, pourcentages, test avancé de déduction de Pearson et le moment de corrélation. Apres analyse des données les résultats suivants ont été obtenus.

- ✓ La première hypothèse a été teste valide avec r=539 et le degré de liberté était 17. La valeur r lue était 455 puisque r calcule est supérieur à r lue ainsi il existe une relation significative entre méthodes d'enseignement et l'ordre supérieur de la réflexion et de la compétence.
- ✓ Pour la deuxième hypothèse, r= .321 et le degré de liberté est de 16. La valeur lue r=.468 cependant, r lue est supérieur à r calcule, ceci confirme qu'il existe une relation significative entre les matériels de pédagogies d'apprentissage et l'ordre supérieur de réflexion et compétence.
- ✓ Pour la troisième hypothèse, r= .513 et le degré de liberté est de 14, la valeur lue r= .497 par conséquent r calcule est supérieur à la valeur r lue. Ainsi, il existe une relation significative entre l'évaluation des activités et l'ordre supérieur de la réflexion et compétence.

Au regard de cette étude menée, nous pouvons conclure qu'il existe une relation entre les pratique de pédagogies et l'ordre supérieur de la réflexion et compétence. Toutefois quelques recommandations ont été faites à l'attention des élevés, enseignants, curriculum de promoteur et du gouvernement.

LIST OF ABREVIATIONS

ILO	**:**	International Labor Organization
HOTS	**:**	Higher Order Thinking Skills
PAJER-U	**:**	Rural And Urban Youth Support Program
PIASSI	**:**	Integrated Support Project for Actors of the Informal Sector
PIFMAS	**:**	Integrated Project For Manufacturing of Sporting Materials
NEETS	**:**	Education, Employment or Training
NEF	**:**	National Employment Fund
TLM	**:**	Teaching Learning Material
WATS	**:**	West African Time
ZPD	**:**	Zone of Proximal Development

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE
GENERAL INTRODUCTION

1.0 INTRODUCTION

This chapter gives an introduction of what this research work contains. It begins by tracing the historical, contextual, conceptual and theoretical background of Higher Order Thinking Skills (HOTS) and highlights relevant literature that supports and better explains the problem under study. The chapter also brings out the statement of the problem under study, objectives of the study, research questions, and research hypotheses, significance of the study and operational definition of key terms.

1.1 BACKGROUND OF THE STUDY

1.1.1 Historical Background

Throughout history, philosophers, politicians, educators and many others have been concerned with the art and science of thinking. The intellectual roots of critical thinking are as ancient as its etymology, traceable, ultimately, to the teaching practice and vision of Socrates 2,500 years ago who discovered by a method of probing questioning that people could not rationally justify their confident claims to knowledge. He established the importance of asking deep questions that probe profoundly into thinking before we accept ideas as worthy of belief (Presseisen 1986). He equally established the importance of seeking evidence, closely examining reasoning and assumptions, analyzing basic concepts, and tracing out implications not only of what is said but of what is done as well. His method of questioning is now known as "Socratic Questioning" and is the best known critical thinking teaching strategy.

Aristotle, and the Greek sceptics, all of whom emphasized that things are often very different from what they appear to be and that only the trained mind is prepared to see through the way things look to us on the surface (delusive appearances) to the way they really are beneath the surface (the deeper realities of life). From this ancient Greek tradition emerged the need, for anyone who aspired to understand the deeper realities, to think systematically, to trace implications broadly and deeply, for only thinking that is comprehensive, well-reasoned, and responsive to objections can take us beyond the surface (Presseisen 1986). .

In the Middle Ages, the tradition of systematic higher order thinking was embodied in the writings and teachings of such thinkers as Thomas Aquinas (Summa Theologica) who to

ensure his thinking met the test of critical thought, always systematically stated, considered, and answered all criticisms of his ideas as a necessary stage in developing them. Aquinas heightened our awareness not only of the potential power of reasoning but also of the need for reasoning to be systematically cultivated and "cross-examined." Of course, Aquinas' thinking also illustrates that those who think critically do not always reject established beliefs, only those beliefs that lack reasonable foundations.

The importance of developing higher order thinking skills have origins escalating back to 1910, when philosopher, John Dewey provided purpose to education---to teach young men and women to think "there is not adequate theoretical recognition that all which school can do for pupils, so far as their minds are concerned, is to develop their ability to think" (Dewey, 1916). His ideas about teaching people to think were developed in his book, "How we think" (1910), and led to a large movement devoted to critical thinking in the 1960s.

In1910, Edward de Bono supported Dewey's purpose, and from this, his Thinking Program (1974) has led to expansive efforts to create thinking skills curriculum for the classroom. He proposed three basic principles underlying his method: 1) Thinking is a skill that can be developed, 2) Most practical thinking takes place in the perception stage, 3). The tools method is used to teach thinking. While considering these three basic principles, it was found that the various skills defined in the Bloom's Taxonomy (1956) were declared as skills fundamental to the future of effective education (Education Commission of States, 1982). Emphasis on these skills was echoed by McTighe and Schoenberger (1985) in a report stating, "Higher-level thought processes…are needed for students to function properly".

Furthermore, in 1999 Costa and Liebman recognize higher order thinking as a necessary attribute to thrive in the workforce. They stated that the understanding, knowledge, and development of such thinking skills created, "self-initiating, self-modifying, self-directed thinkers…beyond just fixing problems… and search continuously for creative solutions" who are individuals for the future. As a result of his support for developing thinking skills in the classroom, a resource book for critical thinking, called "Developing Minds" was edited by Costa (2001), and has become one of the leading resource books for thinking skills curriculum to this day, with its first edition released in 1985,and most recent in 2001.

In the twentieth century, the ability to engage in careful, reflective thought has been viewed in various ways: as a fundamental characteristic of an educated person, as requirement for responsible citizenship in a democratic society, and, more recently, as an employability skill for an increasingly wide range of jobs.

Robinson, in her 1987 practicum report: states that, teaching children to become effective thinkers are increasingly recognized as an immediate goal of education....If students are to function successfully in a highly technical society, then they must be equipped with lifelong learning and thinking skills necessary to acquire and process information in an ever-changing world.

Beyth-Marom, et al. (1987) underscore this point, characterizing thinking skills as means to making good choices: Thinking skills are necessary tools in a society characterized by rapid change, many alternatives of actions, and numerous individual and collective choices and decisions. The societal factors that create a need for well-developed thinking skills are only part of the story, however, another reason that educators, employers, and others call for more and better thinking skills instruction in schools is that most young people, in general, do not exhibit an impressive level of skill in critical or creative thinking. The following observation from Norris's (1985) review is typical: Critical thinking ability is not widespread. Most students do not score well on tests that measure ability to recognize assumptions, evaluate arguments, and appraise inference.

Likewise, Robinson notes that: While the importance of cognitive development has become widespread, students' performance on measures of higher-order thinking ability has displayed a critical need for students to develop the skills and attitude of effective thinking.
There is yet another major force behind the call for improved thinking skills instruction. Educators are now generally agreed that it is in fact possible to increase students' creative and critical thinking capacities through instruction and practice. Ristow, (1988) notes that, in the past, these capacities have often been regarded as: a fluke of nature, a genetic predisposition....qualities [that] are either possessed or not possessed by their owner and that education can do very little to develop these qualities.

Ristow then goes on to say: the direct teaching of creative skills can produce better, more creative thinkers. Presseisen, (1986) makes this point even more forcefully, asserting that: The most basic premise in the current thinking skills movement is the notion that students can learn to think better if schools concentrate on teaching them how to do so.

1.1.2 Contextual Background

Generally, teaching practices in Cameroon secondary schools are still using conventional teacher–centred approaches that focuses on information surveying, as well as drill and practice,(Lim, Fatimah, & Tan, 2002; Maimunah, 2000; Tan &Arshad, 2011). Teachers perceived their main role as the surveyor of information and instruction, and thus

posse's high intention to implement teacher–centred learning in their classroom (Lim, 2007). During lesson, students listen passively to the teacher and questioning only happens occasionally. Students are used to relying on their teachers for all information, explanation, and instructions. As a result, low participation rates, rote learning, and lack of higher order thinking among students.

It is for this reason that, youth unemployment in the world is blighting a whole generation of youngsters. The International Labour Organization (ILO) estimates that there are 75million 15-24 year old looking for work across the globe. An estimated of 26 million youths are not in Education, Employment or Training (so-called NEETs). Globally, about 85% of the world's young people live in developing countries and an increasing number of these young people are growing up in cities. In many cities on the African continent, more than 70% of the inhabitants are under the age of 30 with about 6% of the total population below the age of 35 years making Africa, the most youthful continent in the world.

In Cameroon, the unemployment rate is 30% while that of underemployment stands at 75% (International Labour Organization's 2013 report). It is worth noting that Cameroon has a population of over 20 million inhabitants and most of the people belong to the middle class. It may interest you to know that the working population of Cameroon is about 12million and only a little over 200,000 people work in the public service. With government being the highest employer, this implies that the other 11.8million people who are not government employed are a call for concern. This is due to the fact that, most graduates lack employability skills such as reasoning, problem solving, decision making and interpersonal competence (King, Goodson, &Rohani, 2011)

Most of the barriers to resolving the unemployment challenge in Cameroon includes: the unprecedented economic crisis suffered in the 1990s, the educational system of Cameroon which focuses mainly on theories and abstract concepts with little or no training in technology and entrepreneurship, low-quality jobs, skills mismatch, inadequate job matching, the work experience trap, lack of access to capital, little or no entrepreneurship and business training, limited youth participation, social discrimination and corruption, frustration and discouragement, amongst others. But our major concern here is on the fourth point which is skills mismatch. The skills students acquire in school do not match with what employers want, which is attributed to the lack of higher order thinking skills in the teaching practices carried out during the teaching and learning process. This is because; employers are not only looking for employees with highly specialized academic skills, but those with good thinking and communicative skills. Employees who can learn quickly and can solve problems, think

creatively, gather and analyze information meaningfully. Many of the highest paying jobs require higher order thinking, such as critical thinking skills, that can generate effective ideas and making important decisions

It is true that the Cameroon government has become aware of the dangers posed by the growing rate of youth unemployment and has made moves in that regards. . This can be seen through the Ministries of Youth Affairs and Civic Education and that of Employment and Vocational Training. The programs designed by government via these ministries include the Rural and Urban Youth Support Program known by its French acronym as PAJER-U, the Integrated Project for Manufacturing of Sporting Materials (PIFMAS), the National Employment Fund (NEF) and the Integrated Support Project for Actors of the Informal Sector (PIAASI). But the bottom line is that, despite all these efforts made by government, a lot more still has to be done especially in the Cameroon curriculum so as to be able to transfer knowledge learned in school into the real world and as well be able to solve problems they encounter in daily lives.

1.1.3 Conceptual Background

However, higher order thinking skills developed it roots in Bloom Taxonomy. Bloom's Taxonomy was proposed to establish taxonomy of cognitive domains (Bloom, 1956). The purpose of this taxonomy was to create a model for teachers to follow in their classroom instruction. Using this taxonomy as a guide, teachers could develop educational objectives that would help students achieve Bloom's ultimate learning outcome—the practice and mastery of higher order thinking skills. The taxonomy organized thinking skills into six levels, from the most basic to the more complex: knowledge, comprehension, application, analysis, synthesis, and evaluation. These six levels were included in a set of educational objectives within cognitive domain (knowledge), (Bloom, 1956) which classifies learning abilities into three levels based on complexity and mastery of skills. Bloom Taxonomy constructs its domain as a stacking of skills where you grow from the most basic to the most advanced. Our main focus is on the last four stages of the cognitive domain which include; application, analysis, synthesis and evaluation. These are the stages Bloom considers as leading to higher order thinking skills. But it doesn't necessarily mean that the first two stages (knowledge and comprehension) are not important because knowledge begins from simple recall of facts to more complex tasks. Although higher order thinking skills begins at the elementary, it should be noted that, more emphases should be laid on the secondary school because, this is a period where students are expected to move from developmental knowledge

to applicative knowledge. Perhaps most importantly in today's information age, thinking skills are viewed as crucial for educated persons to cope with rapidly changing world, (Deborah Gough, 1991).

Over the decades, the aim of developing and enhancing students' HOT has been a major educational goal (Fisher, 1999). As Resnick in 2010 said, "scaling up the 'thinking curriculum' in a way that will foster proficiency for all students is currently a major educational challenge" (Zohar, 2013, p. 234); and a primary glance at teachers' perspective tells us that most teachers agree that it is crucial to teach students HOT, primarily to guide their idea generation (Yee et al., 2012). This commitment toward HOT is relevant to global economic growth, the development of information and communications technology (ICT), acknowledge-based economy and a fast-paced world. In reality, HOT is an extremely needed skill for every individual in any education setting.

Also, Fisher (1999) believes that the development of students' HOT is complementary with the inculcation of lifelong learning among them. In other words, we need "thinking" students who can incessantly respond to real-world demands (Vijayaratnam, 2012). Obviously, we know what is important and what we expect of our education system, of our teachers and of our students; but how well are they responding to the challenge of teaching and/or learning HOT? For one, "in most classrooms higher order thinking receives little or no attention" (Ivie, 1998, p. 35). Ivie (1998) continues to substantiate using previous findings that even when HOT does occur in the classroom, teachers rarely make effort to sustain students' flow of higher-level thoughts, perhaps due to teachers' incompetency or disinterest in pursuing learning outcomes other than learning content-specific goals. Sadly, a classroom scenario of such dismalness is believed to be epidemic across nations.

According to Rajendran and Idris (2008), students who were taught how to develop higher order thinking skills to solving problems were better suited for more complex problem solving than those who were not. Therefore, the need for HOTS in the teaching and learning of secondary students cannot be over emphasized. Rajendran and Idris (2008), also suggests that thinking skills enhance academic achievement. HOTS is a major component of creative and critical thinking and creative thinking pedagogy can help students develop more innovative ideas, ideal perspectives and imaginative insights. Again, it can also be noted that HOTS focuses on developing students' abilities to be able to analyze effectively, evaluate by drawing inference from existing information and creating (synthesizing) something new. When students are able to create and fuse these skills in their learning activities, then such student has been able to demonstrate HOT.

Furthermore, (Yee et al., 2011) suggest that HOTS are teachable and learnable, and all students have the right to learn and apply this thinking to solving problems. Hence, the development of this skill is not just expedient for developing high cognitive capacities, but also responsible for the development of an all-round individual. By this, we mean that the individual develops an all-round capacity, thus enabling a competitive student's thought system, development in their intellect and a means to helping students avoid errors in thinking (Yee et al., 2010).

On the other hand, despite unfavourable reports, considerable development has occurred in improving the teaching and/or learning of HOT; it is just that in terms of realizing the educational ideal of having 'thinking' students in a 'thinking' classroom within the 'thinking' curriculum where active cognition is a routine, we still need to work real hard (Zohar, 2013). Attention is needed at the planning and implementation levels because recurring inconsistencies in curriculum development and enforcement will continue to keep the effective teaching of HOT in the classroom as pure rhetoric (Ivie, 1998).

1.1.4 Theoretical Background

This study was partly supported by the social constructivist theory of Lev Vygostky which states that learning occurs via the construction of meaning in social interaction, within cultures, and through language. This theory explains the fact that individuals are said to be co-constructors of their own knowledge through interaction with the environment. Vygostky, the proponent of this theory emphasized the role of individual interaction with their socio cultural environment with the process of knowledge construction. Vgostky has become known for his second concept, the zone of proximal development or ZPD. The ZPD defines the distance between a student's current level learning and the level he/she can reach with the tools, people and powerful artefacts (Brown, 1994). In the ZPD, the teacher work together on task that the learner could not perform independently because of the difficult level. This process captures the idea of collaborating and mentoring processes, requiring the teacher, who has and knows more skills, to share that knowledge in a cultural mediated interaction (daloz, 1906) with a student or a group of students working together.

According to Vygostky, good teaching and the right environment and exposure anticipates the development of the child, within the child's Zone of Proximal Development where with the support of others, children are able to attain more than they could do on their own. This concept of ZPD is a vehicle for pushing learners to heightened levels of learning competencies.

Recently, constructivist theories of learning have sparked reforms in teaching practices, suggesting that learning environments focus directly on students, the importance of context, authentic problems and tasks, discovery learning, student's prior knowledge, group projects and discussion, student choice, and authentic assessment. Explicit strategies or approaches to learning also have been identified that support individual and social learning: Anchored instruction, situated learning, and cognitive apprenticeship are just a few different approaches to teaching and learning that draw from constructivist theories. Anchored instruction involves lodging instruction in an authentic problem-based story, case study, or situation in which students generate and test possible problem solutions. Situated learning emphasizes learning through social interaction and collaboration in authentic contexts. And cognitive apprenticeship, like traditional apprenticeship, relies on pairing a guide or an expert with a learner in an authentic study but focuses on making thinking explicit. Despite the implications, adopting a constructivist theory of learning does not preclude teacher-centred approaches to teaching and learning because both knowledge and learning are the result of construction regardless of the teaching approach.

Brunner's theory of discovery learning was also used in this study. Brunner suggested that, meaningful learning means discovery and if the learner discovers information through his or her own effort, it is more useful and more lasting than information which is given to them already prepared by teachers. Students who discover learning by themselves know how to analyze and critic ideas, they are able to make connections across discipline, see knowledge as useful and applicable to daily life and understand content on a deeper, more lasting level.
To improve memory according to Brunner, you need to find out information for yourself. He also encourages creativity. Learners should be active and not passive. The learner should discover relationship between concepts by themselves. It is very easy to practice information discovered or apply concepts discovered. According to Brunner, a teacher should allow students to look for answers. He encourages group discussion which facilitated discovery learning and brainstorming which is another aspect of discovery learning.

The researcher also made use of the cognitive constructivist theory of Jean Piaget. According to Piaget the developmental stages are the key to cognitive development. School-age and adolescent children develop operational thinking and the logical and systematic manipulation of symbols. As adolescents move into adulthood, they develop skills such as logical use of symbols related to abstract concepts, scientific reasoning, and hypothesis testing. These skills are the foundation for problem solving, self-reflection, and critical reasoning (Crowl et al., 1997). Cognitive theorists recognize that much learning involves

associations established through contiguity and repetition. They viewed learning as involving the acquisition or reorganization of the cognitive structures through which human process and store information (Good and Bophy, 1990, pp.187). The constructivist theory resulted from Jean Piaget (1964) says an individual confronted to a given situation will mobilize a number of cognitive structures which he calls operational designs. The learning of operational designs is done through two complementary processes: Accommodation is the transformation of the cognitive structure of the individual in order to incorporate new elements of experience. Assimilation on the other hand is the process whereby the individual incorporate information from the environment to the cognitive structure. In this case, knowledge is not given but is being constructed by the learner through mental activities. The learner adapts itself to knowledge through active learning and exploration. The learner has to think and explains his way of reasoning to the teacher instead of memorizing what was taught to him by the teacher. The learner is at the centre of the learning process and his knowledge is formed by his abilities to treat and interpret information. Teaching thus become an interdisciplinary and the teacher plays only the role of a guide, facilitator. As suggested by IsidoreLauzier and alii(2007), "The teacher (to remain in uniformity with what preceded) is an adviser; it is the student that looks for the means of acquisition of his knowledge".

In this light, the role of the teacher is not to block the internal development process of the student by imposing a teaching program, but rather consist in observing, diagnosing and practice formative evaluation and differential pedagogy. Teaching should therefore be adapted to the need of the child. When constructivist theory is applied in the learning environment, the educator's role is to facilitate rather than dispense information, Huang (2002) used in Collins (2008). In this environment both teacher and the student take part in the learning process. Learners develop internally rather than passively receiving information transmitted by an instructor.

It is for this reason that this study aimed to look at the various ways in which teaching practices such as teaching methods, teaching materials, assessment activities can lead to the development of higher order thinking skills so as to make our society a better one by the year 2035.

1.2. STATEMENT OF THE PROBLEM

Law no. 98/004 of 14th April 1998 to lay down guidelines for education in Cameroon stipulates in section 5 that, education should be that which develop creativity, a sense of initiative and spirit of enterprise. The aim of education therefore is to develop and enhance students' Higher Order Thinking Skills (H.O.T.S). As Resnick (2010) say, "scaling up the 'thinking curriculum' in a way that will foster proficiency for all students is currently a major educational challenge" (Zohar, 2013, p. 234); and a primary glance at teachers' perspective tells us that most teachers agree that it is crucial to teach students Higher Order Thinking Skills(H.O.T.S), primarily to guide their idea generation (Yee et al., 2012). The past decade has witnessed a strong emphasis on employability skills, with the rational that secondary schools equip students with the skills demanded by employers. There have been more concerted attacks from the labour market concerning mismatches in the skills possessed by graduates and those demanded by employers (Archer and Davison, 2008).Secondary schools are typically charged with failing to instil in graduates the appropriate skills and disposition that enable them to add value in the labour market. The problem has been largely attributed to the teaching practices in secondary schools focusing too rigidly on academically oriented provision and pedagogy, and not enough on applied learning and functional skills. Most lessons in schools did not sufficiently engage students in constructive thinking where teachers relied on lecture format and most importantly, the learning focus was still directed at recalling facts or achieving surface-level content understanding rather than cultivating HOT. In short, lower-order thinking, instead of HOT, still dominates teaching methods and learning outcomes (Zoha, 2013).

Students do not understand in the most basic sense the term HOT. That is, they lack the capacity to take knowledge learned in one setting and apply it appropriately in a different setting. As a result of this, many young people face difficulty in finding a job because of the mismatch between their education/training and labour market requirement. Study after study has found that even the best students in the best schools can't do this. In order for graduates to remain relevant, they need to be able to develop capacities to learn continuously through thinking and reasoning, problem solving, decision making and interpersonal competence (King, Goodson, &Rohani, 2011).

The existing problem as regard the lack of higher order thinking skills among secondary school students continue to generate concerns among the major stakeholders (educationists, Parents, government, examination bodies and students). However, the questions posed are; is the concept of higher order thinking (HOT) still strange to these

teachers? Or do students not grasp the meaning and understanding of the concept (Yee et al., 2011)? It is for this reason that, this study seeks to look at the relationship that exist between teaching practices and H.O.T.S.

1.3 OBJECTIVES OF THE STUDY

1.3.1 General Objective

The aim of this study is to find out if teaching practices can lead to higher order thinking skills among secondary school students.

1.3.2Specific Objectives

The specific objectives of this study is

- ✓ To find out the relationship between teaching methods and higher order thinking skills
- ✓ To look at the relationship between teaching learning materials and higher order thinking skills
- ✓ To look at the link between assessment activities and higher order thinking skills

1.4 RESEARCH QUESTIONS

1.4.1General Research Question

What is the relationship between teaching practices and higher order thinking skills?

1.4.2Specific Research Questions

The research questions to be used in this study will include the following;

- ✓ What is the relationship between teaching methods and higher order thinking skills?
- ✓ What is the relationship between teaching learning materials and higher order thinking skills?
- ✓ Does assessment activities leads to higher order thinking skills?

1.5 HYPOTHESES OF THE STUDY

1.5.1General Hypothesis

Ho Teaching practices do not influence higher order thinking

1.5.2Specific Hypotheses

- ✓ SH1 Teaching methods influence higher order thinking
- ✓ SH2 teaching learning materials influence higher order thinking
- ✓ SH3 Assessment activities influence higher order thinking

1.6 SIGNIFICANCE OF THE STUDY

The result of the study would be of great significance to students, teachers, curriculum developers and the government.

- **Students**: HOTS shall make students to become life-long learners, capable of analysing new situations, relating new situations to what they already know, and thinking critically and creatively to solve problems, improve processes, and understand their world. Students who knows how to analyse and critic ideas are able to make connections across disciplines, see knowledge as useful and applicable to daily life and understand content on a deeper, more lasting level.

Students with higher order thinking skills becomes more independent and self reliance learners as they do not rely on teachers and classroom time for instruction and guidance. Higher order thinking enables students to assess their learning styles, strength and weaknesses, and allows them to take ownership of their education.

It equally enhances in the learner's language and presentation skills. This is because, thinking clearly and systematically can improve the way learners expresses their ideas in learning how to analyse the logical structure of texts and improve comprehension abilities.

Student's achievement also increases through higher-order thinking skills. This is because using assignments and assessments that require intellectual work and critical thinking is associated with increased student achievement. These increases have been shown on a variety of achievement outcomes, including standardized test scores, classroom grades, and research instruments.

Higher-Order Thinking also increases Student Motivation. Studies have shown that holding students accountable for higher-order thinking by using assignments and assessments that require intellectual work and critical thinking increases student motivation as well as achievement. Students do not become engaged with their studies in the abstract, nor do they Become motivated in the abstract. Rather, they become engaged in thinking about particular things and motivated to learn particular things. Higher-order thinking increases students' sense of control over ideas. Thinking is much more fun than memorizing.

- **Teachers**: It shall help them to think when planning their lessons especially on the type of teaching methods that can enhance HOTS such as problem solving, discussion method and the discovery method.

It will equally help the teacher to select the best teaching materials that can promote HOTS and assessment strategies to be stressed on that can make students to accomplish a task and develop in them a critical and creative thinking skill.

It requires teachers to move from the traditional instructional model to one that engages teachers and students as partners in learning, with the teacher functioning in the role of facilitator or coach rather than leader or all-knowing authority.

It will help teachers to promote learning by acting as models, demonstrating behaviors they want their students to adopt. They prompt students to take ownership of the problem and responsibility for its solution, and then fade into the background.

It will help teachers to improve on their interpersonal skills and group dynamics; they need to be able to adapt instructional strategies, resources, and activities to promote students' development of basic skills, thinking skills, and personal qualities (Crunkilton 1992; Flowers 1992).

It will help teachers to also encourage students to reflect on their learning so they understand their thinking strengths and weaknesses.

- **Curriculum developers:** this study will help them to design a curriculum and assessment system that will allow students to think creatively and collaborate, to emphasize on authentic real world problems, engage students in enquiry and exploration and provide opportunities for students to apply what they know in meaningful ways.
- **Government**: The result of this study will enable the government to see the need to develop a curriculum that will not only be base on the theoretical aspect of learning, but also, and more importantly the competence of the learners upon graduation, in order to create an emerging Cameroon by the year 2035.

1.7 OPERATIONAL DEFINITION OF KEY TERMS

- **Higher Order Thinking Skills (H.O.T.S)**: According to Wikipedia definition, higher order thinking is that mode of thinking about any subject, content, in which the thinker improves the quality of his or her, thinking by skilfully analyzing, assessing, and reconstructing it. It is a self-directed, self monitor and self-corrective thinking. Rajendran and Idris (2008), also defines HOTS as the expanded use of the mind to meet new challenges. They viewed HOTS as a thinking function of the mind's ability to solving challenging situations. It is basically thinking that is taking place in the higher –level of the hierarchy of cognitive processing.

- ✓ **Teaching practices**: Teaching practices according to Alexander (2001) are the specific actions and discourse that take place within a lesson and that physically enact the approach and strategy.
- ✓ They are equally all the activities that take place in the classroom in order to enhance the teaching learning process
- ✓ **Teaching methods:** Tchombe (2004) defines teaching methods as that which refer to the formal structure of the sequence of facts commonly indicated by instruction. According to her, Teaching methods therefore cover the strategies and activities of teaching as well as the choice of what is taught. The means by which teaching is carried out, including the appropriateness of the time are vital.
- ✓ They are also the principles used for instruction to be implemented by teachers to achieve the desired learning of students.
- ✓ **Assessment activities:** according to the Cambridge Advanced Learner's Dictionary, assessment is the act of judging or deciding the amount, the value, quality or importance of something or the judgment or decision that is made.
- ✓ Brookhart, S.(2010), defined assessment activities as all the activities undertaken by teachers—and by their students in assessing themselves—that provide information to be used as feedback to modify teaching and learning activities. Assessment is an integral part of instruction, as it determines whether or not the goals of education are being met.
- ✓ **Teaching learning materials (TLM):** Brown, (1995), defines TLM as "any systematic description of the techniques and exercises to be used in classroom teaching which is broad enough to encompass lesson plans and yet can accommodate books, packets of audio-visual aids, games, or any of the other myriad type of activities that goes on in the classroom". It is a spectrum of educational materials that teachers use in the classroom to support specific learning objectives, as set out in lesson plans.

CHAPTERTWO
LITERATURE REVIEW AND THEORITICAL FRAMEWORK

2.0 INTRODUCTION

This chapter aims at examining the conceptual and theoretical considerations that experts hold in relation to teaching practices and higher order thinking skills. This would be done through a review of related literature based on variables of the study, and relevant theories.

2.1 CONCEPTUAL DEFINITION AND IMPORTANCE OF HIGHER-ORDER THINKING SKILLS.

According to Rajendran and Idris (2008), HOTS is the expanded use of the mind to meet new challenges. He viewed HOTS as a thinking function of the mind's ability to solving challenging situations, but the question is, is HOTS just about the extended use of the mind? Research findings have revealed more about the underlying importance of HOTS in the teaching and learning process. HOTS involve analyzing information to determine the problem, evaluating the problem and creating new workable solutions. The continuous development of HOTS is a direct determinant of continuous practice, and involving in task that stimulates the thinking faculties. It is worthy of note that, problems which are very critical cannot be merely solved by direct application of previous knowledge. Rather such problems can be solved when the individual engage in critical and creative thinking, inferring from prior knowledge (R. Thomas, 1992). This is because HOTS is characterized by complex, self-regulative, meaningful, nuanced judgments, uncertainty, multiple criteria as well as multiple providing solutions (Yee et al., 2010; Yee et al., 2011). HOTS should be an important aspect of the teaching and learning process, because one of the major goals of teaching is to ensure that students can think and solve problems critically. This feat can be achieved when students are not just taught a series of routine activities, but are taught how to think and create for themselves. This corroborates with the views of (Kerka, 1992) and (Chinedu, Libunao, Kamen, &Saud, 2014) that the best way to prepare future employees and problem solvers, is to teach students how to think instead of what to think.

Yee et al. (2011) also opined that thinking skills is fundamental to the educational process. A person's thought can affect his/her ability to learn, speed and effectiveness of learning. Therefore HOTS cannot be separated from the learning process. Research literature

has also shown that students who are trained to think critically demonstrate a positive impact in the advancement of their educational pursuit. For instance, the world became a global village as a result of the invention of the World Wide Web. This is no doubt the consequence of HOTS. Similarly, in the automotive industry, there has been rapid developmental changes and evolution. In the manufacture of automotive vehicles, there has been a shift from the use of analogue systems to digital systems, from carburettors to injection fuel systems, as well as hybrid system. This clearly indicates that if the world is to continue to enjoy fruition from continual technological advances and innovative practices, we must no doubt engage in teaching students how to think creatively and become critical problem solvers. The premise that research literature supports the teaching and learning of HOTS is no longer an issue for contention (Yee et al., 2011). Hence the issue lies with how best to teach this highly needed skills (HOTS). In a study conducted by Anderson et al. (2001), former students and colleagues of Bloom, after reviewing Bloom's taxonomy of HOT, came up with a six step taxonomy which includes; remembering, understanding, applying, analyzing, evaluating and creating process. These six steps they proposed promote the development of HOTS but emphasis much emphasis was placed on analyzing, evaluating and creating. They suggested that educators and teachers should teach analysis by using approaches that integrates– differentiating, organizing, attributing (to break into constituent parts) and determine how these parts relate to one another and also to an overall structure and purpose (Yunos et al., 2010; Zohar &Dori, 2003).

According to Thomas and Thorne (2009), HOTS may seem easy for some students, but prove difficult for others. But the fact that it can be learned and developed by a person's practice is justifiable. They further stated that HOTS involves thinking on a level that is higher than memorizing facts or telling something back to someone exactly the way it was said. It involves doing something new with the facts, understanding them, infer from them, connect them to other facts and concepts, categorize them, manipulate them and put them together in a new or novel way. Process in the context of the above description means that students should be able to produce creatively, technology based products. This therefore implies that design and technology education requires a higher level of thinking skills.

David (2008) and Robinson et al. (1999) agrees that a national consensus for creative and cultural education is needed in order to unlock the potential of every student, thus they proposed that HOTS should be viewed as having the following features and in doing so, teach students to understand and integrate these features in design a technology education; i) Using imagination ii) Pursuing purposes iii) Being original iv) Being of value.

According to Robinson et al. (1999), HOT is a function of one's imagination- the ability to creatively design what has not yet become fact or knowledge. This he opined is a fundamental tool in developing HOTS. His views may hold a stronger meaning than it appears to have, in the sense that every technological input or discovery in the world today was first created from imagination which later became insightful facts and knowledge.

Furthermore, Yee et al. (2010) reveals that there is research evidence supporting the teaching and learning of HOTS, owing to the low level of thinking skills among secondary school students. This they ascertained, when they assessed students on the rubric standards of Marzano thinking skills. Thus they suggested that models, strategies, techniques and activities, model lesson plans, use of integrated approach as well as the use of a self instructional approach be used in the teaching and learning of HOTS. They further opined that the self-instructional approach should be used on the ground that it caters for individual differences of learners and support students to study at their own pace. However, the problem with this approach according to King et al. (2011) is that it does not offer support (scaffolding) to students engaged in HOT activities. Instead King et al. (2011) suggested that lessons involving HOTS require particular clarity of communication to reduce ambiguities and confusion, and improve student's attitudes about thinking tasks. When students engage in self-instructional study they may select only task that are aligned with their abilities, thus not provoking the domains of the thinking faculties without the teacher's role of clarifying communication and reducing ambiguities of the learning task. Students may engage in an array of misguided learning activities. King et al. (2011) opines that students should be given support at the beginning of the lessons and gradually allowed to operate independently.

However, it should be noted that too much or too little support (scaffolding) can disrupt the development process of students. Therefore teachers should take caution in balancing the support they offer to students; as no support may lead to misguided learning and too much support would not aid students in the developing of their thinking skills.

2.1.1 Instructional Objective and Higher Order Thinking Skills

Weimer, (1996), identify instructional objective as the logical foundation of the teaching- learning- assessment process and agree that the first step of an instructional plan is to identify the course objectives. Objectives set the stage for effective planning, teaching, and assessment by specifying what a student should know and be able to do at the end of an instructional course.

Educators frequently concentrate on what material to include in a course before identifying what knowledge and skills they want students to develop. This approach tends to emphasize the recall of factual information instead of focusing the students on developing higher order thinking skills. Identifying the objectives as the initial steps in planning guides the instructional and assessment process for a course and also provides the frame work for developing measurement instruments that provide valid and reliable information about student achievement.

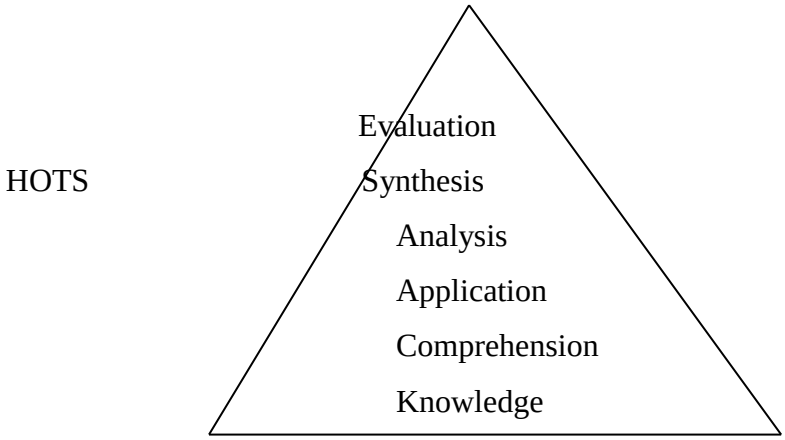
Bloom's Taxonomy is the most widely used, and subsequent frameworks for teaching thinking. A committee under the leadership of Dr Benjamin Bloom created the Taxonomy in 1956. Bloom's aim was to promote higher forms of thinking in education, such as analyzing and evaluating, rather than just teaching students to remember facts (rote learning). Learning was divided into three domains of educational activity:

- ✓ **Cognitive**: mental skills (knowledge)
- ✓ **Affective**: growth in feelings or emotional areas(attitude or self)
- ✓ **Psychomotor**: manual or physical skills (skills)

While all three domains are important for a 'rounded' person, it is the first domain (Cognitive) that is the subject of this paper. The cognitive domain involves 'knowledge and the development of intellectual skills' (Bloom, 1956). The abilities and skills within the domain are listed in six major categories starting from the simplest thinking behavior to the most complex. It is generally accepted that each behavior needs to be mastered before the next one can take place. This is useful knowledge in assisting teachers in their lesson planning and improve on higher – order thinking skills.

The cognitive domain

Cognitive objectives call for outcomes of mental activity such as memorizing, reading, problem solving, analyzing, synthesizing, and drawing conclusions. Bloom and others further categorize cognitive objectives into various levels from the simplest cognitive tasks to the most complex cognitive task. These categories can be helpful when trying to order objectives so they are sequentially appropriate. This helps to ensure that prerequisite outcomes are accomplished first. It deals with knowledge and the development of intellectual abilities and skills. Bloom,(1956). HOTS can be viewed from the more complex stages of the Bloom Taxonomy to the simplest as seen in the pyramid below.



Developed by the researcher, (2017)

Figure 1: Higher Order Thinking Skills

According to Bloom, a teacher can take a learning objective and build upon it by moving questioning and activities further up the pyramid until you reach the top. He continues further by saying that, students move from simple memorizing information to developing their original work base on the original education standard.

Bloom's Taxonomy was later revised by Anderson and Krathwohl (2001) which contains four knowledge categories: factual, conceptual, procedural, and metacognitive. The revised version was created in hopes to provide relevance to 21st century students. The skills to be acquired are:

Remember: the most basic level of knowledge, which primarily consist of memorization and recall of facts.

Understanding: students explain concepts through discussion, identification, or classification.

Apply: students may take presented information and put it into a new context through interpretation, demonstration or as a means to solve problems.

Analyze: the opportunity to take ideas and develop connection through compare/contrast, experimentation or examination.

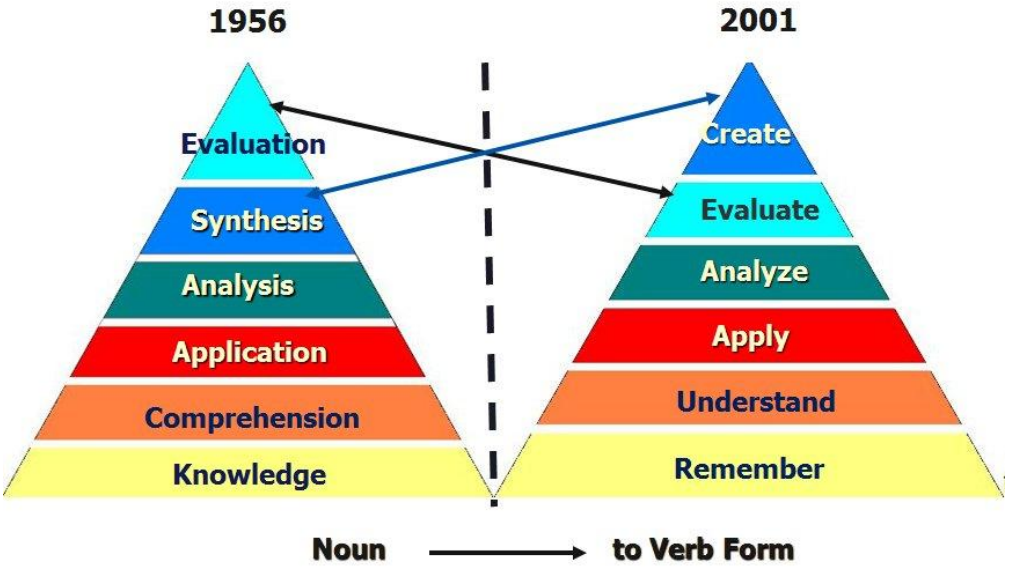
Evaluate: students use argument, research or appraisal to justify a stance or decision.

Create: the most advanced level of learning, where new or original work is developed through formulation, investigation or construction.

According to the new version, the intellectual behaviours that students should practice and engage in are remembering, understanding, applying, analyzing, evaluating and creating. The behaviours at the beginning of the list (remembering, understanding and applying) are

lower order, while the other behaviours (analyzing, evaluating and creating) are higher order. These take more critical thinking and thoughtfulness.

A comparison of the two taxonomies is shown in Figure 1.



Source: Wilson, Leslie O. (2001)

Figure 2: Bloom vs. Anderson/Krathwohl

Most teachers are familiar with Higher-order Thinking (HOT) due to Bloom's taxonomy (Figure 2). It was found that it is common understanding that to develop students' HOT teachers should promote student engagement with learning tasks which exceed the second level 'comprehension' in order to encourage application, analysis, synthesis and evaluation activities in processing information (Zohar, 1999). This resonates with the notion that HOT encompasses any thinking skills which require more than mere recall or memorization of information (Ivie, 1998; Underbakke, Borg &Peterson, 1993).

As you will see the primary differences are not in the listings or rewordings from nouns to verbs, or in the renaming of some of the components, or even in the re-positioning of the last two categories. The major differences lie in the more useful and comprehensive additions of how the taxonomy intersects and acts upon different types and levels of knowledge — factual, conceptual, procedural and metacognitive. This melding can be charted to see how one is teaching at both knowledge and cognitive process levels. Please remember the chart goes from simple to more complex and challenging types of thinking.

Table 1: Taxonomies of the Cognitive Domain

Bloom's Taxonomy 1956	**Anderson and Krathwohl's Taxonomy 2001**
. Knowledge: Remembering or retrieving previously learned material. Examples of verbs that relate to this function are: know identify define recall record name relate list memorize repeat recognize acquire	**1. Remembering:** Recognizing or recalling knowledge from memory. Remembering is when memory is used to produce or retrieve definitions, facts, or lists, or to recite previously learned information.
. **Comprehension**: The ability to grasp or construct meaning from material. Examples of verbs that relate to this function are: restate locate report identify discuss illustrate interpret recognize explain describe discuss draw represent express review infer differentiate conclude	**2. Understanding**: Constructing meaning from different types of functions be they written or graphic messages or activities like interpreting, exemplifying, classifying, summarizing, inferring, comparing, or explaining.
Application: The ability to use learned material, or to implement material in new and concrete situations. Examples of verbs that relate to this function are: apply relate organize employ practice calculate develop translate restructure interpret show exhibit use operate demonstrate illustrate dramatize	**3. Applying:** Carrying out or using a procedure through executing, or implementing. Applying relates to or refers to situations where learned material is used through products like models, presentations, interviews or simulations.
Analysis: The ability to break down or distinguish the parts of material into its components so that its organizational structure may be better understood. Examples of verbs that relate to this function are: analyze compare Differentiate experiment probe inquire contrast investigate scrutinize discover examine contrast detect survey inspect dissect categorize classify deduce discriminate separate	**4. Analyzing**: Breaking materials or concepts into parts, determining how the parts relate to one another or how they interrelate, or how the parts relate to an overall structure or purpose. Mental actions included in this function are differentiating, organizing, and

	attributing, as well as being able to distinguish between the components or parts. When one is analyzing, he/she can illustrate this mental function by creating spread sheets, surveys, charts, or diagrams, or graphic representations
Synthesis: The ability to formulate new structures from existing knowledge and skills. Examples of verbs that relate to this function are: Compile create, Develop generalize, Integrate propose.	**5. Evaluating:** Making judgments based on criteria and standards through checking and critiquing. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the processes of evaluation. In the newer taxonomy, evaluating comes before creating as it is often a necessary part of the precursory behaviour before one creates something.
Evaluation: The ability to judge, check, and even critique the value of material for a given purpose. Examples of verbs that relate to this function are: judge assess argue decide choose validate consider compare evaluate rate select estimate appraise value conclude measure criticize infer deduce	**6. Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing. Creating requires users to put parts together in a new way, or synthesize parts into something new and different creating a new form or product. This process is the most difficult mental function in the new taxonomy

(Summarized from: Anderson, L. W. &Krathwohl, D.R., et al (2001) taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy of educational objectives. New York: Longman.)

2.1.2 The role of instructional objective

Objective guide the instructional process by synchronizing the planning and implementation of teaching, learning, and assessment activities, thereby focussing on the outcome teachers wants students to achieve, unfortunately, course preparation often involves planning for the content and teaching activities without first establishing the clear definition of what students outcomes are desired. This approach can lead to instructional methods and assessments that focus on knowledge acquisition rather than on higher- level learning outcomes.

If students are expected to achieve the objectives of a course, they must be provided with appropriate opportunities to learn what they need to learn (Huba $ Freed, 2000).

Instructional objectives require teachers to provide students with the kind of experiences that facilitate the attainment of the objectives. When objectives are determined at the beginning of the course, they provide direction to the teacher for selecting the instructional activities that achievement of the desired behaviours (Gronlund, 2004). For example, a course objective that requires a student to demonstrate critical thinking skills necessitates that the teacher select learning experiences and assessment activities that require the ability to think critically.

2.2 SOME CONCEPTS RELATED TO HIGHER- ORDER THINKING SKILLS

Higher order thinking which is the expanded use of the mind to meet new challenges as defined by Rajendran and Idris (2008), can be viewed under six domains namely, metacogntion, procedural knowledge, comprehension, creativity, critical thinking and intelligence. They are subsets of higher order thinking skills but not higher order thinking skills.

2.2.1 Critical Thinking and Higher-Order Thinking Skills

Critical thinking is the ability to think clearly and rationally about what to do or what to believe. It includes the ability to engage in reflective and independent thinking. Ristow, R.S. (1988). Someone with critical thinking skills is able to do the following:

Understand the logical connections between ideas, identify, construct and evaluate arguments, detect inconsistencies and common mistakes in reasoning, solve problems systematically, identify the relevance and importance of ideas, and reflect on the justification of one's own beliefs and values.

Critical thinking is not a matter of accumulating information. A person with a good memory and who knows a lot of facts is not necessarily good at critical thinking. A critical thinker is able to deduce consequences from what he knows, and he knows how to make use of information to solve problems, and to seek relevant sources of information to inform him.

Critical thinking enhances language and presentation skills. Thinking clearly and systematically can improve the way we express our ideas. In learning how to analyze the logical structure of texts, critical thinking also improves comprehension abilities.

Critical thinking promotes creativity. To come up with a creative solution to a problem involves not just having new ideas. It must also be the case that the new ideas being generated are useful and relevant to the task at hand. Critical thinking plays a crucial role in evaluating new ideas, selecting the best ones and modifying them if necessary

Critical thinking is crucial for self-reflection. In order to live a meaningful life and to structure our lives accordingly, we need to justify and reflect on our values and decisions. Critical thinking provides the tools for this process of self-evaluation.

Good critical thinking is the foundation of science and democracy. Science requires the critical use of reason in experimentation and theory confirmation. The proper functioning of a liberal democracy requires citizens who can think critically about social issues to inform their judgments about proper governance and to overcome biases and prejudice.

2.2.2 Creativity and Higher-Order Thinking Skills

Although some references do not explicitly include creativity as higher order thinking, it cannot be unmeshed from the process. The very act of generating solutions to problems requires the creative process of going beyond previously learned concepts and rules. Creativity involves divergent and convergent thinking to produce new ideas (Crowl et al., 1997). Its place in the network of higher order thinking skills was well articulated in Pasteur's observation that "chance favors only the prepared mind" because "only a trained mind can make connections between unrelated events, recognize meaning in a serendipitous event," and produce a solution that is both novel and suitable (cited in crwol et al., 1997).

There are major features of creativity which involves the following; Creativity involves discovering and solving problems. Innovative approaches are used to accurately evaluate shortcomings, and actions are taken to remedy those weaknesses.

Creativity involves selecting the relevant aspects of a problem and putting pieces together into a coherent system that integrates the new information with what a person already knows (Crowl et al., 1997). In a basic sense, it involves a series of decision-making choices between "two or more competing alternatives of action," each having "several pros and cons associated with it"

Creativity overlaps with other characteristics, such as "intelligence, academic ability, dependability, adaptiveness, and independence" and can "evolve within each of the seven intelligences". Creativity require many of the same conditions for learning as other higher order thinking skills. The learning processes are enhanced by supportive environments and deteriorate with fears, insecurities, and low self-esteem. Creativity deteriorates with extrinsic motivation, restraint on choice, and the pressure of outside evaluation (Crowl et al., 1997).

2.2.3 Metacognition and Higher- Order Thinking Skills

The self-correcting nature of thinking is called "metacognition." Metacognition includes awareness of one's thinking processes, self-monitoring, and application of known heuristics and steps for thinking. One's success with metacognition depends, in part, on a belief in one's ability to get smarter as well as the beliefs of others, such as teachers, in one's ability (Crowl et al., 1997).

2.2.4 Procedural Knowledge and Higher-Order Thinking Skills

Procedural knowledge sometimes is misunderstood as a higher order thinking skill. While it may be a prerequisite for higher order thinking, it actually is a type of knowledge—specifically, knowledge of rules and their application (Crowl et al., 1997). The ability to recite a rule or set of procedures is "information learning"; the ability to apply a rule or procedure to a routine single variable situation is "application." Neither of these capabilities involves higher order thinking. Instead, applications of procedural knowledge that also involve analysis and synthesis of two or more concepts would be considered higher order thinking. Examples include "constructing map projections and grids, writing clear and concise case reports, calculating the fixed overhead costs for a project, designing spread sheets, drawing conclusions about the impact of social reform on the universality of social programs, and establishing meaningful relationships with co-workers"(Huot,1995).

2.2.5 Comprehension and Higher-Order Thinking Skills

Comprehension, a part of lower order thinking skills, is integral to higher order thinking skills development. In fact, some research and teaching strategies focus on comprehension as if it were within the higher order domain. While it is an important prerequisite, it is not a higher order thinking skill. Comprehension remains the process by which individuals construct meaning from information and form new "schemata" through specific activities (Crowl et al., 1997), including, but not limited to, generating and answering questions that demand higher order thinking about old and new ideas; confronting conflicting ideas and information, problems, or dilemmas; exploring and making discoveries; conducting systematic inquiries; summarizing, reciting, and discussing new ideas and their relationships; relating new understandings to other concepts; applying new ideas and information in basic problem-solving activities; or reflecting and verbalizing about cognitive processes involved in comprehension.

2.2.6 Intelligence and Higher-Order Thinking

In the past decade, intelligence has been defined more broadly (Kauchak&Eggen, 1998). Intelligence is no longer limited to the idea of a single ability or global capacity to learn, adapt, and think rationally; inclusive in its general and specific abilities to embrace general knowledge, comprehension, thinking, and problem solving; multidimensional in mental processes involving convergent and divergent thinking; and multilevel, including linguistic-verbal, logical-mathematical, spatial, musical, bodily kinaesthetic, interpersonal, and intrapersonal abilities that influence one's approaches to problem solving and thinking.

Summary of the Development of Higher Order Thinking Skills

Higher order thinking includes critical, logical, reflective, metacognitive, and creative thinking. These skills are activated when students of any age encounter unfamiliar problems, uncertainties, questions, or dilemmas. Successful applications of these skills result in explanations, decision, performances and products that are valid within the context of available knowledge and experience, and promote continued growth in higher order thinking, as well as other intellectual skills.

2.3 THE CONCEPT OF TEACHING PRACTICES

Teaching practices have long generated debate and ideological controversy, especially as to 'best practice' we view teaching as a knowledge-rich profession with teachers as 'learning specialists.' As professionals in their field, teachers can be expected to process and

evaluate new knowledge relevant for their core professional practice and to regularly update their knowledge base to improve their practice and to meet new teaching demands. The policy imperative for the teaching and learning of 21st century skills, such as problem-solving, collaboration, communication, and creativity, might entail a re-skilling of the current teacher workforce and upgrading of the knowledge base of the teaching profession.

Teaching practices according to Alexander (2001) are the specific actions and discourse that take place within a lesson and that physically enact the approach and strategy. To him, teaching practices comprises the following: Teacher spoken discourse (including instruction, explanation, metaphor questioning, responding, elaboration and management talk; pedagogy, curriculum, and teacher education in developing countries. Visual representation (using a chalkboard, writing, diagrams, pictures, textbook, learning aids such as experiments, drama) to understand or construct the new knowledge being presented or indicated to learners. The act of telling or providing tasks for learners to cognitively engage with new content or develop physical skills, such as experimentation, reading, writing, drawing, mapping, rehearsing, problem solving, practicing; A variety of interactions in which language is central between learners or learners and teacher such as pairs, groups, individually or whole class; Teachers monitoring, use of feedback, intervention, remediation and formative assessment of the student or assessment b the students themselves

"In Shulman's view, teaching practices is a form of practical knowledge that is used by teachers to guide their actions in highly contextualized classroom settings. This form of practical knowledge entails, among other things: (a) knowledge of how to structure and represent academic content for direct teaching to students; (b) knowledge of the common conceptions, misconceptions, and difficulties that students encounter when learning particular content; and (c) knowledge of the specific teaching strategies that can be used to address students' learning needs in particular classroom circumstances. In the view of Shulman (and others), teaching practices builds on other forms of professional knowledge, and is therefore a critical—and perhaps even the paramount—constitutive element in the knowledge base of teaching (Rowan et al., 2001)."

To him, teaching practices represents the blending of content and pedagogy into an understanding of how particular aspects of subject matter are organized, adapted, and represented for instruction. Shulman argued that having knowledge of subject matter and general pedagogical strategies, though necessary, were not sufficient for capturing the knowledge of good teachers. To characterize the complex ways in which teachers think about how particular content should be taught, he argued for "pedagogical content knowledge" as

the content knowledge that deals with the teaching process, including "the ways of representing and formulating the subject that make it comprehensible to others". If teachers were to be successful they would have to confront both issues (of content and pedagogy) simultaneously, by embodying "the aspect of content most germane to its teaching ability" (Shulman, 1986). At the heart of teaching practices is the manner in which subject matter is transformed for teaching. This occurs when the teacher interprets the subject matter, finding different ways to represent it and make it accessible to learners.

Shulman's acknowledgment that teaching practices is of special interest because it identifies the distinctive bodies of knowledge for teaching. It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction.

Rosenshine (1986) looks at teaching practices as a direct instruction. To her, it is a systematic method for presenting learning material in small steps, pausing to check for student understanding, and eliciting active and successful participation from all students. Teaching practices modes of instruction are well grounded in findings from evidence-based research in cognitive science, and give little attention to the 'causes' of underachievement, learning difficulties, or to students' underlying abilities (Casey, 1994). Thus, teaching practices programs are designed according to **what**, not **who**, is to be taught. Individual differences among students are allowed for through different entry points, reinforcement, amounts of practice, and correction strategies (Engelmann, 1980, 1999; 2005) teaching practices is based on both the theory and evidence that learning can be greatly accelerated if instructional presentations are clear, minimize, misinterpreted, and facilitate generalizations (Northwest Regional Education Laboratory, 2003).

2.3.1 Importance of Effective teaching practices

Maintain good communication skills: A successful teacher is one that is able to build a rapport with his /her students, one that can easily connect with his learners and feel their needs as individuals. Open and clear communication is the key to develop a healthy friendly learning atmosphere inside your class.

Getting student's engagement: There is nothing as challenging as getting students engaged. Today's students are multitasked and can hardly maintain a long concentration. They can easily get bored and therefore disconnected. There are many ways you can fight off this problem: Use interesting educational games and activities, use technology and multimedia

resources and finally make your teaching student-centred and try your maximum to relate what you teach to student's immediate environment.

Positive feedback: «Good job, excellent, act" are simple words that might not mean anything to you but they mean the whole world to students. Think back to the days when you were a student and how a positive feedback from your teacher would make both you and your parents' whole day. Publicly praise positive behaviour and show your students are celebrating their achievements as well.

Involve students in decision making: Students tend to do great when they feel they are trusted and that they are real parts in the learning / teaching operation. Use voting and polling to investigate about a certain topic or classroom assignment. Try from time to time to give them the wheel and let them lead. Use peer learning. Peer learning is a form of 'cooperative learning that enhances the value of student-student interaction and results in various advantageous learning outcomes.

Teaching practices is therefore of special interest because it identifies the distinctive bodies of knowledge for teaching. It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction. This therefore, will enable students to think critically, acquire skills to solve problem, thereby leading to higher – order thinking skills.

2.4 TEACHING METHODS AND THE DEVELOPMENT OF HIGHER ORDER THINKING SKILLS

Educators are increasingly expected to be responsible not only to help students achieve the best possible outcomes, but also to use the most scientifically valid methods to achieve them especially in increasing higher-order thinking shills among students. Hampton (1996) identified that, when teachers uses poor teaching methods, the impact upon teaching performances with respect to teaching thinking skills to young people will most likely to be negative. The use of teaching methods that promote thinking skills are therefore essential in the development of student's self –efficacy towards thinking skills.

A teaching method comprises the principles and methods used for instruction to be implemented by teachers to achieve the desired learning of students. Teaching methods can be classified as direct, indirect, interactive, experiential and independent study methods. Teaching methods can be general or specific. General teaching methods are the procedures that are common in the teaching of different subjects. In other words, a general or generic

teaching method is used in the teaching of more than one subject. On the other hand, specific teaching methods may be applicable mainly to specific subjects. (Tambo, 2012).

Davis (1997) suggests that the design and selection of teaching methods must take into account not only the nature of the subject matter but also how students learn. In today's school the trend is that it encourages a lot of creativity. It is a known fact that human advancement comes through reasoning. This reasoning and original thought enhances creativity.

2.4.1 Approaches to Teaching Thinking

Rajendran, 2001 and Zohar, 2005, proposed two main ways of teaching higher-order thinking. That is the infusion and the separate thinking subject approach. The infusion approach refers to the teaching of higher-order thinking in a content-specific setting; teachers integrate higher-order thinking explicitly with the teaching of specific content. The separate - subject approach regards higher-order thinking as general strategies used across subjects domains (not content-specific; teachers teach higher-order thinking as a set of skills or strategies to be acquired).

The approaches for teaching can also broadly be classified into teacher centred and student centered.In Teacher-Centered Approach to Learning; Teachers are the main authority figure in this model. Students are viewed as "empty vessels" whose primary role is to passively receive information (via lectures and direct instruction) with an end goal of testing and assessment. It is the primary role of teachers to pass knowledge and information onto their students. In this model, teaching and assessment are viewed as two separate entities. Student learning is measured through objectively scored tests and assessments. Thereby limiting students in acquiring higher- order thinking skills.

In Student-Centered Approach to Learning, while teachers are an authority figure in this model, teachers and students play an equally active role in the learning process. The teacher's primary role is to coach and facilitate student learning and overall comprehension of material. Student learning is measured through both formal and informal forms of assessment, including group projects, student portfolios, and class participation. Teaching and assessments are connected; student learning is continuously measured during teacher instructions. Learners construct their own knowledge through group discussions. Thereby leading to higher- order thinking skills.

Based on the reviews brought forth by various researchers, the researcher identifies the following as the various teaching methods that can enhance higher-order thinking skills among secondary school students.

2.4.1.1 Cooperative or collaborative learning methods

Cooperative Learning is a method of teaching and learning in which students form teams for structured activities to achieve a common goal. They are individually accountable for their work, and the work of the entire group. Members of cooperative teams work together and have clearly defined roles. It allows students to actively participate in the learning process by talking with each other and listening to other points of view. Collaboration establishes a personal connection between students and the topic of study and it helps students think in a less personally biased way. Group projects and discussions are examples of this teaching method. Teachers may employ collaboration to assess student's abilities to work as a team, leadership skills, or presentation abilities. (Kauchak & Eggen, 1998).

Cooperative Learning should include five essentials:

- ✓ **Positive interdependence**: Students realizes that each individual affects the work and success of the others. The work is structured so that students must share information in order to complete their cooperative tasks.
- ✓ **Student-to-student interaction**: The teacher openly encourages students to help each other. Students share resources with each other, provide constructive feedback, challenge other members' reasoning and ideas, keep an open mind, act in a trustworthy way, and promote a safe feeling for all by reducing anxiety.
- ✓ **Individual accountability*:*** Even though students work together, they also perform independently. Each individual's performance is assessed. Students must take personal responsibility for working toward the group goal(s).
- ✓ **Social skills**: Students learn and use appropriate social skills that include leadership, decision-making, trust building, communication, and conflict-management.
- ✓ **Group process**: To better develop the group process, students must analyze how well they are achieving their goals while maintaining effective working relationships.
- ✓ **Cooperative Learning Approaches**
- ✓ To be successful, Cooperative Learning tasks are designed by teachers so that students are required to depend on one another to complete the assigned tasks and to master content and skills. There are many Cooperative Learning approaches that are designed to achieve different objectives. When these approaches are used frequently and

correctly, students will acquire the positive results of Cooperative Learning. Some Cooperative Learning approaches are described below.

- ✓ **Jigsaw**- Each student, in a four to five member team, is given information for only one part of the learning activity. However, each student needs to know all information to be successful. Students work cooperatively in two different teams, their original team and an expert team. All students in the expert team seek the same information, study it, and decide how best to teach it to their peers in the original team. After this is accomplished, students return to their original teams to teach their portion of the lesson to the others in the team.
- ✓ **Think-Pair-Share**- This strategy can be used before introducing new concepts. It gives everyone in the class time to access prior knowledge and provides a chance for them to share their ideas with someone. Think-Pair-Share helps students organize their knowledge and motivates learning of new topics. There are three steps to Think-Pair-Share with a time limit on each step signalled by the teacher. (1) Students are asked to brainstorm a concept individually and organize their thoughts on paper. (2) Students pair up and compile a list of their ideas. (3) Each pair will then share with the entire class until all ideas have been recorded and discussed.
- ✓ **Send-a-Problem**- Students are placed in heterogeneous teams of four. Each team designs a problem to send around the class. The other teams solve the problem. Since all of the teams send their own problem, there are a series of problems solved in this one activity. Results are shared with the class.
- ✓ **Mind mapping**- Mind Mapping is the process of visually depicting a central concept with symbols, images, colours, keywords, and branches. This is a fast and fun way to take visual notes, foster creativity, and stretch students' visual thinking skills, make learning contextual and meaningful, and promote active involvement with the learning
- ✓ Content. Pairs of students may create their own mind map or they may simultaneously add to the team and/or class mind map.
- ✓ **Benefits of cooperative or collaborative learning**
- ✓ There are many benefits from using Cooperative Learning. Students will appreciate the value of teamwork and make a positive contribution when working with others to solve
- ✓ problems and complete tasks. Students learn research skills more readily when skills are shared through cooperative learning. Cooperative Learning allows students to enhance their ability to manage ideas and information in collaboration with others.

- ✓ Cooperative Learning allows students to observe, imitate, and learn from each other. Students keep each other on task and share a sense of accomplishment. The encouragement, support, and approval of peers build motivation and make learning an enjoyable experience. In addition, with advances in technology and changes in the workforce infrastructure, the teamwork and cooperation learned through Cooperative Learning activities is of high value for the future success for the students.

2.4.1.2 Discussion teaching method

Class room discussion is a democratic way of handling a class, where each student is given equal opportunity to interact and put forth their views. A discussion taking place in a classroom can be either facilitated by a teacher or by a student. A discussion could also follow a presentation or a demonstration. Student discussions "stimulate thinking, challenge attitudes and beliefs, and develop interpersonal skills" (Kauchak & Eggen, 1998, p. 250).When organized and managed well, discussions allow students "to develop critical thinking abilities and investigate questions that don't have simple answers" (Kauchak & Eggen, 1998, p. 250). There are several types of classroom discussion approaches. Some of which include; the panels, buzz sessions, forum, and whole-class discussion approaches.

- ✓ **Panels**

A panel consists of three to six learners who are selected and encouraged to discuss a relevant issue among themselves, with or without active participation by the rest of the class. The panel is often seated at a table, which is placed in such a way that the whole class can see and hear all the members.

A panel is most useful when the teacher wants learners to do high-level of thinking and when the issue under discussion can be viewed from different perspectives that are if it is fairly controversial. The learners selected to form the panel are given enough time, often lasting some days or weeks, to research on the topics, gather information and then present their findings to the class. After the panels members have present their findings, the teacher could then engage the whole class in a discussion of the findings.

- ✓ **Buzz sessions**

In this approach to discussion, the teacher divides the class into small groups to discuss a given issue or topic. Each group moves to a specific corner of the room and elects a leader. Each group discusses the issue for a given time and writes down its points or suggestions. When the time given by the teacher expires, the whole class comes together and

listens to the suggestions or points raised in each group. The teacher may then use the suggestions to carry out a whole class discussion on the issue.

- ✓ **Forum**

The forum is a discussion type in which a small number of students presents information they have investigated about a topic or an issue to the whole class. After the presentation, the speakers then ask the whole class questions on their presentation. The class is also encourage to ask the speakers questions.

- ✓ **Whole-class discussion**

The whole class discussion involves the class as a whole discussing a topic or an issue under the leadership of the teacher. As the discussion, the teacher asks questions, answers students questions, clarifies their comments and makes summaries as the discussion proceeds. (Tambo, 2012).

- ✓ **Importance of classroom discussion**

Class discussions can enhance student understanding, add context to academic content, broaden student perspectives, highlight opposing viewpoints, reinforce knowledge, build confidence, and support community in learning. The opportunities for meaningful and engaging in-class discussion may vary widely, depending on the subject matter and format of the course. Motivations for holding planned classroom discussion, however, remain consistent. An effective classroom discussion can be achieved by probing more questions among the students, paraphrasing the information received, using questions to develop critical thinking with questions like "Can we take this one step further?;" "What solutions do you think might solve this problem?;" "How does this relate to what we have learned about..?;" "What are the differences between ... ?;" "How does this relate to your own experience?;" "What do you think causes .... ?;" "What are the implications of .... ?"

2.4.1.3 Role Plays

Role-play an unprepared and unrehearsed dramatization. In role-play, the action comes directly from student's creative use of their own knowledge of the situation or issue. They act the situation using their own words rather than the prepared words of someone else.

For role-play to be effective, at least three conditions should be fulfilled: (a) the issue should be clear in the minds of the students, (b) the class should have common interest or group feeling on the issue, and (c) the role-playing should be seen by the class as a means of learning, not of entertaining. (Tambo, 2012).

- ✓ **Importance of role-play**

In role plays, participants use their own experiences to play a real life situation. When done well, role plays increase the student's self-confidence, give them the opportunity to understand or even feel empathy for other people's viewpoints or roles, and usually end with practical answers, solutions or guidelines.

Role plays are useful for exploring and improving interviewing techniques and examining the complexities and potential conflicts of group meetings. They help students to consolidate different lessons in one setting and are good energizers.

However, role plays can be time-consuming and their success depends on the willingness of students to take active part. Some students may feel a role play is too exposing, threatening or embarrassing. This reluctance may be overcome at the outset by careful explanation of the objectives and the outcome. Some role plays can generate strong emotions amongst the students. It is therefore essential that a role play is followed by a thorough debriefing. This provides the opportunity for the teacher and the students to raise and assess new issues.

2.4.1.4 Problem-solving method

Problem-solving is the ability to identify and solve problems by applying appropriate skills systematically. It is a process—an ongoing activity in which we take what we know to discover what we don't know. It involves overcoming obstacles by generating hypo-theses, testing those predictions, and arriving at satisfactory solutions.

Problem-solving involves three basic functions; seeking information, generating new knowledge and making decisions.

Problem- solving is, and should be, a very real part of the curriculum. It presupposes that students can take on some of the responsibility for their own learning and can take personal action to solve problems, resolve conflicts, discuss alternatives, and focus on thinking as a vital element of the curriculum. It provides students with opportunities to use their newly acquired knowledge in meaningful, real-life activities and assists them in working at higher levels of thinking.

The problem-solving method of teaching incorporates problem-solving activities, but places the responsibility for learning on the student. It requires teachers to move from the traditional instructional model to one that engages teachers and students as partners in learning, with the teacher functioning in the role of facilitator or coach rather than leader or

all-knowing authority. It requires the use of problems that have real meaning to students, thus motivating them to reach a solution.

To implement a problem-solving approach, teachers need to improve their interpersonal skills and group dynamics; they need to be able to adapt instructional strategies, resources, and activities to promote students' development of basic skills, thinking skills, and personal qualities (Crunkilton 1992; Flowers 1992) suggest that problem-based activities be used to integrate technology into the instructional program, defining technology as "the application of knowledge to solve problems" (p. 7). They suggest that problem-based activities "provide the context for learning particular skills, use a team approach for reaching the best solution, and give a reason for using instructional technology" (ibid.). The technological problem-solving process requires students to "think critically, creatively, and resourcefully, while employing basic academic, technical, and social skills" (Penn and Williams 1996).

2.5 TEACHING LEARNING MATERIALS AND THE DEVELOPMENT OF HIGHER ORDER THINKING SKILLS

Brown (1995) defines teaching learning materials as any systematic description of the techniques and exercises to be used in classroom teaching which is broad enough to encompass lesson plans. These can be games, videos, flashcards, computer software, visual aids, posters and more.

In the traditional classroom teaching there is hardly any scope for the children to interact with the teacher, teaching learning materials and teaching environment. So teaching becomes very monotonous and students have to mostly rely on rote learning. Most often classroom teaching is dominated by the lecture method of teacher. Except some essential aids like chalk, duster, blackboard, teaching learning materials are hardly used in the classroom. Learning has shifted from response strengthening to knowledge acquisition to construction of knowledge. In this context, the duty of the teacher is to provide appropriate environment where the child will construct his own knowledge by interacting with his physical and social environment. Teachers should therefore develop specific teaching learning program useful to enhance the quality of teaching-learning process and the development of higher-order thinking.

Traditional teaching materials, however, especially textbooks and other materials especially developed for classroom use, tend to focus on the development of lower order skills. This is because the curricular, by default, have focused almost exclusively on this

variety of skills (Matsuda, 2002). Support in resources to ensure an ongoing learning process among the teachers and the students is lacking. Practicing Higher-order thinking with students in class is intense and could always throw the teacher's pre-planned lesson out the window. Thus having a variety of materials (e.g., computers, reference books, news papers, etc) is a must to cater to the on-going intellectual interaction in the classroom (sparapani, 1998).

As Nacino $ Desmond (1992) states: there is a great variety of materials around that can be used to make our meaning ibid and more interesting. These materials are often referred to as teaching materials or devices as they are used to supplement or complement the teacher's task. They vary from very simple and expensive ones such as the chalkboard, flat pictures, diagrams, illustrations and maps, specimen, films and projectors.

The above quotation outlines the vital role played by teaching materials within the teaching learning process and the enhancement of higher thinking skills. The more use of these materials however not guarantee effective communication or effective teaching does. It is their careful selection and skilful handling by the teacher that renders them useful in facilitating learning. This view suggests that the function of the teaching material is to support and reinforce learning. Simple teaching materials are used to improve communication between the instructor and the learners. This on condition that the instructor understands these teaching materials. The direct result will be to improve learning.

Watchower (2001) supports the above points by saying that "A visual aid often makes clearer or a more lasting impression on the mind than does the spoken word". It is because doing so can make teaching more effective. That is to succeed; a competent teacher must use pictures, maps, charts or other objects to make important points of instruction more vivid. These materials are important because they can significantly increase student achievement by supporting student leaning. For example, a worksheet with important opportunity to practice a skill gained in class. This process aids in the learning process by allowing the student to explore the knowledge independently as well as providing repetition. Learning materials regardless of what kind, all have some functions in students learning and the acquisition of thinking skills.

Teaching learning materials also helps for the preparation of the learner to receive information, to assist learners to form the same mental picture that has been visualized by the instructor, to assist the learner in retaining as much of the instruction as possible, by appealing to as many of the senses as can sight. Developing and maintaining interest and helping to clarify concepts.

Mzeka (1989) observed that, teaching materials are objects used by the teacher to enable him or her teach effectively. Although they are called teaching materials, they do not make the teachers job easy. On the contrary, they make it more difficult because he or she has to acquire or produce them. Consequently few teachers use teaching materials after training. More suitable, teaching materials could be described as a tool that facilitates learning. Discovery making and doing things as well as seeing, hearing and discussing them makes learning exciting. These actions can bring classroom learning to life and involve learners in critical thinking and problem solving as well.

Tchombe (2004) contended that, the value of teaching materials needs no emphasis. Teaching materials range from chalkboard to other manufactured items. Other visual aids may include posters and wall charts, blanket boards, flannel graph or board. These are useful to make learning alive and interesting. Posters and charts put up should be large and clear, attract attention, self explanatory and easily seen from any point in the class. Instruction must be clear and meaningful. According to Tchombe (2004), teachers writing and drawing on the blackboard can portray a negative view of the teacher's personality. They can be indicating insecurity, lack of confidence in teacher's ability and competence.

Tambo (2003) discusses some basic educational media by saying that Cameron classrooms tend to be so lacking of teaching media. It is common for example to find teachers in classrooms rushing with explanations of complicated concepts, expecting the students to grasp the concepts within the few minutes of the lesson without employing the use of any teaching media to facilitate the lesson. This makes learning difficult for the learners because they often have no other media (textbooks, films, computer programs, models, audio tape, etc) to twin to for further learning.

As teaching materials function in supporting and reinforcing learning, learning materials are also known to enhance student's achievement and increase their thinking skills. Fondham (1992) observe that, "learning materials are key ingredients for learning. They should organize the presentation of information, provide children opportunities to use what they have learned and in case of test and quizzes, help teachers assesses students learning". Learning materials that are known to help learner's achievement and increases their ability to think critically are textbooks and teaches guide. Textbooks should contain questions that enable students to think critically.

Based on the reviews brought forth by various researchers, the researcher identifies the following as the various teaching learning materials that can enhance higher-order

thinking skills in the classroom. There are many aids available these days. We may classify these aids as follows; Visual aids, audio aids and audio-visual aids.

2.5.1 Visual display devices

These are teaching aids which uses senses of vision. They include, actual or real objects, models, pictures, charts, maps, flash cards, flannel board, bulletin board, chalkboard, overhead projector, slides etc. out of these, the chalkboard is the commonest one.

2.5.1.1 Graphic materials

The term graphic is used to describe those teaching materials that show relationship by means of lines, colour or symbols. Graphics include; graphs, charts, maps, diagrams, cartoons and posters. They are used in teaching because they render verbal symbols or descriptions more concrete and clearer to the learner. For example, a political map of Africa can show the location of one country in relation to another more clearly and in more concrete terms than a verbal description of that location.

Graphic materials also provide students with a nice way of framing their thoughts in an organized manner. By drawing diagrams or mind maps, students are able to better connect concepts and see their relationships. This helps students to better develop a habit of connecting concepts. It equally helps them with visual stimulation and the opportunity to access the content from a different point. This gives each learner the opportunity to interact with the content in a way which allows them to comprehend more easily.

2.5.1.2 Print materials

These materials can come in many forms, including textbooks, workbooks, news papers, magazines, pamphlets and reference books. They are all used to supplement and simplify learning. These materials help to improve reading comprehension skills, illustrating or reinforcing a skill or concept and relieving anxiety or boredom by presenting information in a new and exciting way. Using magazines and news papers articles, and books are viable teaching materials that assist in helping students comprehend text. Textbooks should comprehend questions that enable higher thinking in the students than relying solely on factual recall of knowledge.

2.5.1.3 Real objects (concrete materials)

Tambo continues by saying that, the use of real things makes learning not only natural, but also enjoyable. He classified real things into three categories. (1) unmodified real things, they are things just as they are; things that have not been altered in any way by the teacher, except that he or she may have removed them from their original real-life surroundings into a classroom environment. They have all their parts complete intact and therefore are alive and can operate or work. Example of these is frog, rat, bicycle or flowers. (2) Modified real things, are things that have modified in some way to make them more suitable for class use. Modification can be in the form of painting, re-arrangements of parts, subtraction of parts or enlargement. For example, a car engine can be separated and re-arranged to help learners understand its structure; parts of a human skeleton can be painted for emphasis. (3) Specimens are objects that are representative of a group or class of similar objects. There are two main types: living and non- living specimens. Living specimens consist of plans and animals. Non-living specimens include rock samples, art works and fabric samples.

Many of the real things teachers bring to class may be rare, expensive or delicate. The teacher's responsibility is to ensure that learners have intimate contact with the things brought in for study. Participation in discussion is more interesting than merely listening to a lecture without actively been involved in it. Discovering, making and doing things as well as seeing, hearing and discussing them makes learning more meaningful, exiting and long lasting.

Heinich et al (1996) are of the opinion that, teaching learning materials do not have to be exotic or expensive to have educational value. Objects drawn from real life and models are sometimes all that will be available in remote rural schools districts with low budgets. Real objects can be some of the most involving, accessible, and intriguing educational materials used in the classroom. For instance, coins, plants, animals, tools, and machines offer the potential to stimulate learner's imagination and attainment of concepts.

Models are equally not left out as far as teaching learning materials are concern. These are three dimensional representations of real life things. The model may be smaller, larger. Or the same size as the thing it represents. Models of almost anything from cars to the human body can be built or purchase for classroom use. Indeed constructing or assembling models can be an appealing classroom project. Such activity can sharpen both cognitive and psychomotor skills. These models can provide learning experience that real life things cannot provide.

Moore (2001) stresses on the fact that pictures, drawing and charts are relatively inexpensive learning materials. Many can be obtained at little or no cost. They can be used to

stimulate creative expression, such as writing stories or poetry; to help sharpen interpretation skills, such as economic predictions from charts, to show motion, such as drawing showing how to perform a motor skill; or to develop decoding skills, as in the interpretation of intent from a carton.

2.5.1.4 Technology Integration and the development of higher-order thinking skills

It's not news that technology plays an important role in modern classrooms. Many teachers encourage their students to use word processors to format papers, make revisions and do calculations. However, technology can do more than refine students' projects. When used correctly, technology can help develop higher order thinking skills. In fact, some technology-based lessons do a better job of this than non-technological lessons.

Teachers can help students develop higher order thinking skills by integrating technology into their lessons. Technology can help students analyze information, make evaluations and create their own work, all beneficial skills necessary in their future endeavours.

Computer related technology has advanced to a level where it cannot only be used to support a teacher, but can actually be used to facilitate the learning process without the direct involvement of the human or life teacher. Computer software is also used in teaching problem solving in school. The idea of teaching problem solving is to help students become critical thinkers and better problem solvers in real life. Often, however, the problems that are presented to students are artificial ones with ready-made answer and this make such an exercise not so useful. With adequate computer software, however, students can be led to encounter problems that are more related to real life situations (Tambo, 2012).

Simulations can also be used to increase student's higher-order thinking. This is a program that tries to imitate a real life experience in order to provide learners with opportunities to learn specific skills, improve decision-making or problem solving skills. For example, simulations can be made for teaching how to drive a car. Simulation can be produced on the dissection of animals in science, the Foumban Conference that cemented the unification of French-speaking and English Cameroon, and so on. The use of simulations is highly recommended for the teaching of higher-order skills and processes. (Tambo, 2012).

2.6 ASSESSMENT AND THE DEVELOPMENT OF HIGHER-ORDER THINKING SKILLS

Linn and Miller (2005) define assessment of student learning as a systematic process of collecting information about student progress towards the learning goals. Similarly, Dhindsa et al. (2007) characterize assessment as a key component of teaching and learning, "a systematic process of data gathering" about students' progress (p. 1261). They maintain that students' performance can be measured in various ways, including "traditional paper and pencil tests, extended responses (essays), performance of authentic task, teacher observation, and student self report" (Linn & Miller, 2005, p. 26).

In the early theories of learning, it was believed that complex higher-order thinking skills were acquired in small pieces, breaking down learning into a series of prerequisite skills. After these pieces were memorized, the learner would be able to assemble them into complex understanding and insight -- the puzzle could be arranged to form a coherent picture. Today, we know learning requires that the learner engage in problem-solving to actively build mental models. Knowledge is attained not just by receiving information, but also by interpreting the information and relating it to the learner's knowledge base. What is important, and therefore should be assessed, is the learner's ability to organize, structure, and use information in context to solve complex problems. Thomas, A and Thorne, G. (2009.

"Assessment should be deliberately designed to improve and educate student performance, not merely to audit as most school tests currently do."

One of the main 21st century components that teachers want their students to use are higher-order thinking skills. This is when students use complex ways to think about what they are learning. Higher-order thinking takes thinking to a whole new level. Students using it understand higher levels rather than just memorizing facts. They would have to understand the facts, infer them, and connect them to other concepts.

Marso&Pigge,(1993), believe that most teachers, in fact, do understand this reality. But we often don't carry it through into our assessment practices. Studies analyzing classroom tests, over many decades, have found that most teacher-made tests require only recall of information. However, when teachers are surveyed about how often they *think* they assess application, reasoning, and higher-order thinking (McMillan, Myron, & Workman, 2002), both elementary and secondary teachers claim they assess these cognitive levels quite a bit. Although some of this discrepancy may come from recent advances in classroom practices that emphasize higher-order thinking, it is also clear that many teachers believe they are assessing higher-order thinking when, in fact, they are not.

The reason that recall-level test questions are so prevalent is that they are the easiest kind to write. They are also the easiest kind of question to ask off the top of your head in class. Teachers who do not specifically plan classroom discussion questions ahead of time to tap particular higher-order thinking skills, but rather ask extemporaneous questions "on their feet," are likely to ask recall questions. The same thing happens on classroom tests. Teachers who put together tests quickly, or who use published tests without reviewing them to see what thinking skills are required, are likely to end up asking fewer higher-order-thinking questions than they intended. Contrary to some teachers' beliefs, the same thing also happens with performance assessments. Students can make posters or prepare presentation slides listing facts about elements, planets, or stars without using higher-order thinking, for example. Of course, what amount and what kind of higher-order thinking should be required on a classroom assessment depend on the particular learning goals to be assessed.

In the Western countries at present, students are encouraged to fully participate in classroom activities. According to Herrera, Murry and Cabral (2007), students are now being asked to use their "cognitive development, academic knowledge, and language skills to read, comprehend, synthesize, analyze, compare, contrast, relate, articulate, write, evaluate and more" (p. 23). This encouragement builds the foundation for alternative forms (formative) of assessment to be used in the classrooms so that the instructors can "measure incremental gains" (Herrera, Murry& Cabral 2007, p. 22).

William and Thompson (2008) introduce a shift from traditional assessment forms to a newer paradigm, alternative assessment. Particularly, the emergence of formative and summative assessment as two different formats has attracted educators' attention (William & Thompson, 2008). The authors argue that the use of assessment for student learning is the main feature of formative assessment. According to William and Thompson (2008) and Bloom (1969) proposed the terminology "formative" and "summative" assessment,. Bloom (1969) asserts that when assessment is aligned with the process of teaching and learning, it will have "a positive effect on students' learning and their motivation" (cited in William, 2008, p. 58).

2.6.1 Types of assessment

2.6.2 Diagnostic assessment

It is often undertaken at the beginning of a unit of study to assess the skill, abilities, interest, experiences, and levels of achievement or difficulties of an individual student or a whole class. It can involve formal measurements (e.g. IQ \aptitude tests, fitness test) that are

used to establish a starting point or baseline or informal measurements (e.g. observation, discussions, questioning). It also informs programming and planning, and learning and teaching methods used, as well as assessment choices (Looney, 2005, p. 21).

2.6.3 Summative assessment

It assists you to make judgements about student achievement at a certain relevant points in the learning process or unit of study (e.g. end of course, project, semester, unit, and year). It can be used formally to measure the level of achievement of learning outcomes. (E.g. tests, labs, assignments, projects, presentations etc). It can also be used to judge programme, teaching and\ or unit of study effectiveness (that is as a form of evaluation).

2.6.4 Formative Assessment

It is the practice of building a cumulative record of student achievement. Usually takes place during day to day learning experiences and involves ongoing informal observations throughout the term, course, semester or unit of study. It is used to monitor student's ongoing progress and to provide immediate and meaningful feedback. It assist teachers in modifying or extending their programmes or adapting their learning and teaching methods. It is very applicable and helpful during early group work processes.

Informal assessment on the hand involves a systematically observation and monitoring of students during class learning and teaching experience, interacting with students to gain a deeper knowledge of what they know, understand and can do. Circulating the classroom and posing questions, guiding investigations, motivating and quizzing students. Providing opportunities for students to present or report upon their learning and teaching experiences. Collecting, analysing, and providing feedback on in and out of class work samples (e.g. how their group work projects are progressing). Formal assessment involves the use of specific assessment strategies to determine the degree to which students have achieved the learning outcomes.

Assessment strategies including therefore include essays, exams, reports, projects, presentations, performances, laboratories or workshops, resource development, artwork, creative design tasks, quizzes and tests, journal writing, portfolio. Individual and/or collaborative tasks that usually attract a mark (group work may include both an individual and group component) (Broadfoot et al., 1999, p. 7).

2.7 TYPES OF ASSESSMENT PRACTICES THAT LEAD TO HIGHER ORDER THINKING SKILLS

Assessment methods for measuring higher order thinking include multiple-choice items, multiple-choice items with written justification, constructed response items, performance tests, and portfolios. These methods can be used in both classroom and state-wide assessments.

2.7.1 Item/Test Formats

Higher order thinking skills can be measured by a variety of item and test formats. Sugrue (1994, 1995) integrated information from three research-based, domain-specific problem-solving models and identified three response formats for measuring higher order thinking skills: (1) selection (multiple-choice, matching), (2) generation (short answer, essay, performance), and (3) explanation (giving reasons for selection or generation of a response).

2.7.2 Multiple-Choice Items

Prominent investigators of critical thinking have endorsed the use of the multiple-choice format in measuring at least some higher order skills. Paul and Nosich (1992) recommended the use of multiple-choice, multiple-rating, and short-essay items in constructing an instrument for the national assessment of higher order thinking. Multiple-choice items could be used for assessing "micro-dimensional critical thinking skills, like identifying the most plausible assumption, recognizing an author's purpose, selecting the most defensible inferences, and such like" (p. 7).

Facione (1989), Norris (1989), and Ennis (1993) all recognized that subjects can select keyed responses to multiple-choice items for the wrong reasons and distracters can be chosen for valid reasons. Facione (1989) and Norris (1989) recommended that a think-aloud procedure be employed to investigate the construct validity of multiple-choice items during test construction. Subjects are asked to tell what they are thinking as they select their answers. When correct responses were chosen through faulty thinking or incorrect responses through valid thinking, items could be modified or discarded. Norris and King (1984) used this methodology in constructing the Test on Appraising Observations. Simpson and Cohen (1985) used a think-aloud procedure in connection with item analytic data to demonstrate the validity of multiple-choice items categorized as knowledge or thinking items based on Bloom's taxonomy. Ennis (1993) suggested that answer justification be incorporated into the actual test. Subjects would be asked to select correct responses and then to provide written

justifications for their choices. An advantage of this procedure is that subjects could be given credit for nonkeyed responses if they provided adequate justification. Answer justification for higher order thinking items was first recommended by Bloom (1956), who cast both item and justification in multiple choice formats.

Hancock (1994) cited a number of empirical studies in which multiple-choice and constructed-response tests measured the same higher order skills. He constructed multiple choice and constructed-response items to measure the knowledge, comprehension, application, and analysis skills of undergraduate and graduate students in introductory educational measurement and research statistics courses. His findings indicated that the two-item formats were generally comparable for all four skill levels.

2.7.3 Essay Test

Essay tests are tests consisting of questions (items) designed to elicit from the learners through freedom of response the extent to which they have acquired the behaviour called for in the course objectives. The answers to such questions which the learners are confronted vary in quality and degree of correctness. It measures complex learning outcomes that cannot be measured by other means. For instance, it has the ability to measure learner's communication skills. That is, the learner's ability to produce an answer, synthesize and organize ideas and present them readably in a logical and coherent form. This is the major advantage. It also enables the measurement of organizational and divergent thinking skills by laying emphasis on the integration and application of thinking and problem solving skills, creativity and originality. It is very applicable for measuring learning outcomes at the higher levels of educational objectives such as application, analysis, synthesis and evaluation of levels of the cognitive domain. Essay items require the student to generate a response. These items can measure higher order skills that multiple-choice or multiple-rating cannot.

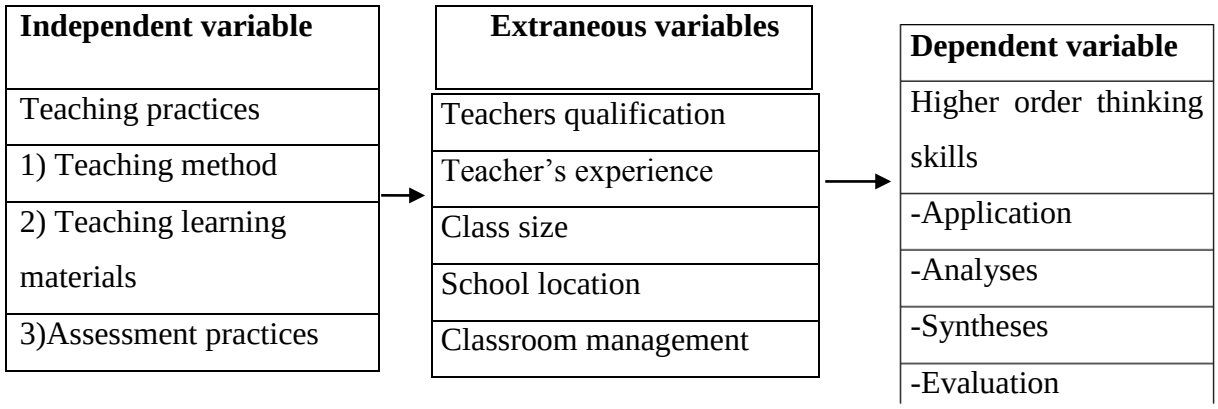


Figure 3: Conceptual Diagram

Developed by Research

To control extraneous variables, the researcher selected thickly populated schools to complement the issue of class size. Also to control teacher's qualification and teacher's experience, the researcher observed only teachers who had taught for at least five years and had attended training colleges because it is believed such can handle classrooms well in terms of classroom management.

2.8 THEORITICAL FRAMEWORK

The theoretical frame work of this study will comprise of the social constructivist theory of Lev Vygostsky, the cognitive theory of Jean Piaget and Brunner's theory of discovery learning.

2.8.1 Socio-Constructivist Theory of Lev Vygostsky (1978)

Vygostsky (1978) in his socio-constructivist theory looks at the development of thinking skills in a socio-cultural context. To him, learning is through interactions. He emphasised in Santrock (2004) that individuals learn best when they actively construct their own knowledge and understanding. This implies that, learners could be highly involve in higher order thinking skills when they are engage in a kind of group activity that will enable them to share ideas on the task given to them by their instructor and by so doing building their own knowledge and understanding.

This is in line with what Lave and Wenger (1991) say, that learning is thought to take place through a process of interaction, negotiation and collaboration. This means that involvement whit others create opportunities to evaluate and refine their understanding. Their exposition to the thinking of others and their participation in creating shared understanding further enhances the construction of their knowledge. This process captures the idea of

collaborating and mentoring processes, requiring the teacher, who has and knows more skills, to share that knowledge in a cultural mediated interaction (daloz, 1906) with a student or a group of students working together. They acquire language and presentation skills which enable them to express and present themselves where ever they go. This will intern enable them to be creative and think critically which is an aspect of HOTS since every member is oblige to be active. When learners work as a team, they acquire leadership skills which are needed by most employees now our days. This is because a leader should be able to think critically and be creative in other to solve problems.

Vygostsky also stresses the importance of what he called the Zone of Proximal Development (ZPD); The (ZPD) refers to the various tasks that are too difficult for children to master alone but that can be learned with guidance and assistance from adults or more skilled peers. The Zone of Proximal Development was developed by Lev SemenovichVygostky during 1920s. He defined the Zone of Proximal Development as 'the distance between the actual development level as determined independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peer. In relation to this study, students to develop higher order thinking skills must work together with others. They have to be engage in more difficult activities than what they do alone such that they will need to work together either with another, a more competent peer or with a teacher to finish the task. Rooseevelt (2008). It is for this reason that, the role of teaching practices is to provide students with activities and experiences that will challenge them but allow eventual success with sensitive adult or capable guidance. This is because when student work with a more competent person, they learn to internalise new competence and skills, they equally think in abstract terms with the help of the guidance.

In the case of a classroom situation, the teacher acts as a guide or a facilitator as the students go through the task. Here, the students learn to construct knowledge which instils in them a sense of creative and higher thinking.

2.8.2 Brunner's Theory of Discovery Learning, (1961)

According to Brunner, the development of Higher-order thinking skills involve active, inquiry and discovery, inductive reasoning and intrinsic motivation and linkage of previously learned material. Brunner suggested that meaningful learning means discovery and if the learner discovers information through his or her own effort, it is more useful and more lasting than information which is given to them already prepared by teachers.

This theory is linked to this study in that, for students to develop their thinking skills, they must be active and not passive. That is, they must be active participants in class and this can only be done through the help of a teacher by making the classroom a learner-cantered classroom where the learner is at the centre of learning and the teacher acts merely as a guide or a facilitator. This is because when learners are active, they are able to discover learning by themselves by working in groups. Through this, they are able to interact with one another and use the, experience, insights, and knowledge provided by other peers to develop different ways of thinking. Students can learn from others to organise their thoughts and to develop rational arguments. When this happens, learners develop their thinking skills.

Brunner's theory also made mention of the fact that, learners should be able to discover learning for themselves. This theory is related to this study in that when teachers use teaching methods such as the discovery teaching methods and other teaching methods that can lead to the development of HOTS, the students will be able to discover knowledge by them, as result, develop their thinking skills in this situation, students are be presented with a kind of group assignment that enable them to look at the relationship of some concepts. By so doing, they work as a team and discover new ideas from peers and be able to think critically so as to give their own contributions to the work. This intends helps to develop their thinking skills. Students also discover knowledge when they are presented with teaching learning materials that leads to the development of thinking skills such as the use of charts, graphs and real objects. Students who look for solutions to problems are able to think critically. This implies that, discovery learning helps in developing higher thinking skills in the students.

Also, according to Brunner, discovery learning takes place in problem situations where the learner draws on his or her own experience and prior knowledge. To him, discovery learning mode requires that the student participate in decision making about what, how, and when something is to be learned instead of being "told" the content by the teacher. It is relevant to the study in that, for learners to be able to acquire HOTS, they should be able to discover knowledge in problem situations. They do this through various activities that take place in the classroom. They are most often given the opportunity to decide on what happens in the classroom. This enables them to be able to think "out of the box" as a result of the fact that what happen in class comes from them. This helps to motivate them intrinsically. Also, discovery learning helps to increase higher thinking skills when the students are asked to recall past lessons taught. This is because they will be given the opportunity to think on what is been taught thereby making them to retain the lesson more.

Furthermore, to him, for students to discover learning, they must be provided with feedback. This is because when they are provided with feedback, it will help to develop their thinking skills. Teachers can help students refine their higher thinking skills by consistently providing effective feedback on the quality of their students' arguments, reasoning and thinking. Instead of simply telling students they're wrong, constructive feedback offers specific, helpful suggestions as to ways a student can improve aspects of her reasoning skills. By focusing only on ways students can make their arguments even more effective, constructive feedback helps them learn without damaging their self esteem.

Brunner also made mention of scaffolding in which adult particularly parents support children's cognitive development through everyday interactions. The purpose of the support is to allow the child to achieve higher levels of development by: simplifying the task or idea, motivating and encouraging the child, highlighting important elements or errors, giving models that can be imitated. In relation to this study, teachers in this classroom are seen as facilitators since they provide support to learners when they don't know what to do. This is a learner centered classroom because the learner is the one searching for the knowledge and with this they will be able to have the opportunity and ability to think critically hence, involving them in higher order thinking skills.

2.8.3 The Cognitive Developmental Theory of Jean Piaget (1896)

According to piaget, students develop higher order thinking skills as a result of biological maturation and interaction with the environment. To him, the students must be mentally ready to be taught certain concepts until they have reached the appropriate stage of cognitive development. This explains why this study makes use of upper sixths students . this is because it is believed that children at this stage are mentally mature enough to be taught certain concepts. It is equally in line with the fourth stage of piaget's cognitive theory. That is the Formal Operational stage (from 11 years and above). The formal operational stage lasts from adolescence until early adulthood. During this period, the individual gains increasing ability to think abstractly. Logical reasoning becomes more sophisticated. Adolescents gain abilities to plan more effectively, and systematically test hypotheses. The individual becomes able to use hypothetical and deductive reasoning, and to follow a process for problem-solving. The adolescent can also gain abilities to formulate complicated verbal arguments, and to understand complex mathematics. Knowing this, teachers can challenge students with projects that require a deeper and more reflective thinking process. Students at this stage are readily mature enough to build concepts and to think in abstract terms. This implies that, as students

move from one stage to another or from one class to another, they develop more complex skills that enable them to think critically.

Piaget's theory of cognitive development proposes that humans cannot be "given" information which they immediately understand and use. Instead, humans must "construct" their own knowledge. They build their knowledge through experience. Experiences enable them to create schema that is mental models in their heads. This is done through two complimentary processes: assimilation and accommodation. Assimilation to piaget is using an existing schema (knowledge) to deal with a new situation. Accommodation on the other hand happens when the existing schema doesn't work and needs to be changed to deal with a new situation and equilibration is the force which moves development along. To piaget, assimilation and accommodation require an active learner, not a passive one because problem-solving cannot be taught, they must be discovered.

This implies that, in a classroom situation, students should be given opportunities to construct knowledge through their own experiences. As suggested by Isidore Lauzier and alii (2007), "The teacher (to remain in uniformity with what preceded) is an adviser; it is the student that looks for the means of acquisition of his knowledge".

They should be able to use previously learned materials to build new concepts. It is for this reason that teachers always revise previously learned materials in order to allow students to be able to develop new outlooks, rethink what were once misunderstandings and evaluate what is important, ultimately altering their perceptions thereby developing their thinking skills. According to Piaget, teachers can also provide a learning environment that helps expand the conceptual and experiential background of the students by allowing them to work in groups or pair and research controversial topics which they must then present to the class. Here, the teacher acts as a guide or a facilitator while the students perform the task. This is because for students to develop higher order thinking skills, they must be active and creative.

2.2.4 Summary of chapter two

This chapter looks at the concept of higher order thinking skills. That is what other authors say about it. It also looked at HOTS and the development of instructional objectives (Bloom Taxonomy). It also went further to look at other concepts related to higher order thinking such as critical thinking, creative thinking, metacognition, comprehension, intelligence. The chapter also moves forward by looking at the concept of teaching practices. That is, what is it all about and what other authors say about it. It moves forward by reviewing literature on each specific objective. That is teaching method and the development of higher

order thinking skills, teaching learning materials and the development of higher thinking skills, assessment and the development of higher thinking skills. The chapter lastly looked at theories that are linked to the topic such as the social constructivist theory of Vygostsky, Brunner's theory of discovery learning and Piaget's theory of cognitive constructivism.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 INTRODUCTION

This chapter deals with the method that has been used to collect and analyzed data for this study. It comprises the following aspects: area of the study, the research design, the sample and sampling technique; the tool for data collection, validation and reliability as well as the method of data analyses.

3.1 RESEARCH DESIGN

The research design used for this study is the quantitative research design precisely the questionnaire. This design is used because it made used of questionnaires for students. This design permitted the researcher to gather enough data from the sample population within a short period of time.

3.2 AREA OF THE STUDY

The area chosen for this study is Yaoundé, the capital city of Cameroon, Mfoundi division, Yaoundé VI Centre Region. The town Yaoundé has developed in the Ewondo land. The name Yaoundé comes from the word 'Yewondo' in Bulu language known as 'the place of Ewondo people'. Yaoundé is situated on a large number of gentle sloping hills which are dissected by rivers and streams. These smaller hills are found between seven large hills being Mbam, Mbankomo, Mbangkolo, Gwimbiri hills, Nlonlako. Yaoundé is located 3.8 latitudes and 11.52 longitude and situated at elevation726m above sea level. Yaoundé has a population of 1,299,369 making it the biggest city in Centre. The daily temperature is 32^0c maximum while minimum is 24^0c the average precipitation is 298m annually. It operates on the WATS (WEST AFRICAN TIME) time zone. Secondary schools are fairly widespread and easily accessible to the population. It also has a diverse population with ethnic groups coming from the ten Regions of Cameroon. The different schools ranging from public, confessional and private schools have teachers who have also received training from Ecole Normale in Bambili, Maroua and Yaounde . This provides a fertile ground to find out whether the teachers practice HOT in the different schools that would be selected.

It is also in this area where the researcher grew up and equally did her secondary education. During her days and even presently, she realizes that most graduates are unable to transfer knowledge learned in school into the real world due to the lack of Higher- Order Thinking Skills hence the need to implement HOTS in this area.

3.3 POPULATION OF THE STUDY

The population of this study comprises of all the secondary school students of Yaoundé VI, Mfoundi division of the Centre Region. The accessible population consisted of Upper Sixth students. Secondary schools are ideal for this study because secondary education represents the stage where by a child starts to think in a formally logical manner.

3.4 THE TARGET POPULATION

The target population of this study constitutes of 150 upper-sixth students in five secondary schools in the Yaounde VI Sub Division namely, Government Bilingual High School Etoug-ebe, Franky Comprehensive secondary School Biscuiterie, Oxford Comprehensive High School Biscuiterie, Holy Infant Comprehensive High School Melen and Havard School Complex Etoug-ebe. This population is chosen because secondary school students are directly involved with the implementation and application of HOTS. Thus they are in the best position to provide data for this study.

Table 2: Distribution of the target population

S\N	Schools	No of students
1	Government Bilingual High School Etoug-ebe	30
2	Oxford Comprehensive High School Biscuiterie	30
3	Franky Comprehensive High School Biscuterie	30
4	Holy Infant Comprehensive High School Melen	30
5	Havard School Complex Etoug-ebeEtoug-ebe	30
TOTAL		**150**

3.5 SAMPLE SIZE AND SAMPLING TECHNIQUE

The sample of this study is made up of 150 students.To get the sample population, 5 schools were selected and these 5 schools provided the 150 students that took part in the study.

The sampling technique used for this study was the simple random sampling. To select the division, schools and students, strip of papers were made corresponding to the 10 sub divisions. All the 10 strips with the various sub divisions written on each were put in a basket and through a random sample technique, Yaounde VI was selected. In the sub division, 5 schools were drawn through the same sampling technique in which the researcher came up with a basket in which the names of all the secondary High schools found in that area were

written on pieces of papers and shuffled and the 5 schools were picked which automatically constituted the accessible population of the study.

To draw the sample from this population, the simple random sampling was used, that is pieces of papers cut with YES and others with NO. Those who picked papers written with YES were selected for the study while those with NO were exempted from the study. This was to give each and every member of a class a chance to be selected and to avoid bias.

3.6 RESEARCH INSTRUMENTS

The research instrument used to collect data was the questionnaire. It was a closed ended questionnaire designed for upper-sixth students to choose the option that best represents their opinion on the topic. The questionnaire was divided into 5 sections (A, B, C, D and E).Section A was based on Demographic information of the respondent. While the other four sections were base on the research questions to be answered.

3.7 VALIDATION OF INSTRUMENTS

3.7.1 Validity

A research instrument is aid to be valid if it actually measured what is supposed to measure (Amin, 2005). Based on this, the instrument would be validated in two phases; the face validity and content validity.

3.7.1.1 Face validity

After formulating the questionnaire, it was presented to some classmates and lecturers of the department, then to the supervisor of this work for scrutiny. They examined the items, checking the appropriateness of language, clarity of questions, ordering of items and responses. A pilot study was conducted after this process.

3.7.1.2 Content validity

According to Amin (2005, p. 286), “content validity focuses upon the extent to which the content of an instrument corresponds to the content of the theoretical concept it is designed to measure”. In this light, the supervisor of this study checked the items on the instrument with particular attention to indicators of the variables involved in this study, to ensure their relevance to the objective of the study.

3.7.2 Reliability

Reliability refers to the degree of consistency that an instrument demonstrates in measuring what it was designed to measure. To determine the reliability of the instrument constructed, a pilot test was carried out within the area of study. A test-retest reliability method was used on 10 students who were not included in the sample. After analyses, the results obtained at administrations correlated to determine the reliability of the instrument with the score of .741. This means that the instrument is strongly reliable as shown on the table below.

Table 3: Reliability statistics

	N	%
Cases valid	43	74.1
Excluded	15	25.9
Total	**58**	**100.0**

Conbach's Alpha	**Cronbach's Alpha Based on Standardized items**	**N° of items**
.741	.761	25

3.8 ADMINISTRATION OF THE INSTRUMENT

The questionnaires were administered directly to the respondents. Since the students are accessible in school only during school hours, the questionnaires were administered to the students with instructions in the morning, with the help of the principal of the institution. During the exercise, the respondents asked questions for clarification and they were clarified by the researcher.

3.9 METHOD OF DATA ANALYSIS

Both descriptive and inferential statistics were used to analyze the data. The data for descriptive statistics that is frequencies, percentages and pie charts, were used. While Pearson correlation coefficient was used to analyze inferential statistic because both the independent and dependent variable are continues and also because the study looked at the relationship

between the two concepts under study that is teaching practices and higher order thinking skill. It is calculated using the formula below.

$$r=\frac{n\,(\sum \times y) - (\sum \times)(\sum y)^2}{[(n\sum x^2) - (\sum \times)^2][(n\sum y^2) - (\sum y)^2]}$$

Where

r= Pearson correlation coefficient

x= Values in first set of data

y= Values in second set of data

n= Total number of value

CHAPTER FOUR

PRESENTATION OF RESULTS AND DATA ANALYSES

4.0 INTRODUCTION

This chapter examines the results and data analyses presented. The presentation begins with an analysis of the descriptive statistics of the variables under study. The statistical tool that was used to analyze the data obtained from the field was the statistical package of social sciences (SPSS) version 13. The analysis and presentation of results was based on background information obtained in the previous chapters. Conclusions were drawn on the basis of the results that were obtained.

4.1 DEMOGRAPHIC INFORMATION

The sample size of this study was 150 students from both the public, private and denominational schools. A total of 150 questionnaires were administered and 150 were returned giving a 100% return rate. Out of the 150 respondent who returned the questionnaires, 54 were males and 96 were females with ages between 16 to 25 years.

Table 4: Distribution of respondent by gender

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	54	36,0	36,0	36,0
	Female	96	64,0	64,0	100,0
	Total	**150**	**100,0**	**100,0**	

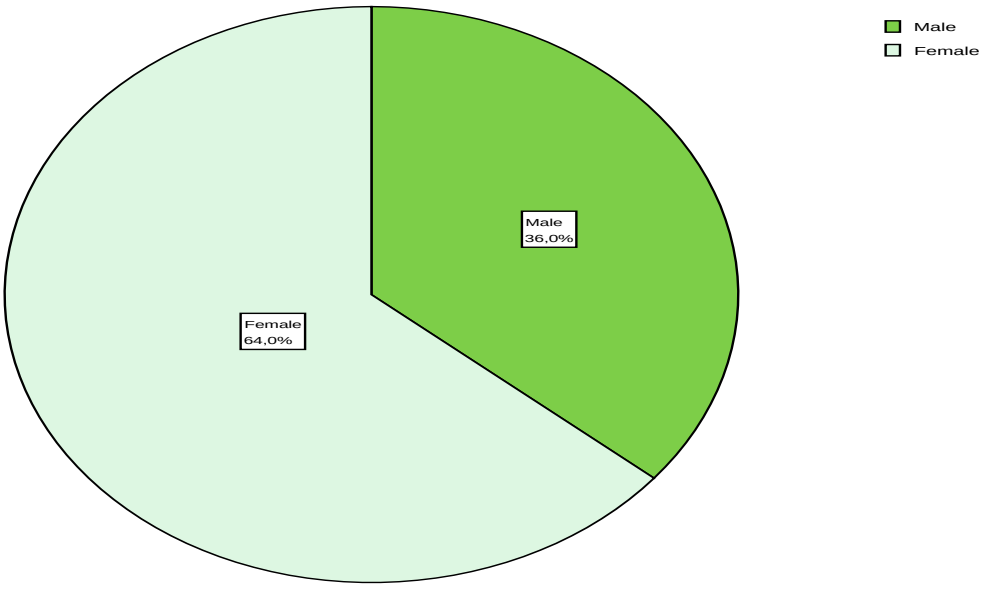


Figure 4: Distribution of respondent by gender

From the above table and pie chart, it is observed that out of the 150 respondent 54 that represents 36% are males while 96 that represent 64% are females. It means that majority of the population are females.

Table 5: Distribution of respondent by Age

Age range		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-19 years	96	64,0	64,0	64,0
	20-25 years	50	33,3	33,3	97,3
	3,00	4	2,7	2,7	100,0
	Total	**150**	**100,0**	**100,0**	

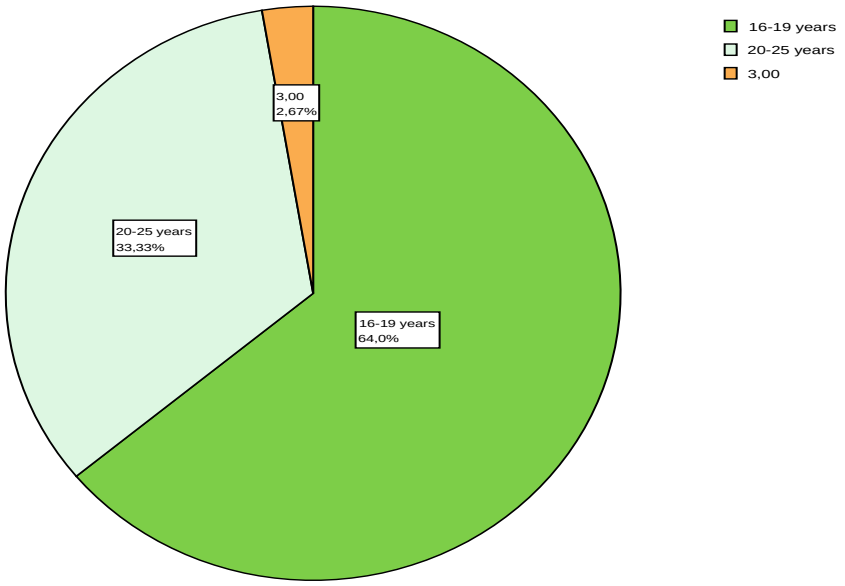


Figure 5: Distribution of respondent by Age

The above table and pie chart shows that 96 of the respondent which represents 64% falls between the ages of 16-19 while 33% which represents 50 falls between the ages of 20-25. This indicates that there are more adults youth in secondary schools than the adult population.

Table 6: Distribution of respondent by Schools

School		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public	72	48,0	48,6	48,6
	Denominational	20	13,3	13,5	62,2
	Lay private	56	37,3	37,8	100,0
	Total	148	98,7	100,0	
Missing	System	2	1,3		
Total		150	100,0		

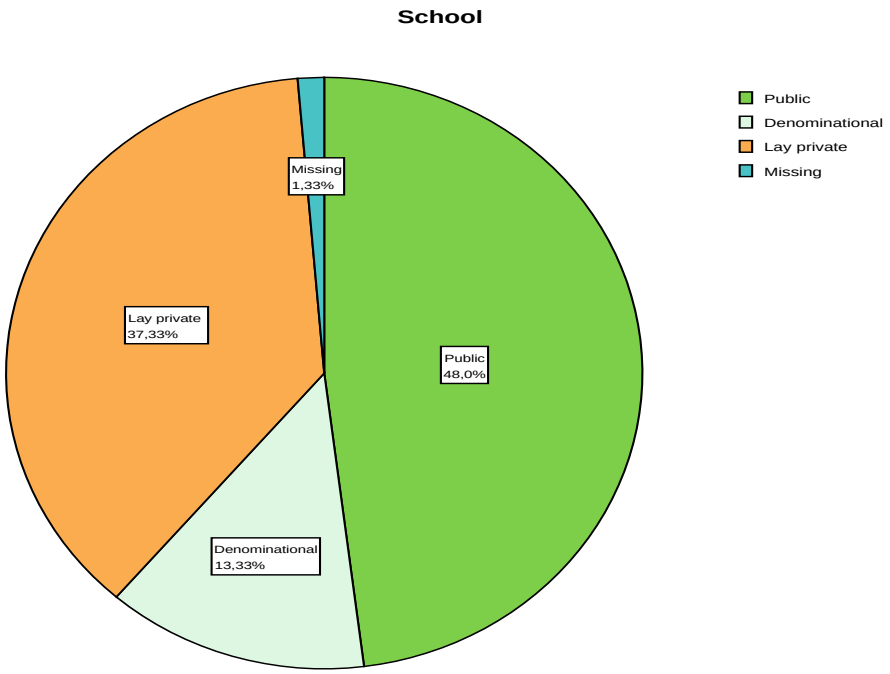


Figure 6: Distribution of respondent by Schools

From the above distribution tableand pie chart, it can be observed that, out of the 150 respondents, 48% (n=72) are of the public school 13% (=20) are of the denominational schools while 37.3% (n=56) are of the lay private schools. This indicates that, majority of the respondent were from the public school and this shows the difference between number of students in public and private schools.

Table 7: We study in groups in most lessons

We study in groups in most lessons		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	10,7	10,7	10,7
	Disagree	23	15,3	15,3	26,0
	Neither agree nor disagree	24	16,0	16,0	42,0
	Agree	56	37,3	37,3	79,3
	Strongly agree	31	20,7	20,7	100,0
	Total	150	100,0	100,0	

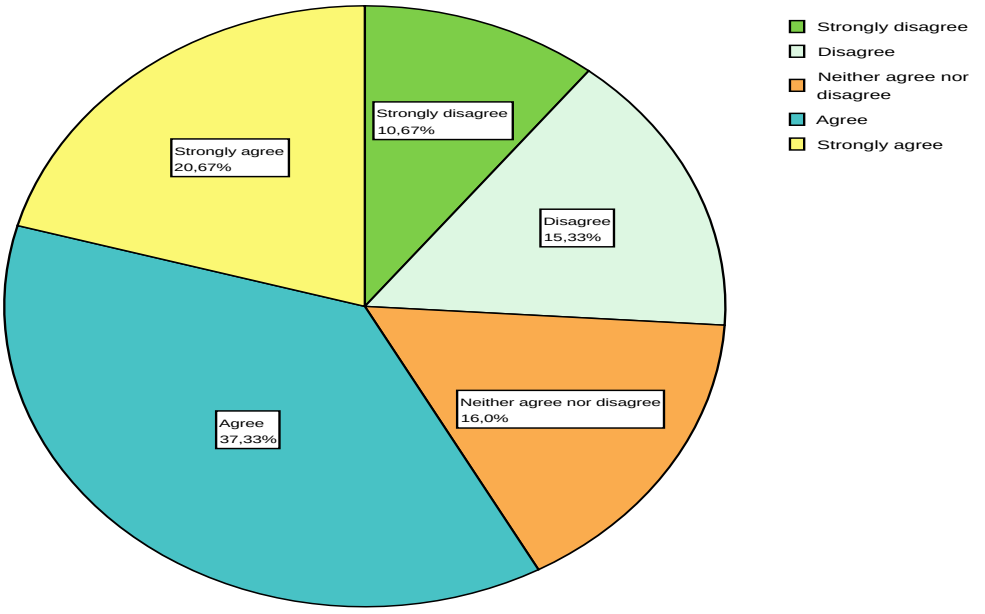


Figure 7: We study in groups in most lessons

The above indicates that of the 150 respondent, 10.7% which represents 16 respondents strongly disagreed that they study in groups in most lessons 15.3% (n=23) disagreed that they study in groups in most lessons 16.0% (n=24) neither agreed nor disagreed that they study in groups in most lessons. Meanwhile 37.3% (n=58) agreed that they study in groups in most lessons and 20.7% (n=31) strongly disagreed that they study in groups in most lessons. It can therefore be observed that, majority of the population agreed that they study in groups in most lessons.

Table 8: Our teachers often give us group assignments to do and present in class

Our teachers often give us group assignments to do and present in class		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	5,3	5,3	5,3
	Disagree	10	6,7	6,7	12,0
	Neither agree nor disagree	6	4,0	4,0	16,0
	Agree	51	34,0	34,0	50,0
	Strongly agree	75	50,0	50,0	100,0
	Total	**150**	**100,0**	**100,0**	

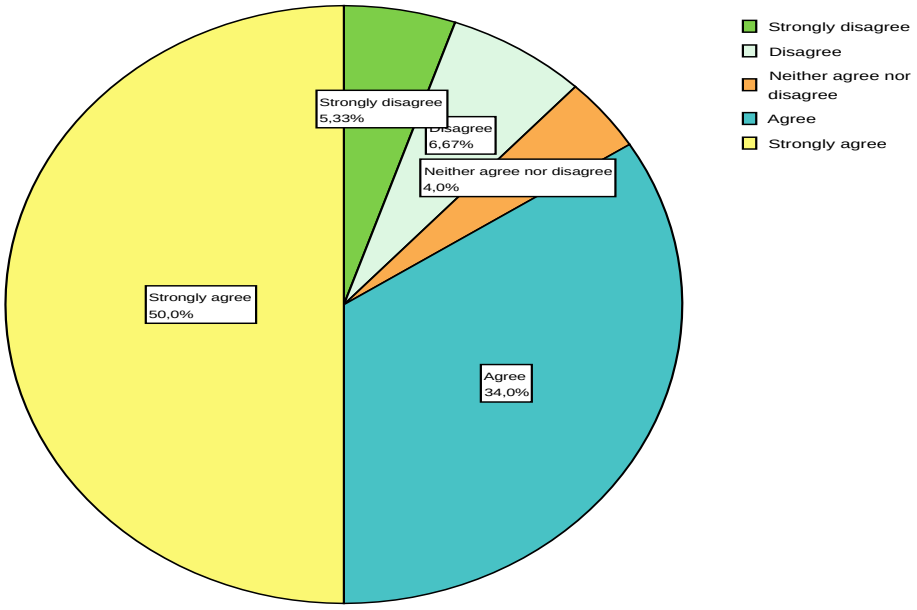


Figure 8: Our teachers often give us group assignments to do and present in class

From the table above, it can be seen that 5.3% (n=8) strongly disagree that their teachers often give them group assignments to do and present in class 6.7% (n=10) disagreed that their teachers often give them group assignment to do and present in class 4.0% (6) neither agreed nor disagreed 34% (n=51) agreed that their teachers often give them group assignments to do and presents in class. And 50.0% (n=75) strongly disagreed that their teachers often give them group assignments to do and present in class. From the above analysis, it could be observed that most of the respondent strongly agreed that teachers do not often give group assignments for students to do and present in class.

Table 9: During lessons, our teachers give room for discussion to get our own opinions

During lessons, our teachers give room for discussion to get our own opinions		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	7,3	7,5	7,5
	Disagree	21	14,0	14,3	21,8
	Neither agree nor disagree	10	6,7	6,8	28,6
	Agree	62	41,3	42,2	70,7
	Strongly agree	43	28,7	29,3	100,0
	Total	147	98,0	100,0	
Missing	System	3	2,0		
Total		**150**	**100,0**		

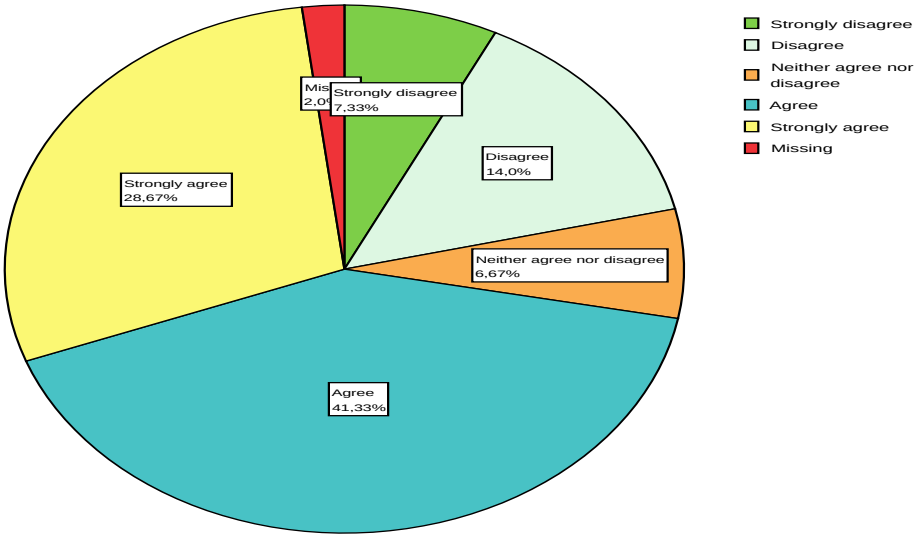


Figure 9: During lessons, our teachers give room for discussion to get our own opinions

From the frequency table and pie chart above, it can be observed that 7.3% (n=11) respondent strongly disagreed that during lessons, their teachers give room for discussion to get their own opinions 14.0% (n=21) respondents disagreed that their teachers give room for discussion to get their own opinions 6.7% (n=10) respondents disagreed 41.3% (n=62) respondents agreed and 28.7 (n=43) respondent strongly agreed that during lessons, their teachers give room for discussion to get their own opinions 2.0% (n=3) respondents did not attempt the question. From the above analysis, it can be observed that majority of the respondent agreed that during lessons, teachers give room for discussion to get their own opinions.

Table 10: After every teaching episode, our teachers give us a task that requires us to discover something new

After every teaching episode, our teachers give us a task that requires us to discover something new		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	2,7	2,7	2,7
	Disagree	19	12,7	12,8	15,5
	Neither agree nor disagree	24	16,0	16,2	31,8
	Agree	48	32,0	32,4	64,2
	Strongly agree	53	35,3	35,8	100,0
	Total	148	98,7	100,0	
Missing	System	2	1,3		
Total		**150**	**100,0**		

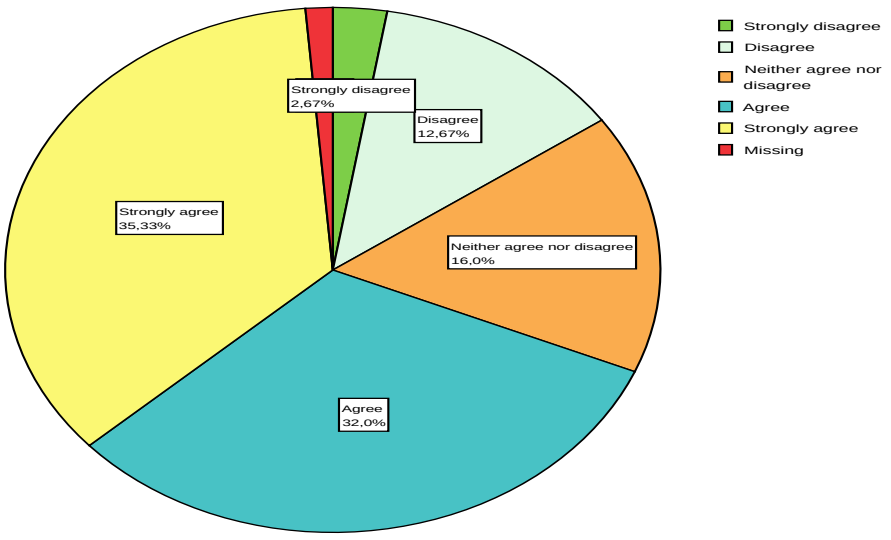


Figure 10: After every teaching episode, our teachers give us a task that requires us to discover something new

The table and pie chart above shows that, out of the 150 respondent, 4 which represent 2.7% strongly agreed that after every teaching episode, their teachers give them task that requires them to discover something new12.7 (n=19) of them disagreed that after every teaching episode their teachers give them a task that requires them to discover something new 16.0% (n=24) of them neither agreed nor disagreed 32.0% (n=48) of them agreed that after every teaching episode their teachers give them a task that require them to discover something new and 35.3 (n=53) of them strongly disagreed. It can therefore be seen that majority of the population strongly agreed that after every teaching episode, teachers do not give them a task that require them to discover something new.

Table 11: **In class, we are assigned to act different roles such as doctors, bankers, journalists etc when given guide lines.**

In class, we are assigned to act different roles such as doctors, bankers, guide lines		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	45	30,0	30,0	30,0
	Disagree	61	40,7	40,7	70,7
	Neither agree nor disagree	12	8,0	8,0	78,7
	Agree	24	16,0	16,0	94,7
	Strongly agree	8	5,3	5,3	100,0
	Total	**150**	**100,0**	**100,0**	

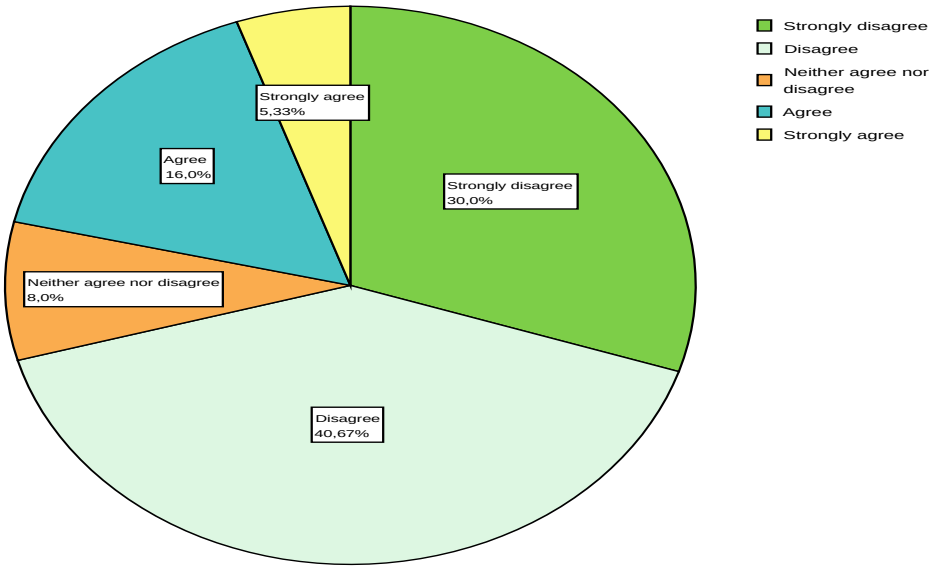


Figure 11: In class, we are assigned to act different roles such as doctors, bankers, journalists etc when given guide lines.

From the above distribution tableand pie chart , it can be observed that, 30.0% (n=45) respondent strongly disagreed that in class they are assigned to act different roles such as doctors, bankers, journalists etc when given guide lines 40.0% (n=61) of them disagreed that in class they are assigned to act different roles such as doctors, bankers, journalists etc when given guide lines 8.0% (n=12) of them neither agreed nor disagreed 16.0% (n=24) of the respondent agreed. And 5.3% (n=8) of them strongly agreed that in class they are assigned to act different roles such as doctors, bankers, journalists etc when given guide lines. From the analysis, it can be observed that most of the respondent strongly disagreed that in class they are assigned to act different roles such as doctors, bankers, journalists etc when given guide lines.

Table 12: Our teachers hardly give us problems that require us to discover knowledge by ourselves.

Our teachers hardly give us problems that require us to discover knowledge by ourselves		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	61	40,7	40,7	40,7
	Disagree	51	34,0	34,0	74,7
	Neither agree nor disagree	16	10,7	10,7	85,3
	Agree	16	10,7	10,7	96,0
	Strongly agree	6	4,0	4,0	100,0
	Total	**150**	**100,0**	**100,0**	

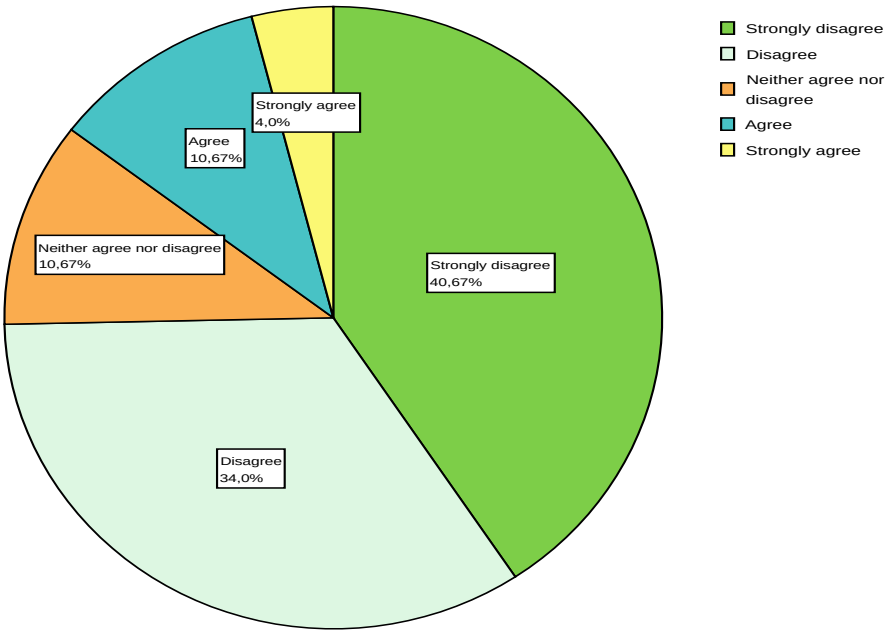


Figure 12: Our teachers hardly give us problems that require us to discover knowledge by ourselves.

The table and pie chart above shows that 40.7% (n=61) respondent strongly disagreed that their teachers hardly give them problems that require them to discover new knowledge by themselves 34.0% (n=51) of them disagreed that their teachers hardly give them problems that require them to discover new knowledge by themselves 10.7% (n=16) of the respondent neither agreed nor disagreed that their teachers hardly give them problems that require them to discover new knowledge by themselves 10.7% (n=16) of them disagreed and 4.0% (n=6) strongly agreed that their teachers hardly give them problems that require them to discover new knowledge by themselves. It can therefore be observed that majority of the respondent strongly disagreed that their teachers hardly give them problems that require them to discover new knowledge by themselves.

Table 13: Our teachers often teach through guiding questions

Our teachers often teach through guiding questions		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	14	9,3	9,3	9,3
	Disagree	22	14,7	14,7	24,0
	Neither agree nor disagree	23	15,3	15,3	39,3
	Agree	63	42,0	42,0	81,3
	Strongly agree	28	18,7	18,7	100,0
	Total	**150**	**100,0**	**100,0**	

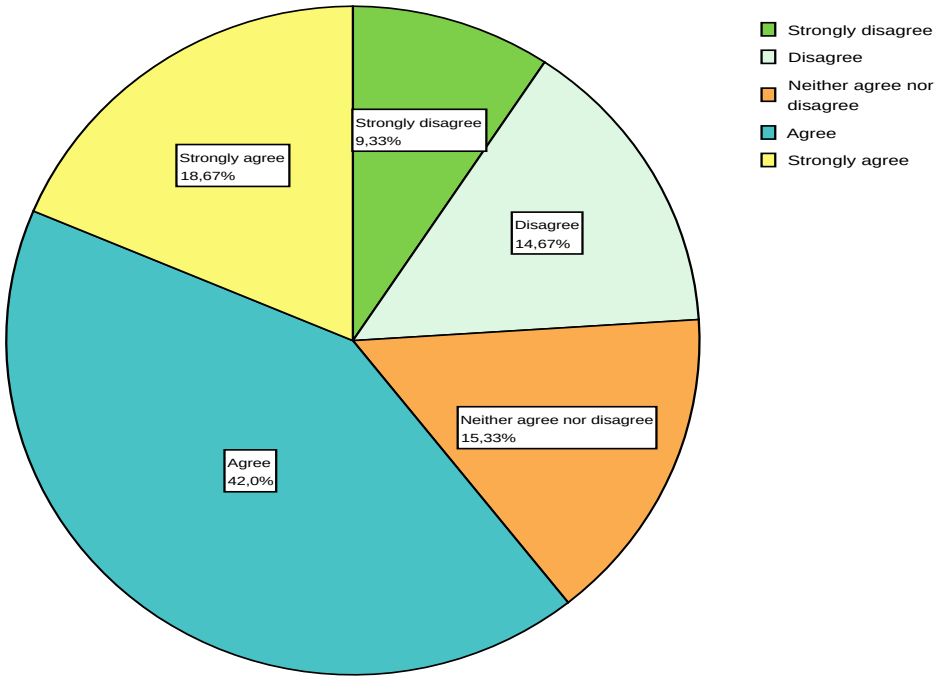


Figure 13: Our teachers often teach through guiding questions

From the table and pie chart above, one could observe that, out of the 150 respondent 9.3% which represent 14 respondent strongly disagreed that their teachers often teach through guiding questions 14.7% (n=22) of them disagreed that their teachers often teach through guiding questions 15.3% (n=23) of them neither agreed nor disagreed that their teachers often teach through guiding questions 42.0% (n=63) agreed that their teachers often teach through guiding questions and 18.7% (n=28) of them strongly agreed that their teachers often teach through guiding questions. It can therefore be observed that most of the respondent strongly agreed that their teachers often teach through guiding questions.

Table 14: When teaching, our teachers make use of teaching learning materials

When teaching, our teachers make use of teaching learning materials		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	8,0	8,0	8,0
	Disagree	16	10,7	10,7	18,7
	Neither agree nor disagree	8	5,3	5,3	24,0
	Agree	77	51,3	51,3	75,3
	Strongly agree	37	24,7	24,7	100,0
	Total	**150**	**100,0**	**100,0**	

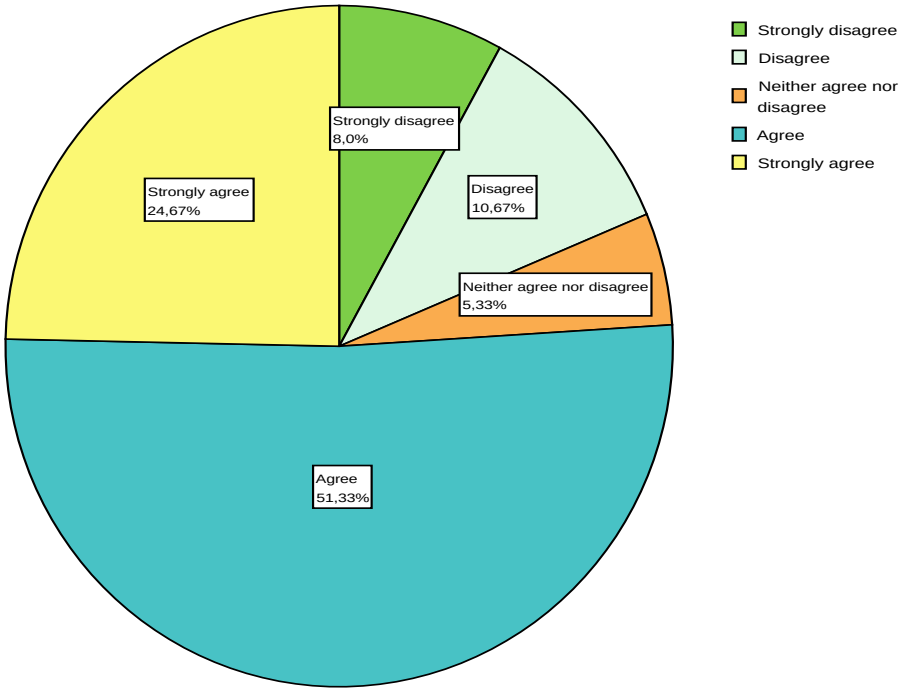


Figure 14: When teaching, our teachers make use of teaching learning materials

The table and pie chart above indicates that 8.0% which represent 12 respondent strongly disagreed that when teaching, their teachers make use of teaching learning material 10.7% (n=16) disagreed that when teaching, their teachers make use of teaching learning materials 5.3% (n=8) of them neither agreed nor disagreed 51.3% (n=77) agreed that when teaching, their teachers make use of teaching learning materials and 24.7% (n=37) strongly agreed that when teaching, their teachers make use of teaching learning materials. The above analysis indicates that majority of the population strongly agreed that when teaching, their teachers make use of teaching learning materials.

Table 15: Our school does not have a library

Our school does not have a library		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	80	53,3	53,3	53,3
	Disagree	52	34,7	34,7	88,0
	Neither agree nor disagree	6	4,0	4,0	92,0
	Agree	8	5,3	5,3	97,3
	Strongly agree	4	2,7	2,7	100,0
	Total	**150**	**100,0**	**100,0**	

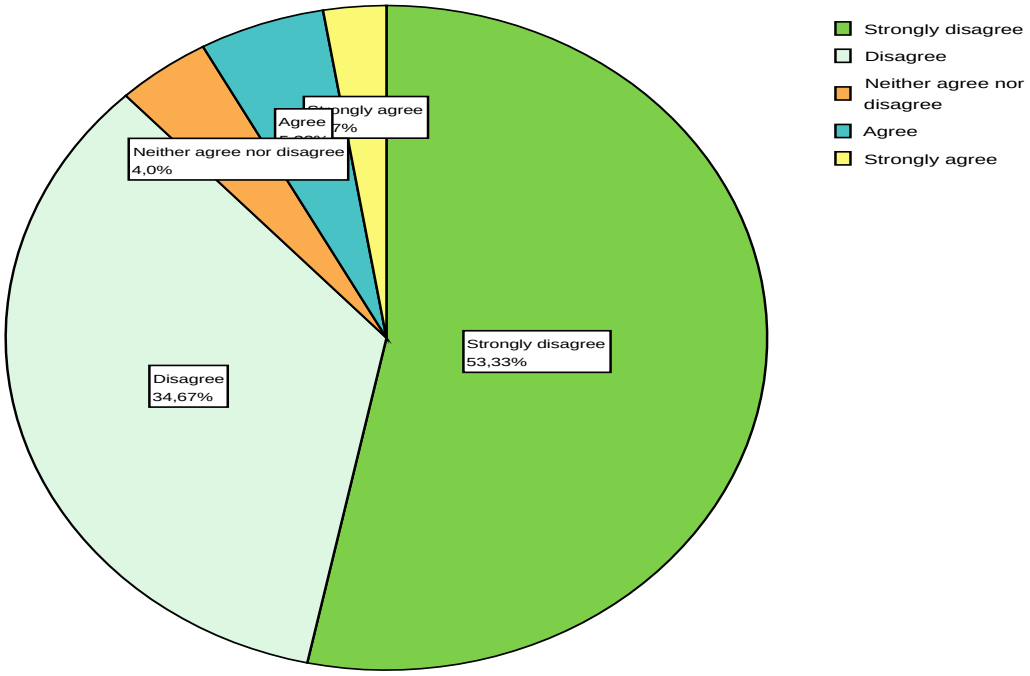


Figure 15: Our school does not have a library

From the above and pie chart table, it can be observed that, 53.3% which represents 80 respondent strongly disagreed that their school has a library 34.7% (n=52) disagreed that their school has a library 4.0% (n=6) of them neither agreed nor disagreed that their school has a library 5.3% (n=8) of them agreed that their school has a library and 2.7% (n=4) of them strongly agreed that their school has a library. It can therefore be observed that majority of the respondent disagreed that their schools have a library.

Table 16: Most at times our teachers projects lessons using computer or video-tapes for us to observe and comment

Most at times our teachers projects lessons using computer or videotapes for us to observe and comment		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	36	24,0	24,0	24,0
	Disagree	35	23,3	23,3	47,3
	Neither agree nor disagree	30	20,0	20,0	67,3
	Agree	35	23,3	23,3	90,7
	Strongly agree	14	9,3	9,3	100,0
	Total	**150**	**100,0**	**100,0**	

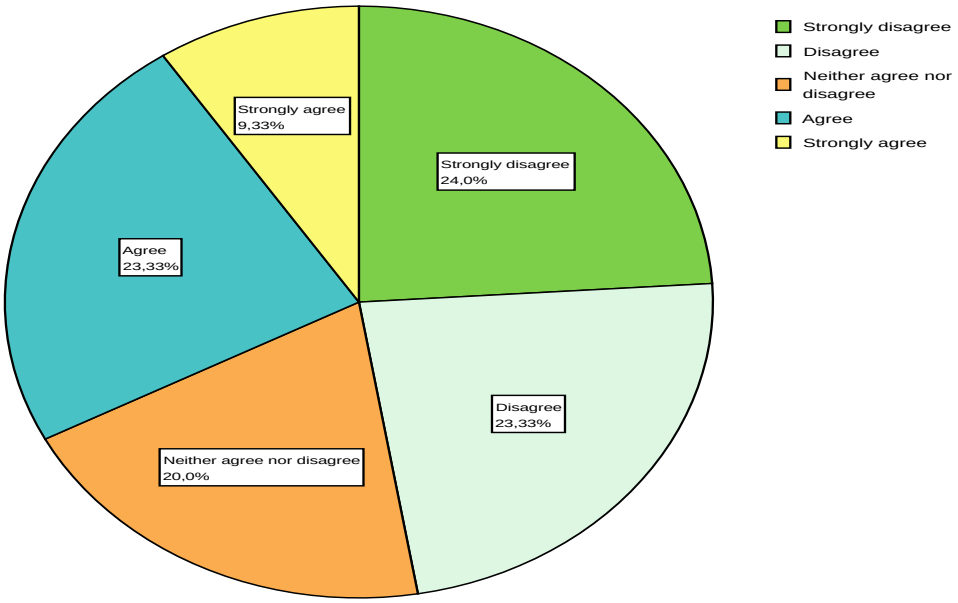


Figure 16: Most at times our teachers projects lessons using computer or video-tapes for us to observe and comment

The above table and pie chart shows that 24.0% which represent 36 respondent strongly disagreed that most times their teacher's projects lessons using computers or video-tapes for them to observe and comment 233% (n=35) of them disagreed 20.0% (n=30) neither agreed nor disagreed that most times their teacher's projects lessons using computers or video-tapes for them to observe and comment 23.3% (n=35) of them agreed and 9.3% (n=14) strongly agreed that most times their teacher's projects lessons using computers or video-tapes for them to observe and comment. It can therefore be observed that most of the population strongly disagreed that most times their teacher's projects lessons using computers or video-tapes for them to observe and comment.

Table 17: Our school has a laboratory

Our school have a laboratory		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	23	15,3	15,5	15,5
	Disagree	7	4,7	4,7	20,3
	Agree	69	46,0	46,6	66,9
	Strongly agree	49	32,7	33,1	100,0
	Total	148	98,7	100,0	
Missing	System	2	1,3		
Total		**150**	**100,0**		

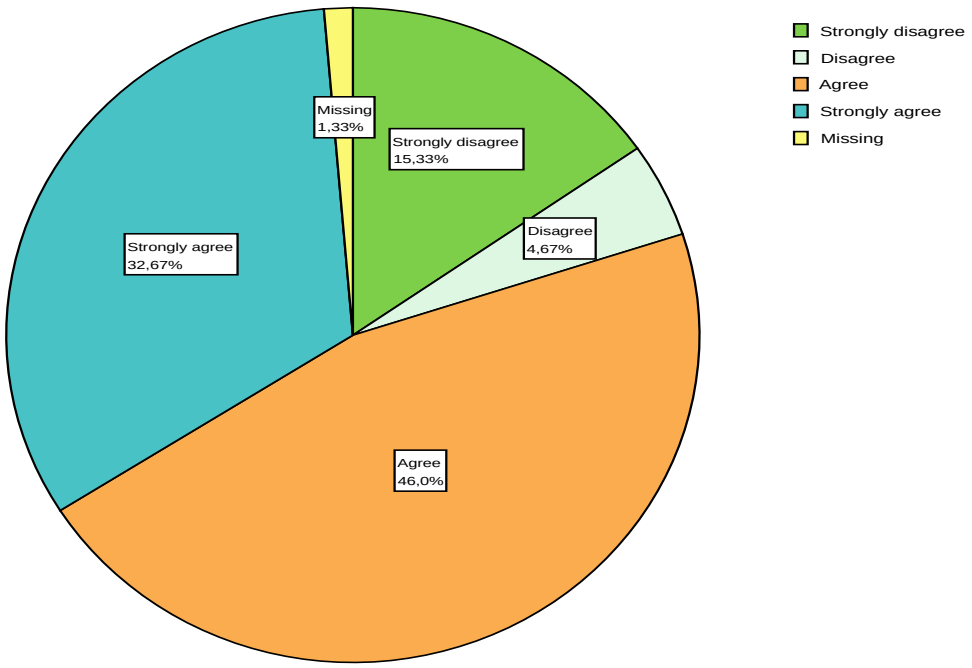


Figure 17: Our school has a laboratory

From the above frequency table and pie chart, it can be seen that 15.3% which represents 23 respondents strongly disagreed that their school has a laboratory. 4.7% (n=7) of them disagreed that their school has a laboratory 46.0% (n=69) of them strongly agreed that their school has a laboratory 98.7% (n=49) strongly agreed that their school has a laboratory. And 1.3% which represents 2 respondents didn't attempt the question. It can be observed therefore that, most of the respondents agreed that their schools have a laboratory.

Table 18: Our laboratory is not well equipped

Our laboratory is not well equipped		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	45	30,0	30,0	30,0
	Disagree	19	12,7	12,7	42,7
	Neither agree nor disagree	17	11,3	11,3	54,0
	Agree	36	24,0	24,0	78,0
	Strongly agree	33	22,0	22,0	100,0
	Total	**150**	**100,0**	**100,0**	

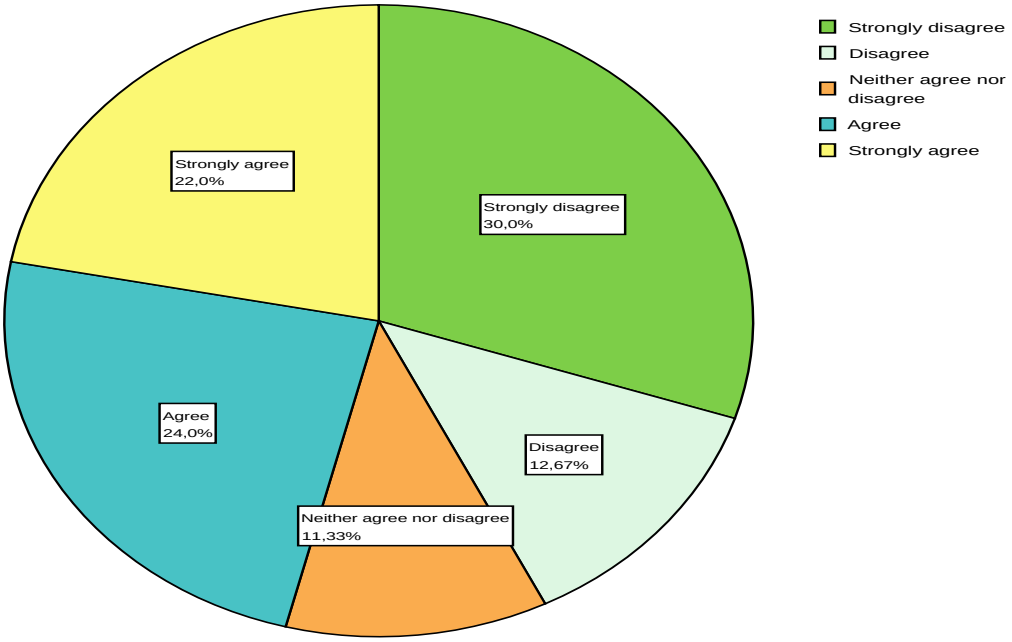


Figure 18: Our laboratory is not well equipped

The table and pie chart above shows that, out of the 150 respondent 30.0% which represents 45 respondents strongly disagreed that their laboratory is not well equippedn12.7% (n=19) of them disagreed that their laboratory is not well equippedn11.3% (n=17) of them neither agreed nor disagreed that their laboratory is not well equipped. 24.o% (n=36) of them agreed that their laboratory is not well equipped 22.0% (n=33) of them strongly agreed that their laboratory is not well equipped. This therefore indicates that, most of the population strongly disagreed that their laboratory is not well equipped.

Table 19: Apart from the classroom, we do go for field studies

Apart from the classroom, we do go for field studies		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	27	18,0	18,0	18,0
	Disagree	21	14,0	14,0	32,0
	Neither agree nor disagree	24	16,0	16,0	48,0
	Agree	53	35,3	35,3	83,3
	Strongly agree	25	16,7	16,7	100,0
	Total	**150**	**100,0**	**100,0**	

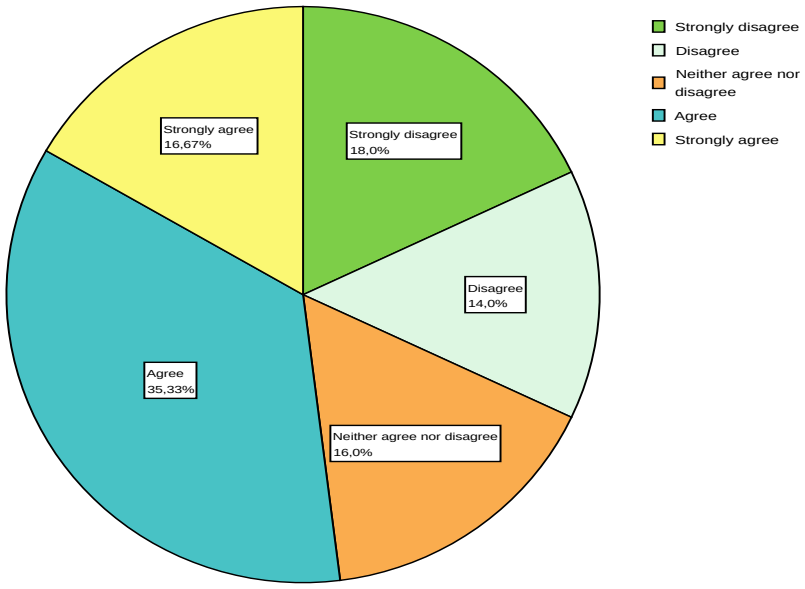


Figure 19: Apart from the classroom, we do go for field studies

From the table and pie chart above, it can observed that, 18.0% (n=27) respondent strongly disagreed that apart from the classroom, they do go for field studies 14.0% (n=21) of them disagreed that apart from the classroom, they do go for field studies 16.0% (n=24) of them neither agreed nor disagreed that apart from the classroom, they do go for field studies 35.3% (n=53) agreed. And 16.7% (n=25) of them strongly agreed that apart from the classroom, they do go for field studies. From the analysis, it can be seen that, majority of the respondent agreed that apart from the classroom, they do go for field studies.

Table 20: Audio-visual materials like motion pictures, televisions, videotapes are usually used in our classroom when teaching.

Audio-visual materials like motion pictures, televisions, videotapes are usually used in our classroom when teaching		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	71	47,3	47,3	47,3
	Disagree	30	20,0	20,0	67,3
	Neither agree nor disagree	31	20,7	20,7	88,0
	Agree	14	9,3	9,3	97,3
	Strongly agree	4	2,7	2,7	100,0
	Total	**150**	**100,0**	**100,0**	

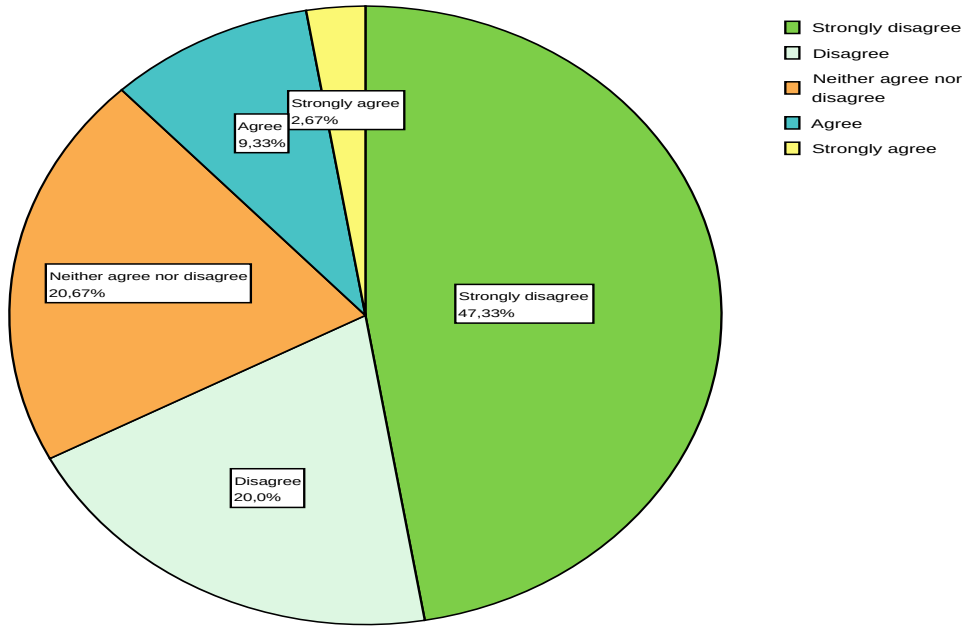


Figure 20: Audio-visual materials like motion pictures, televisions, videotapes are usually used in our classroom when teaching.

From the above frequency table and pie chart, it can be observed that, out of the 150 respondent 47.3% which represents 71 respondents strongly disagreed that Audio-visual materials like motion pictures, televisions, videotapes are usually used in their classroom when teaching 20.0% (n=30) of them disagreed 20.7% (n=31) of them neither agreed nor disagreed 9.3% (n=14) of them agreed Audio-visual materials like motion pictures, televisions, videotapes are usually used in their classroom when teaching. And 2.7% (n=4) strongly agreed that Audio-visual materials like motion pictures, televisions, videotapes are usually used in their classroom when teaching. It can therefore be observed that most of the respondent disagreed that Audio-visual materials like motion pictures, televisions, videotapes are usually used in their classroom when teaching.

Table 21: We are always given questions that require us to look for solutions to problems

We are always given questions that require us to look for solutions to problems		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	2,7	2,7	2,7
	Disagree	8	5,3	5,3	8,0
	Neither agree nor disagree	14	9,3	9,3	17,3
	Agree	98	65,3	65,3	82,7
	Strongly agree	26	17,3	17,3	100,0
	Total	**150**	**100,0**	**100,0**	

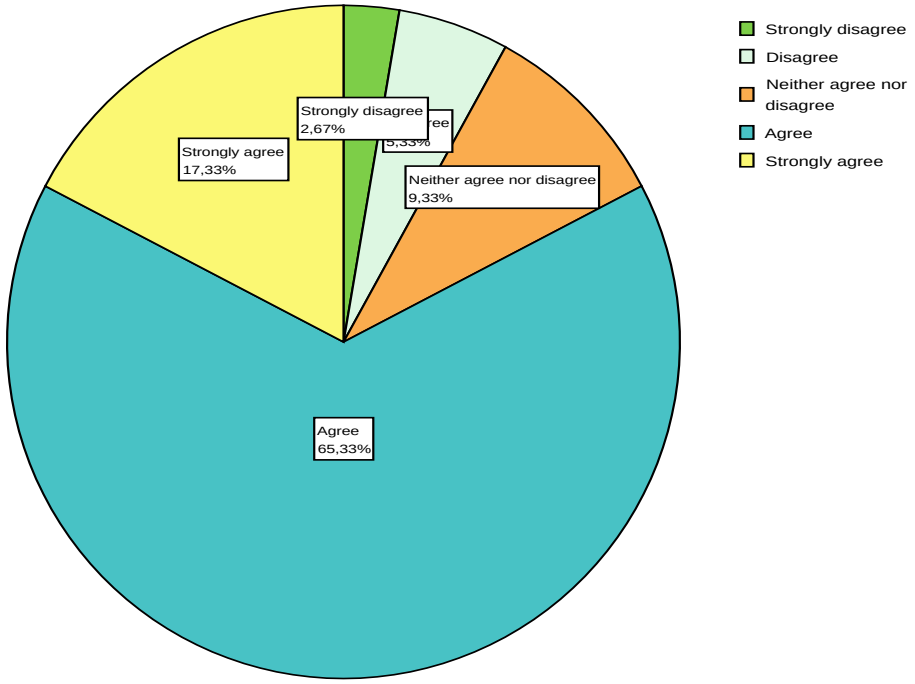


Figure 21: We are always given questions that require us to look for solutions to problems

The table and pie chart above shows that 2.7% of 4 respondent strongly disagreed that they are always given questions that require them to look for solutions to problems 5.3% (n=8) of them disagreed that they are always given questions that require them to look for solutions to problems 9.3% (n=14) of them neither agreed nor disagreed 65.3% (n=98) of them agreed that they are always given questions that require them to look for solutions to problems. And 17.3% (n=26) of the respondents strongly agreed that they are always given questions that require them to look for solutions to problems. This therefore insinuate that majority of the respondent agreed that they are always given questions that require them to look for solutions to problems.

Table 22: Our teachers mostly give us questions that require us to explain and not to merely state or define

Our teachers mostly give us questions that require us to explain and not to merely state or define		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	7,3	7,3	7,3
	Disagree	15	10,0	10,0	17,3
	Neither agree nor disagree	23	15,3	15,3	32,7
	Agree	68	45,3	45,3	78,0
	Strongly agree	33	22,0	22,0	100,0
	Total	**150**	**100,0**	**100,0**	

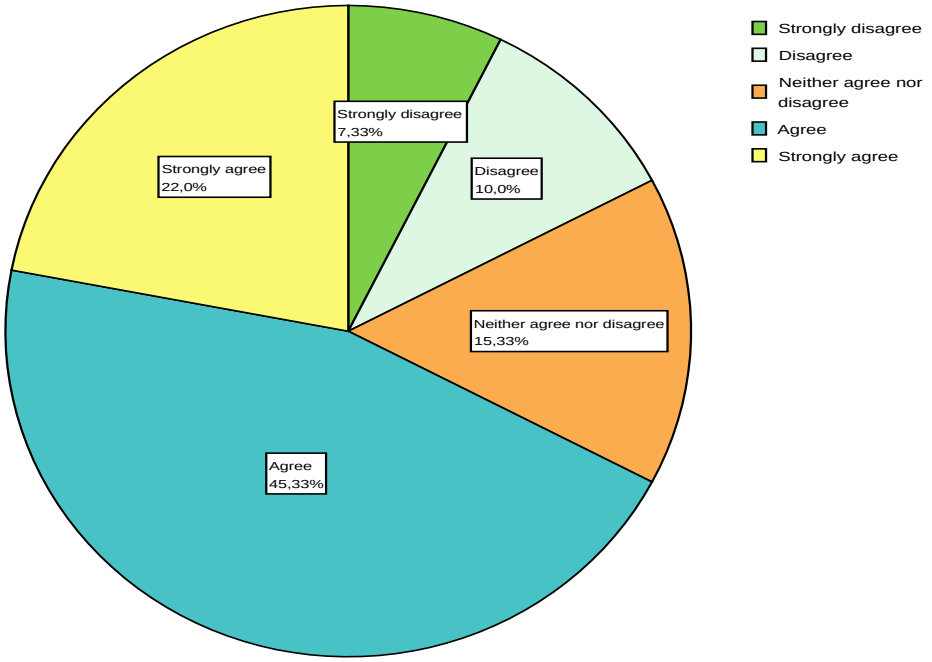


Figure 22: We are always given questions that require us to look for solutions to problems

From the table and pie chart above, it can be observed that, 7.3% of 11 respondents strongly disagreed that their teachers mostly give them questions that require them to explain and not to merely state or define 10.0% (n=15) of them disagreed that 15.3% (n=23) of neither agreed nor disagreed 45.3% (n=68) of them agreed that their teachers mostly give them questions that require them to explain and not to merely state or define 22.0% (n=33) of them strongly agreed that their teachers mostly give them questions that require them to explain and not to merely state or define. It can be observed that from the above table, most of the respondent agreed that their teachers mostly give them questions that require them to explain and not to merely state or define.

Table 23: Our teachers usually give us questions that require us to state why something is good or bad.

Our teachers usually give us questions that require us to state why something is good or bad		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	14	9,3	9,5	9,5
	Disagree	26	17,3	17,7	27,2
	Neither agree nor disagree	25	16,7	17,0	44,2
	Agree	54	36,0	36,7	81,0
	Strongly agree	28	18,7	19,0	100,0
	Total	147	98,0	100,0	
Missing	System	3	2,0		
Total		**150**	**100,0**		

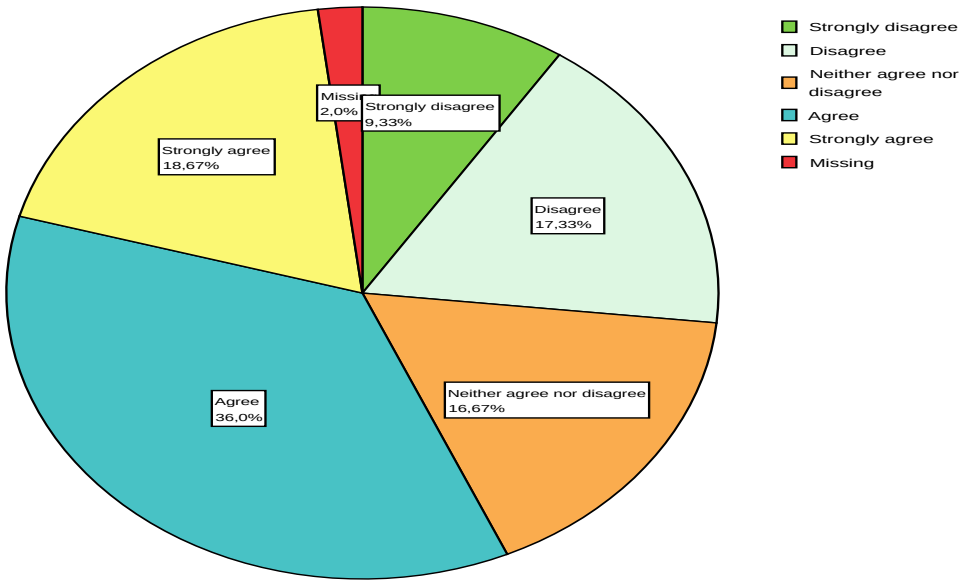


Figure 23: Our teachers usually give us questions that require us to state why something is good or bad.

From the table and pie chart above, it can be seen that, out of the 150 respondent 9.3% which represents 14 respondents strongly disagreed that their teachers usually give them questions that require them to state why something is good or bad17.3% (n=26) of them disagreed. 16.7% (n=25) of them neither agreed nor disagreed 36.0% (n=54) of them agreed and 18.7% (n=28) strongly agreed that their teachers usually give them questions that require them to state why something is good or bad2.0% (n=3) respondents didn't attempt the question. Therefore, most of the population agreed that their teachers usually give them questions that require them to state why something is good or bad**.**

Table 24: Our teachers do not set questions that require us to justify or to comment

Our teachers do not set questions that require us to justify or to comment		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	47	31,3	31,3	31,3
	Disagree	50	33,3	33,3	64,7
	Neither agree nor disagree	24	16,0	16,0	80,7
	Agree	25	16,7	16,7	97,3
	Strongly agree	4	2,7	2,7	100,0
	Total	**150**	**100,0**	**100,0**	

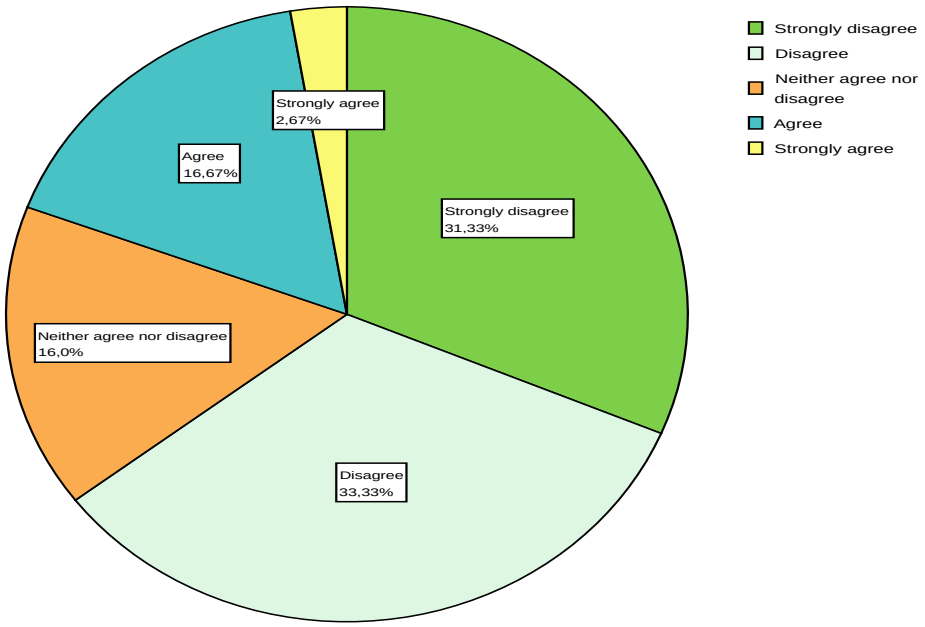


Figure 24: Our teachers usually give us questions that require us to state why something is good or bad.

The table and pie chart above shows that out of the 150 respondent, 31.3% which represent 47 respondents strongly disagreed that their teachers do not set questions that require them to justify or to comment. 33.3% (n=50) of them disagreed that their teachers do not set questions that require them to justify or to comment 16.0% (n=24) of them neither agreed nor disagreed 16.7% (n=25) of them agreed that their teachers do not set questions that require them to justify or to comment 2.7% (n=4) of them strongly agreed that their teachers do not set questions that require them to justify or to comment. It can therefore be observed that majority of the respondent disagreed that their teachers do not set questions that require them to justify or to comment.

Table 25: Our teachers do not set questions that require us to make a critique of something

Our teachers do not set questions that require us to make a critique of something		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	29	19,3	19,7	19,7
	Disagree	65	43,3	44,2	63,9
	Neither agree nor disagree	21	14,0	14,3	78,2
	Agree	26	17,3	17,7	95,9
	Strongly agree	6	4,0	4,1	100,0
	Total	147	98,0	100,0	
Missing	System	3	2,0		
Total		**150**	**100,0**		

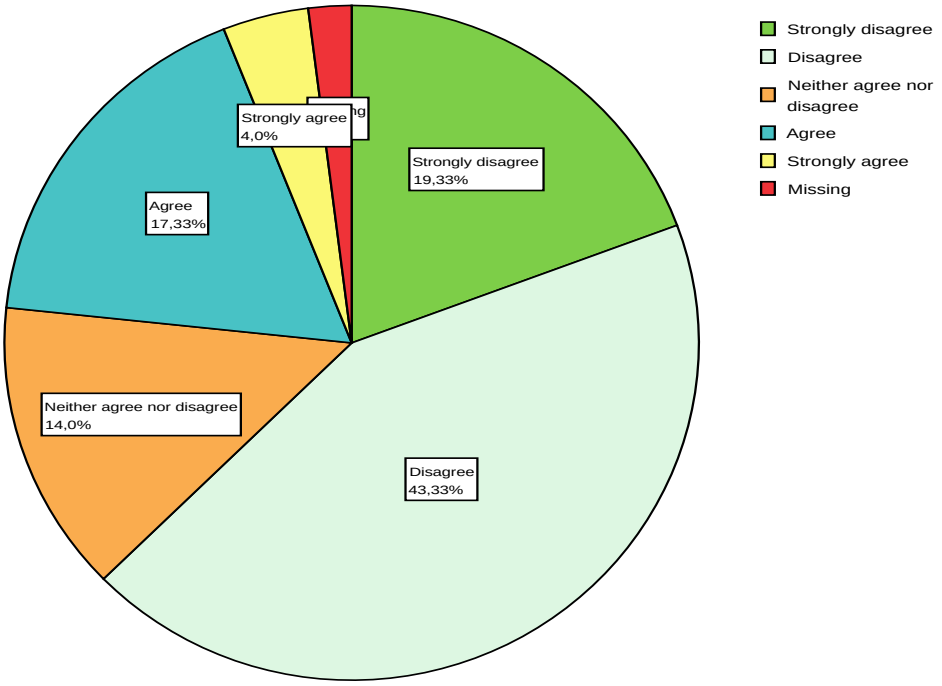


Figure 25: Our teachers do not set questions that require us to make a critique of something

From the table and pie chart above, it can be observed that, 19.3% which represents 29 respondent strongly disagreed that their teachers do not set questions that require them to make a critique of something 43.3% (n=65) of them disagreed. 14.0% (n=21) of them neither agreed nor disagreed. 17.3% (n=26) of them agreed their teachers do not set questions that require them to make a critique of something. 4.0% (n=6) strongly agreed and 2.0% (n=3) respondent didn't attempt the question. It can be observed majority of the population disagreed that their teachers do not set questions that require them to make a critique of something.

Table 26: Our teachers usually set questions that require us to construct or design

Our teachers usually set questions that require us to construct or design		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	29	19,3	19,3	19,3
	Disagree	24	16,0	16,0	35,3
	Neither agree nor disagree	27	18,0	18,0	53,3
	Agree	62	41,3	41,3	94,7
	Strongly agree	8	5,3	5,3	100,0
	Total	**150**	**100,0**	**100,0**	

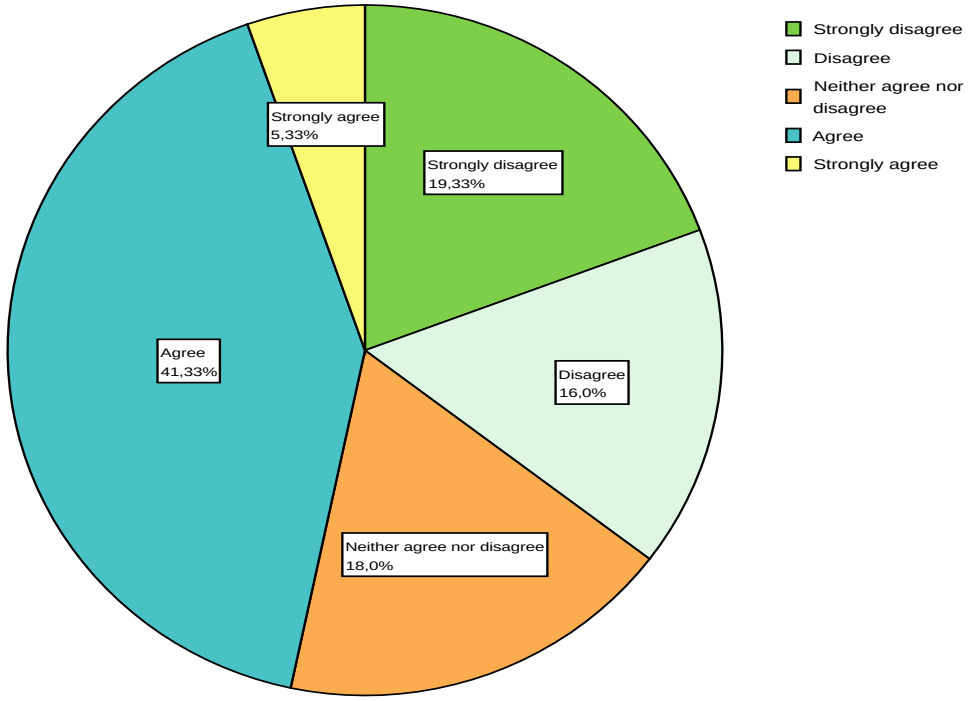


Figure 26: Our teachers usually set questions that require us to construct or design

The table and pie chart above shows that, of the 150 respondent, 19.3% which represents 29 respondents strongly disagreed that their teachers usually set questions that require them to construct or design. 16.0% (n=24) of them disagreed 18.0% (n=27) of them neither agreed nor disagreed that their teachers usually set questions that require them to construct or design 41.3% (n=62) of them agreed and 5.3% (n=8) of them strongly agreed that their teachers usually set questions that require them to construct or design. Therefore, majority of the respondent agreed that their teachers usually set questions that require them to construct or design.

Table 27: We are always provided with questions that require us to distinguish and discriminate

We are always provided with questions that require us to distinguish and discriminate		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	17	11,3	11,3	11,3
	Disagree	18	12,0	12,0	23,3
	Neither agree nor disagree	27	18,0	18,0	41,3
	Agree	62	41,3	41,3	82,7
	Strongly agree	26	17,3	17,3	100,0
	Total	**150**	**100,0**	**100,0**	

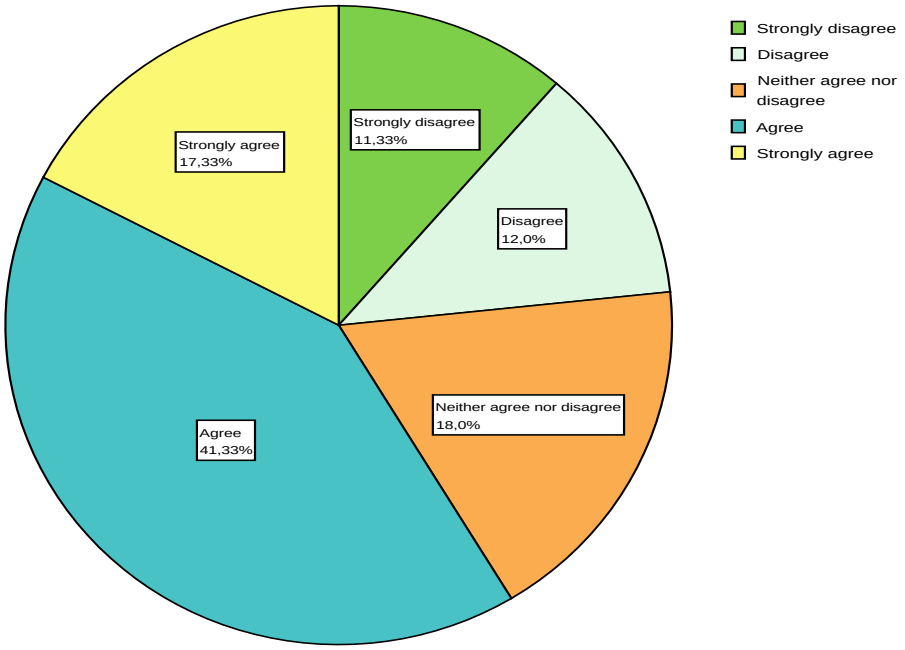


Figure 27: We are always provided with questions that require us to distinguish and discriminate

From the table and pie chart above, it can be observed that 11.3% which represents 17 respondent strongly disagreed that they are always provided with questions that require them to distinguish and discriminate 12.0% (n=18) of them disagreed that that they are always provided with questions that require them to distinguish and discriminate 18.0% (n=27) of them neither agreed nor disagreed 41.3% (n=62) of them agreed and 17.3% (n=26) strongly agreed that they are always provided with questions that require them to distinguish and discriminate. It can be observed that majority of the respondent agreed that they are always provided with questions that require them to distinguish and discriminate.

Table 28: Most at times we are presented with questions that require us to present fact in a step by step manner

Most at times we are presented with questions that require us to present fact in a step by step manner		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	10,7	10,7	10,7
	Disagree	12	8,0	8,0	18,7
	Neither agree nor disagree	38	25,3	25,3	44,0
	Agree	50	33,3	33,3	77,3
	Strongly agree	34	22,7	22,7	100,0
	Total	**150**	**100,0**	**100,0**	

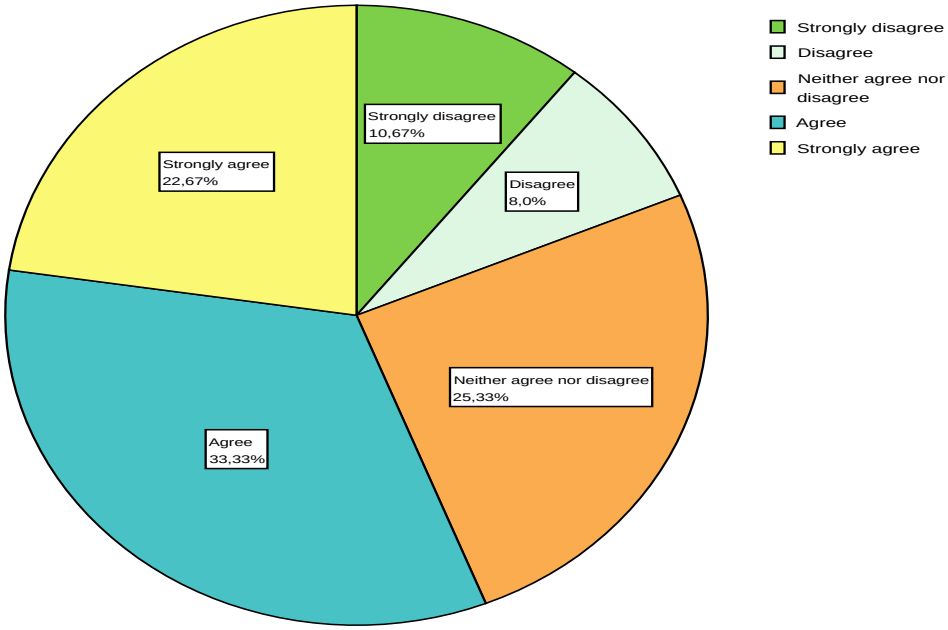


Figure 28: Most at times we are presented with questions that require us to present fact in a step by step manner

From the above table and pie chart, it can be seen that, 1o.7% (n=16) respondent strongly disagreed that most times they are presented with questions that require them to present facts in a step by step manner 8.0% (n=12) of them disagreed. 25.3% (n=38) of the respondent neither agreed nor disagreed 33.3% (n=50) of them agreed and 22.7% (n=34) of them strongly agreed that most times they are presented with questions that require them to present facts in a step by step manner. From the above table, it can be observed that majority of the respondent agreed that most times they are presented with questions that require them to present facts in a step by step manner.

Table 29: I always discover knowledge by myself

I always discover knowledge by myself		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	21	14,0	14,0	14,0
	Disagree	22	14,7	14,7	28,7
	Neither agree nor disagree	12	8,0	8,0	36,7
	Agree	82	54,7	54,7	91,3
	Strongly agree	13	8,7	8,7	100,0
	Total	150	100,0	100,0	

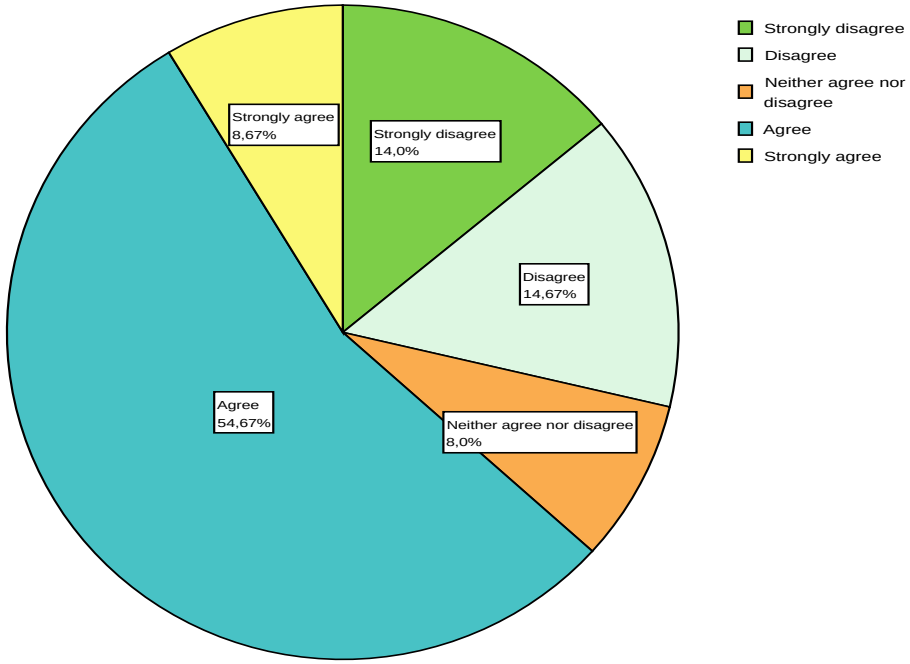


Figure 29: I always discover knowledge by myself

From the table and pie chart above, it can be observed that, of the 150 respondents, 14.0% which represent 21 respondents strongly disagreed that they always discover knowledge by themselves 14.7% (n=22) of them disagreed. 8.0% (n=12) of them neither agreed nor disagreed that they always discover knowledge by themselves 54.7% (n=82) of them agreed while 8.7% (n=13) of them strongly agreed. It can therefore be seen that, most of the respondents agreed that they always discover knowledge by themselves.

Table 30: In class, I'm given activities that require me to think in abstract terms

In class, I'm given activities that require me to think in abstract terms		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	6,7	6,7	6,7
	Disagree	22	14,7	14,7	21,3
	Neither agree nor disagree	21	14,0	14,0	35,3
	Agree	74	49,3	49,3	84,7
	Strongly agree	23	15,3	15,3	100,0
	Total	**150**	**100,0**	**100,0**	

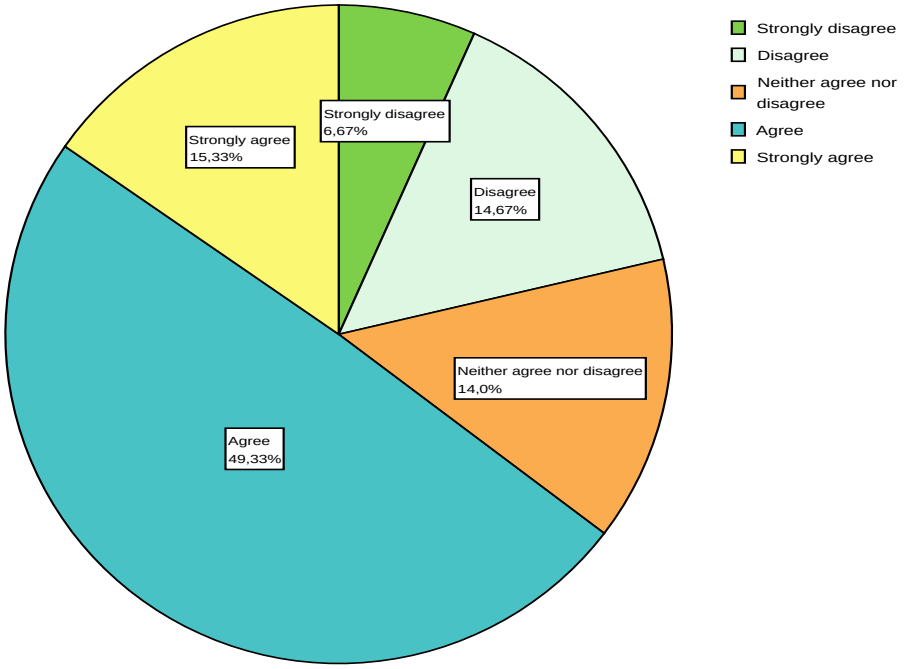


Figure 30: I always discover knowledge by myself

The above table and pie chart indicates that, of the 150 respondent 6.7% which represents 10 respondent strongly disagreed that in class they are given activities that requires them to think in abstract terms 14.7% (n=22) respondents disagreed 14% (n=21) of them neither agreed nor disagreed 49.3% (n=74) of them agreed and 15.3% (n=23) of strongly agreed that they are given activities that requires them to think in abstract terms. This therefore shows that, most of the respondent agreed that they are given activities that require them to think in abstract terms.

Table 31: I can look for solutions to problems

I can look for solutions to problems		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	4,0	4,0	4,0
	Disagree	12	8,0	8,0	12,0
	Neither agree nor disagree	24	16,0	16,0	28,0
	Agree	74	49,3	49,3	77,3
	Strongly agree	34	22,7	22,7	100,0
	Total	**150**	**100,0**	**100,0**	

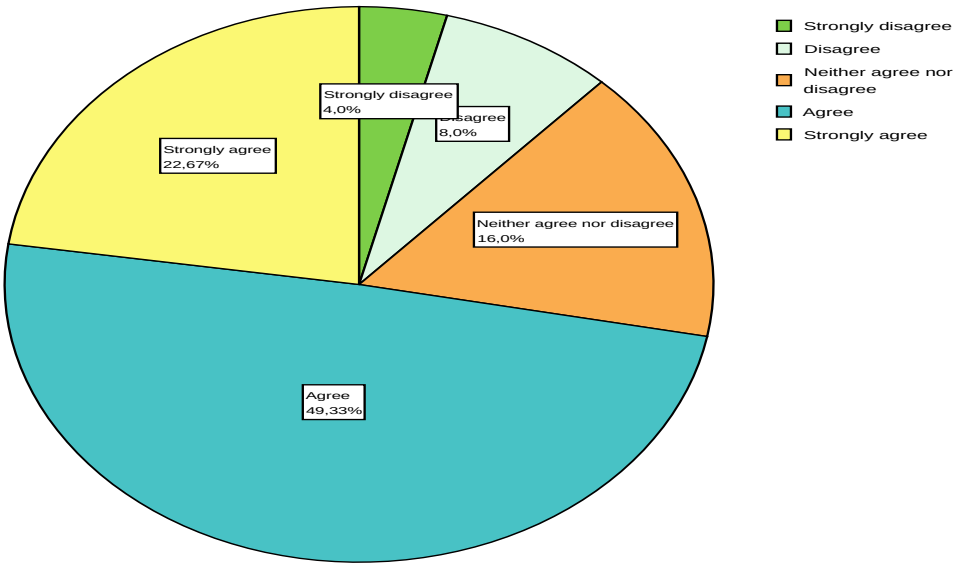


Figure 31: I can look for solutions to problems

The above table and pie chart indicates that, of the 150 respondent, 4.0% which represents 6 respondents strongly disagreed that they can look for solutions to problems 8.0% (n=12) respondents disagreed that they can look for solutions to problems. 16.0% (n=24) of them neither agreed nor disagreed that they can look for solutions to problems49.3% (n=74) of them agreed and 22.7% (n=34) of them strongly agreed. This therefore shows that, most of the respondents agreed that they can look for solutions to problems.

Table 32: I'm always involved in brainstorming sessions

I'm always involved in brainstorming sessions		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	10,7	10,7	10,7
	Disagree	28	18,7	18,7	29,3
	Neither agree nor disagree	37	24,7	24,7	54,0
	Agree	35	23,3	23,3	77,3
	Strongly agree	34	22,7	22,7	100,0
	Total	**150**	**100,0**	**100,0**	

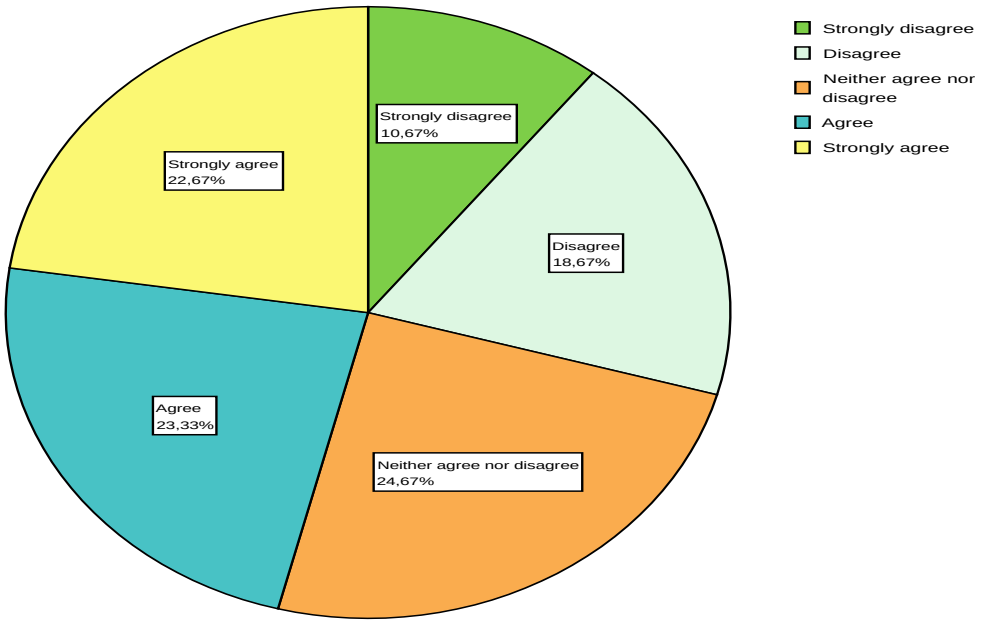


Figure 32: I'm always involved in brainstorming sessions

From the table and pie chart above, of the 150 respondents, 10.7% which represents 16 respondent strongly disagreed that they are always involve in brainstorming sessions. 18.7% (n=38) respondents disagreed that they are always involve in brainstorming sessions24.7% (n=37) of them neither agreed nor disagreed that they are always involve in brainstorming sessions. 23.3% (n=35) of them agreed and 22.7% (n=34) of them strongly agreed. This therefore shows that, most of the respondent neither agreed nor disagreed that they are always involve in brainstorming sessions.

Table 33: Through guiding questions, I'm able to formulate hypotheses to later answer the questions

Through guiding questions, I'm able to formulate hypotheses to later answer the questions		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	4,0	4,0	4,0
	Disagree	25	16,7	16,7	20,7
	Neither agree nor disagree	26	17,3	17,3	38,0
	Agree	46	30,7	30,7	68,7
	Strongly agree	47	31,3	31,3	100,0
	Total	**150**	**100,0**	**100,0**	

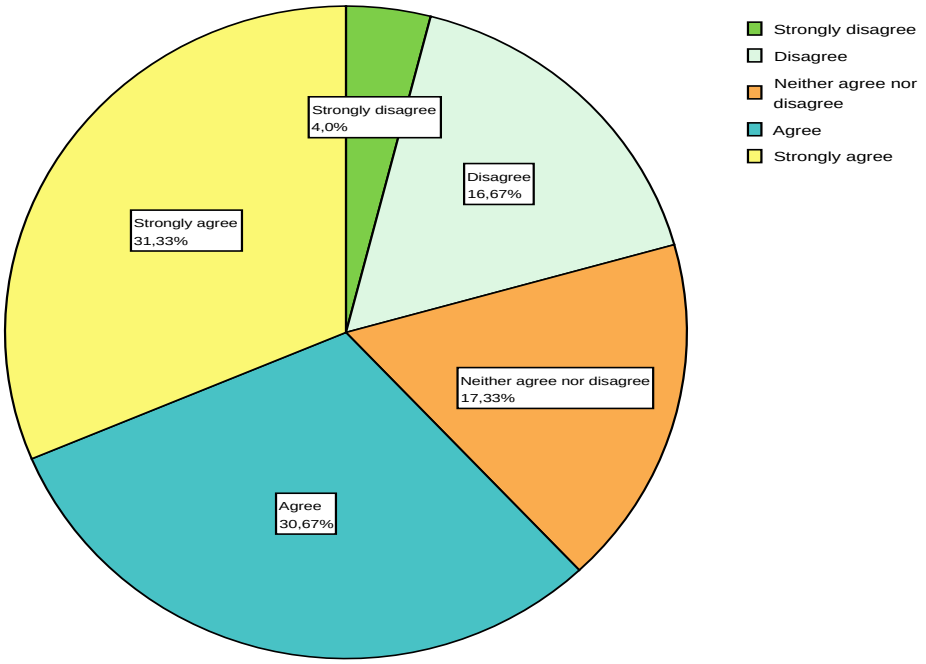


Figure 33: Through guiding questions, I'm able to formulate hypotheses to later answer the questions

The table and pie chart above shows that, of the 150 respondent 4.0% which represent 6 respondent strongly disagreed that through guiding questions they are able to formulate hypotheses to later answer the questions 16.7% (n=25) of them disagreed that through guiding questions they are able to formulate hypotheses to later answer the questions. 17.3% (n=26) of them neither agreed nor disagreed that through guiding questions they are able to formulate hypotheses to later answer the questions 30.7% (n=46) of them agreed and 31.3% (n=47) of them strongly agreed that through guiding questions they are able to formulate hypotheses to later answer the questions Therefore, majority of the respondent strongly agreed that through guiding questions they are able to formulate hypotheses to later answer the questions.

Table 34: In class, I'm always involved in an activity that requires me to be creative

In class, I'm always involved in an activity that requires me to be creative		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	6,7	6,7	6,7
	Disagree	12	8,0	8,0	14,7
	Neither agree nor disagree	17	11,3	11,3	26,0
	Agree	71	47,3	47,3	73,3
	Strongly agree	40	26,7	26,7	100,0
	Total	**150**	**100,0**	**100,0**	

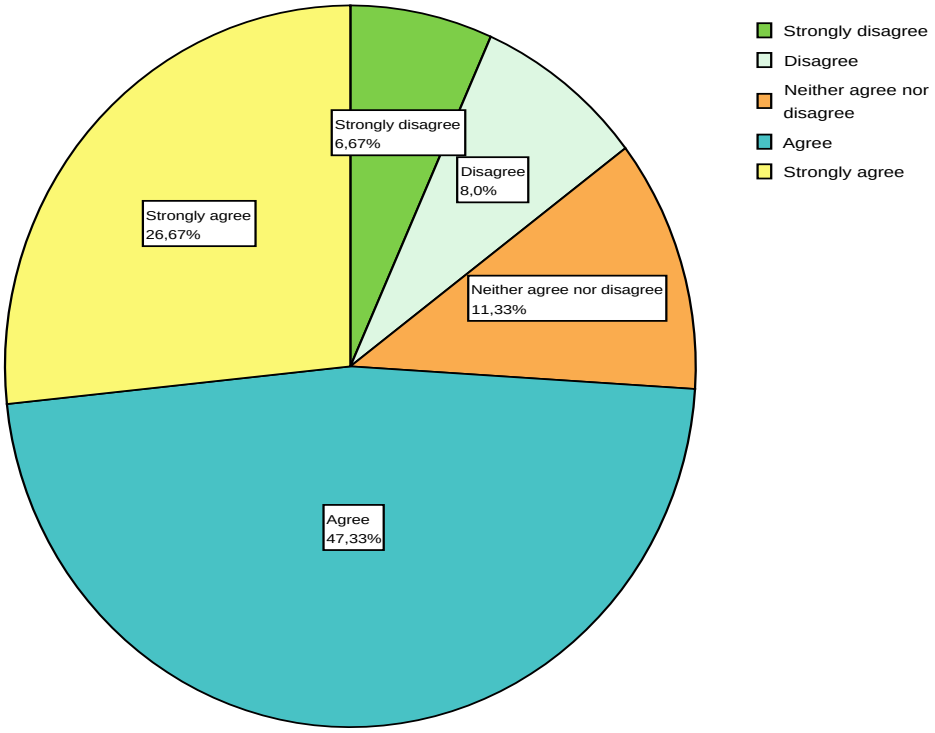


Figure 34: In class, I'm always involved in an activity that requires me to be creative

From the above frequency table and pie chart, it can be observed that, out of the 150 respondent 6.7% which represent 10 respondent strongly disagreed that in class, they are always involved in an activity that requires them to be creative 8.0% (n=12) of them disagreed that in class, they are always involved in an activity that requires them to be creative11.3 % (n=17) of them neither agreed nor disagree. 47.3% (n=71) of them agreed. 26.7% (n=40) strongly agreed that in class, they are always involved in an activity that requires them to be creative. It can therefore be observed that most of the respondent agreed that that in class, they are always involved in an activity that requires them to be creative.

Table 35: I often think critically to come out with possible answers to a problem

I often think critically to come out with possible answers to a problem		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1,3	1,3	1,3
	Disagree	13	8,7	8,7	10,0
	Neither agree nor disagree	27	18,0	18,0	28,0
	Agree	75	50,0	50,0	78,0
	Strongly agree	33	22,0	22,0	100,0
	Total	**150**	**100,0**	**100,0**	

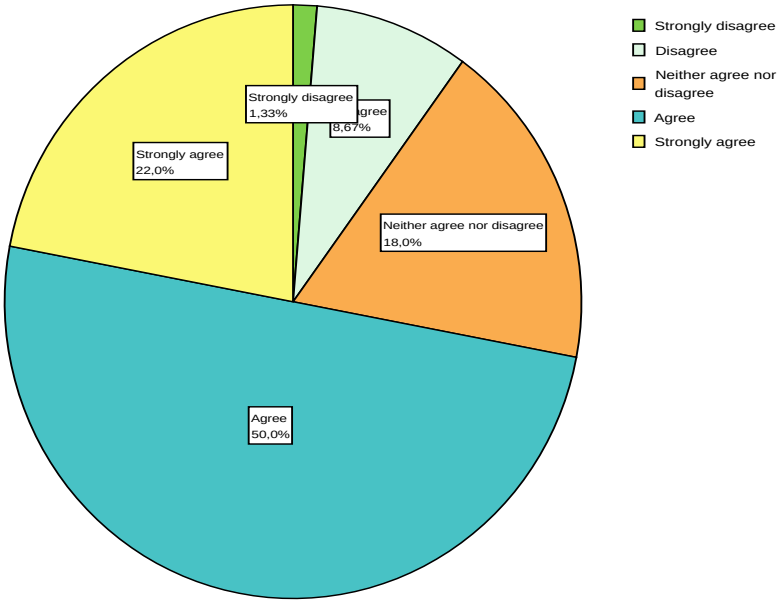


Figure 35: I often think critically to come out with possible answers to a problem

From the above frequency table and pie chart, it can be observed that, out of the 150 respondent 1.3% which represent 2 respondent strongly disagreed that they often think critically to come out with possible answers to a problem. 8.7% (n=13) of them disagreed that they often think critically to come out with possible answers to a problem. 18.0% (n=27) of them neither agreed nor disagreed 50.0% (n=75) of them agreed that often think critically to come out with possible answers to a problem 22.0% (n=33) strongly agreed that they often think critically to come out with possible answers to a problem. It can therefore be observed that most of the respondent agreed that they often think critically to come out with possible answers to a problem.

Table 36: I can make my own analysis to problems

I can make my own analysis to problem		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	2,7	2,7	2,7
	Disagree	10	6,7	6,8	9,5
	Neither agree nor disagree	12	8,0	8,2	17,7
	Agree	91	60,7	61,9	79,6
	Strongly agree	30	20,0	20,4	100,0
	Total	147	98,0	100,0	
Missing	System	3	2,0		
Total		**150**	**100,0**		

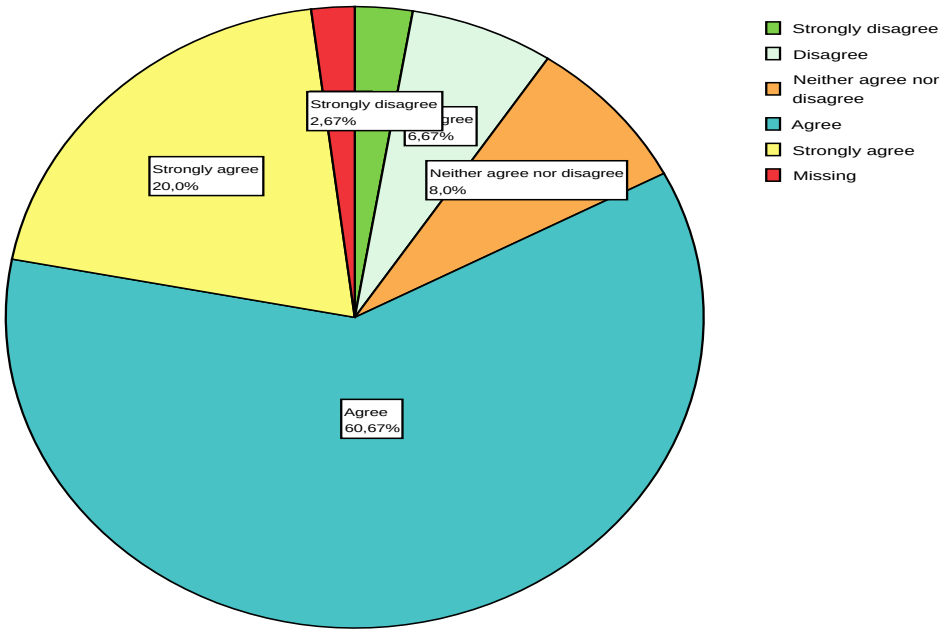


Figure 36: I can make my own analysis to problems

The above table and pie chart indicates that of the 150 respondent, 2.7% which represents 4 respondent strongly disagreed that they can make their own analysis to problems 6.7% (n=10) disagreed that they can make their own analysis to problems 8.0% (n=12) neither agreed nor disagreed that they can make their own analysis to problems. Meanwhile 60.7% (n=91) agreed that they can make their own analysis to problems and 20.0 % (n=30) strongly disagreed that they can make their own analysis to problems. It can therefore be observed that, majority of the population agreed that they can make their own analysis to problems.

Table 37: I can give my own opinion to a problem

I can give my own opinion to a problem		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	8,7	8,7	8,7
	Disagree	9	6,0	6,0	14,7
	Neither agree nor disagree	14	9,3	9,3	24,0
	Agree	73	48,7	48,7	72,7
	Strongly agree	41	27,3	27,3	100,0
	Total	**150**	**100,0**	**100,0**	

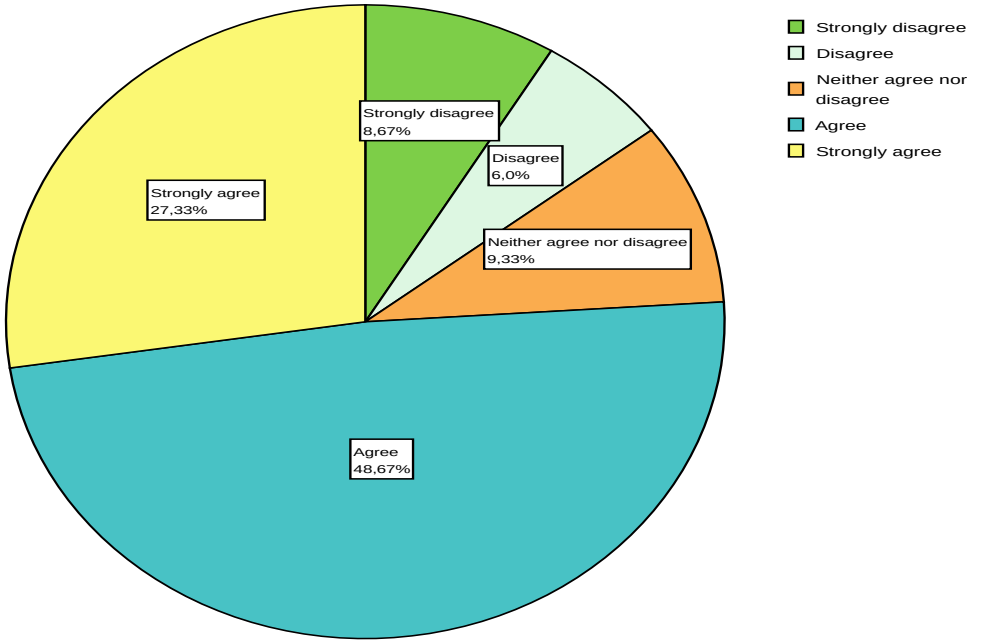


Figure 37: I can give my own opinion to a problem

From the table and pie chart above, it can be observed that 8.7% which represents 13 respondent strongly disagreed that they can give their own opinion to a problem 6.0% (n=9) of them disagreed that that they can give their own opinion to a problem 9.3% (n=14) of them neither agreed nor disagreed that they can give their own opinion to a problem 48.7% (n=73) of them agreed and 27.3% (n=41) strongly agreed that they can give their own opinion to a problem. It can be observed that majority of the respondent agreed that they can give their own opinion to a problem.

Table 38: I'm often involved in activities that permit me to look at the relationship that exists between concepts

I'm often involved in activities that permit me to look at the relationship that exist between concepts		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	4,0	4,0	4,0
	Disagree	33	22,0	22,0	26,0
	Neither agree nor disagree	30	20,0	20,0	46,0
	Agree	43	28,7	28,7	74,7
	Strongly agree	38	25,3	25,3	100,0
	Total	**150**	**100,0**	**100,0**	

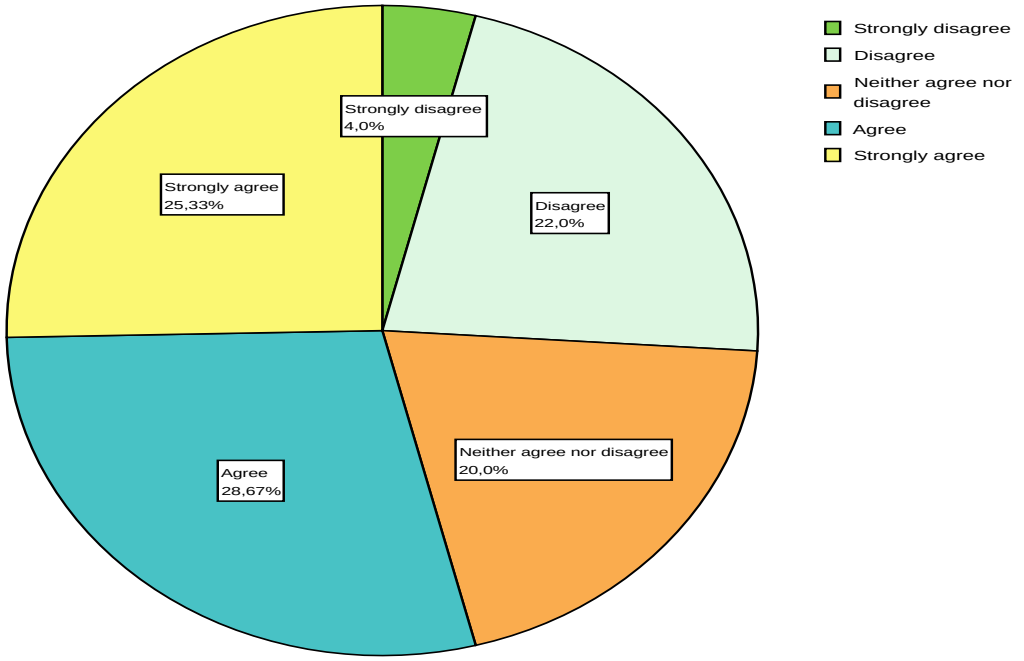


Figure 38: I'm often involved in activities that permit me to look at the relationship that exists between concepts

From the above frequency table and pie chart, it can be observed that, out of the 150 respondent 4.0% which represent 6 respondent strongly disagreed that they are often involved in activities that permit them to look at the relationship that exists between concepts22.0% (n=33) of them disagreed that20.0 % (n=30) of them neither agreed nor disagreed 28.7% (n=43) of them agreed that hey are often involved in activities that permit them to look at the relationship that exists between concepts25.3% (n=38) strongly agreed that they are often involved in activities that permit them to look at the relationship that exists between concepts**.** It can therefore be observed that most of the respondents agreed that they are often involved in activities that permit them to look at the relationship that exists between concepts.

4.2 TEST OF HYPOTHESIS WITH THE CORRELATION OF PEARSON

Table 39: Research hypothesis 1

Teaching methods and higher order thinking skills

	Mean	Std. Deviation	N
iv1	22,8069	4,45704	145
vd	43,5306	6,17807	147

Correlations		iv1	vd
iv1	Pearson Correlation	1	,539(**)
	Sig. (2-tailed)		,000
	N	145	142
vd	Pearson Correlation	,539(**)	1
	Sig. (2-tailed)	,000	
	N	142	147

Correlation is significant at the 0.01 level (2-tailed).

The results from the above table testing the hypothesis that there is a significant relationship between Teaching methods and higher order thinking skills show with the Pearson moment correlation that, the hypothesis has been tested valid with r= to .539 and the degree of freedom is 17. The read r value is .455 since the r calculated is larger than the r read; therefore, the relationship is there with a high degree of correlation. In conclusion, there is a significant relationship between Teaching methods and higher order thinking skills.

Table 40: Research hypothesis 2

Teaching learning materials and higher order thinking skills

Descriptive Statistics

	Mean	Std. Deviation	N
iv2	18,0541	3,64362	148
vd	43,5306	6,17807	147

Correlations

		iv2	vd
iv2	Pearson Correlation	1	,321**
	Sig. (2-tailed)		,000
	N	148	145
vd	Pearson Correlation	,321**	1
	Sig. (2-tailed)	,000	
	N	145	147

**. Correlation is significant at the 0.01 level

The results from the above table testing the hypothesis that there is a significant relationship between teaching learning materials and higher order thinking skills show with the Pearson moment correlation that, the hypothesis has been tested negative with r= to .321 and the degree of freedom is 16. The read r value is .468. Since the r read is larger than the r Calculated, therefore, there is no relationship between the two variables. In conclusion, there is no significant relationship between teaching learning materials and higher order thinking skills

Table 41: Research hypothesis 3

Assessment practices and higher order thinking skills

Descriptive Statistics

	Mean	Std. Deviation	N
iv3	20,5208	3,45393	144
vd	43,5306	6,17807	147

Correlations

		iv3	vd
iv3	Pearson Correlation	1	,513**
	Sig. (2-tailed)		,000
	N	144	141
vd	Pearson Correlation	,513**	1
	Sig. (2-tailed)	,000	
	N	141	147

**. Correlation is significant at the 0.01 level

The results from the above table testing the hypothesis that there is a significant relationship between Assessment practices and higher order thinking skills show with the Pearson moment correlation that, the hypothesis has been tested valid with r= to .513 and the degree of freedom is 14. The read r value is .497. Since the r calculated is larger than the r read, therefore, the relationship is there with a high degree of correlation. In conclusion, there is a significant relationship between Assessment practices and higher order thinking skills.

4.3 CONCLUSION

In this chapter we presented the results obtained on teaching practices and higher order thinking skills among secondary school students. All hypotheses were accepted showing that teaching practices and HOTS have a significant relationship.

The next chapter presents an interpretation of results and discussion

CHAPTER FIVE
DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.0 INTRODUCTION

This chapter contains the summary of the study and findings, conclusions, recommendations and suggestions for further research.

5.1 DISCUSSION OF FINDINGS

The purpose of this study was to look at the relationship that exists between teaching practices and H.O.T.S among secondary school students.
The summary of the findings are here presented with respect to the three research hypothesis.

5.1.1 Hypothesis 1: Teaching methods and higher order thinking skills

The results depict a statistical significant relationship between teaching methods and HOTS show with the Pearson moment correlation that, the hypothesis has been tested valid with r= to .539 and the degree of freedom is 17. The read r value is .455.Since the r calculated is larger than the r read; therefore, the relationship is there with a high degree of correlation. In conclusion, there is a significant relationship between teaching methods and higher order thinking skills.

The findings go to confirm the view of Puchta (2012) who quotes Robert Fisher, stresses, "… thinking is not a natural function… needs to be developed". Indeed, thinking need practice and could be developed, but not automatically (Rjendran, 2010); this shows that thinking skills are indeed teachable. Despite the belief that to an extent the ability to think is something we are born with and hence the limited intelligence capacity of each individual, we do not and could not exactly know the limit of that thinking capacity; that is why thinking can and should be developed so that each student can achieve their highest thinking potentials and this can only be done with the use of appropriate teaching methods that can lead to the development of these skills (Fisher, 1999). Fisher further illustrate that "students who come to believe that with effort you can always do better at thinking and learning will tend to do better at school than those who think their intelligence is fixed" (p.53). This therefore means that, students need the effort of the teacher to teach them these skills through various teaching methods.

Davis (1997) on the other hand says that, teaching methods must be selected and designed in a way that will encourage HOTS in the students. It is a known fact that human advancement comes through reasoning. This reasoning and original thought enhances creativity. This implies that not all teaching methods are suitable for the development of HOTS. That is why Brunner (1961) and Vygostsky (1978) in their theories suggested that teachers should make use of the discovery teaching methods in so students can discover learning for themselves because information learned by one cannot easily be forgotten. This instils in them a sense of creativity thereby improving their thinking skills.

The relationship between teaching methods and higher order thinking skills was equally in line with Pasteur's observation that "chance favors only the prepared mind" because "only a trained mind can make connections between unrelated events, recognize meaning in a serendipitous event," and produce a solution that is both novel and suitable (cited in Crowl et al., 1997). Thus in relation to this, the development of HOTS cannot do without the use of teaching methods because for a mind to develop it must be train and through this training students can actually build concepts and be able to solve problems which is one of the characteristics of HOTS.

According to kauchak $ Eggen, 1998) the best teaching methods that enhance HOTS involve cooperative learning and class discussion teaching methods. This is because to him, Cooperative learning is effective for developing cognitive, affective, and interpersonal skills through individual accountability. It involves more students and teamwork than peer tutoring and capitalizes on student diversity by placing students on learning teams and rewarding the group's planning and inquiry performance. Cooperative learning increases motivation, time on task, and student involvement and improves student self-esteem. While Student discussions stimulate thinking, challenge attitudes and beliefs, and develop interpersonal skills. When organized and managed well, discussions allow students to develop critical thinking abilities and investigate questions that don't have simple answers.

5.1.2 Hypothesis 2: Teaching Learning Materials and Higher Order Thinking Skills

The results of this study indicate that there is a significant relationship between teaching learning materials and higher order thinking skills show with the Pearson moment correlation that, the hypothesis has been tested negative with r= to .321 and the degree of freedom is 16. The read r value is .468. Since the r read is larger than the r Calculated,

therefore, there is no relationship between the two variables. In conclusion, there is no significant relationship between teaching learning materials and higher order thinking skills.

This result affirms the view of Mzeka (1989) that the role of teaching learning materials is to make learning real, practical and fun through seeing, hearing, discovering and doing. Seeing what things look like is more interesting than only reading about them. Students acquire thinking skills when they discover information by themselves through those teaching materials when presented to them by the teacher during a lesson. Mzeka further affirms that, the more a teacher uses teaching materials the better the students learn and acquire thinking skills.

According to Tchombe (2004), the value of teaching materials needs no emphasis because it is a must used materials by teachers. She further says the use of teaching learning materials like audio-visual materials, posters and wall charts makes learning alive and interesting. This is done by putting up posters and charts that are large and clear, attractive, self explanatory and easily seen from any point in the class. According to Tchombe (2004), teachers writing on the blackboard can portray a negative view of the teacher's personality. They can be indicating insecurity, lack of confidence in teacher's ability and competence. Thus teachers should always make use of teaching materials than merely writing o the board. This will instill in the learners of a sense of creativity and the ability to think critically.

Fondham (1992) on his part observed that, teaching learning materials are key ingredients for learning. They organized the presentation of information, provide students opportunities to use what they have learned and in case of test and quizzes, help teachers assessing students learning. According to him, learning materials that are known to help student's achievement and increases their ability to think critically are textbooks and teachers guide. Textbooks should contain questions that enable students to think critically.

Watchtower (2001) confirms that, teaching learning materials regardless of what kind, all have some functions in students learning and the acquisition of thinking skills. These materials are important because they significantly increase student achievement by supporting student learning. For example a worksheet with important opportunity to practice a skill gained in class. This process aids in the learning process by allowing the student to explore the knowledge independently as well as providing repetition. Watchtower (2001) quotes "visual aid often makes clearer or a more lasting impression on the mind than does the spoken word". It is because doing so can make teaching more effective. That is to succeed; a

competent teacher must use pictures, maps, chart or other objects to make important points of instruction more vivid.

Moore (2001) also affirms that teaching learning materials such as pictures, drawing, drawing and charts can be use to stimulate creative expression, such as writing stories or poetry; to help sharpen interpretation skills, such as economic predictions from charts, to show motion, such as drawing showing how to perform a motor skill; or to develop decoding skills, as in the interpretation of intent from a cartoon. All these in a bit to increase Higher order thinking skills.

Tambo (2012) confirms this result by saying that, teaching learning materials such as technology integrated lessons can help students develop higher order thinking skills. This because, when teachers employ technology in their lessons, it helps students analyze information , make evaluations and create their own work, all beneficial skills necessary in their future endeavors. Simulation which is a computer program to imitate a real life experience in order to provide students with opportunities to learn specific skills, improve decision-making skills or problem solving skills. Simulations can be made for teaching how to drive a car. This is highly recommended for the teaching of HOTS.

5.1.3 Hypothesis 3: Assessment practices and higher order thinking skills

The results testing the hypothesis that there is a significant relationship between Assessment practices and higher order thinking skills show with the Pearson moment correlation that, the hypothesis has been tested valid with r= to .513 and the degree of freedom is 14. The read r value is .497. Since the r calculated is larger than the r read, therefore, the relationship is there with a high degree of correlation. In conclusion, there is a significant relationship between Assessment practices and higher order thinking skills.

This result confirms the view of Bloom (1956) whose aim was to promote higher order thinking skills in education such as analyzing and evaluating through assessment activities, rather than just assessing students factual knowledge (rote learning). To Bloom, for HOTS to be assessed, teachers should make use of the last three stages of the cognitive domain in the taxonomy. That is, analysis, synthesis and evaluation. This is because questions asked at these stages require students to analyze facts, differentiate, experiment, create, integrate, judge, compare, criticize etc. teachers who uses such objectives to assess students learning develop in them the skills of decision making and problem solving which are the characteristics of higher order thinking skills.

According to Herrera, Murry and Cbral (2007), students are now being asked to use their "cognitive development, academic knowledge, and language skills to read, comprehend, synthesize, analyze, compare, contrast, relate, articulate, write, evaluate and more" (p.23). This encouragement builds the foundation for alternative forms (formative) of assessment to be used in the classroom so that the instructor can "measure incremental gains".

Thomas, A, and Thorne, G. (2009) confirms that, learning requires that the student engage in problem-solving to actively build mental models. Knowledge is attain not just by receiving information, but also by interpreting the information and relating it to the student's ability to organize, structure, and use information in context to solve complex problems. Assessment thus is deliberately to improve and educate student performance, not merely to audit as most school tests currently do.

5.2. RECOMMENDATIONS

As a consequence of the findings of this study, the following recommendations are proposed to the respective stake-holders in the development of higher order thinking skills (HOTS); students, parents, Curriculum developers, government and teacher education.

To Students;

- ✓ To students, it is recommended that students become life-long learners, capable of analyzing new situations, relating new situations to what they already know, and thinking critically and creatively to solve problems, improve processes, and understand their world. Students who know how to analyze and criticized ideas are able to make connections across disciplines, see knowledge as useful and applicable to daily life and understand content on a deeper, more lasting level.

To Teachers:

- ✓ It is recommended that, to implement a problem-solving approach, teachers need to improve their interpersonal skills and group dynamics; they need to be able to adapt instructional strategies, resources, and activities to promote students' development of basic skills, thinking skills, and personal qualities.
- ✓ Teachers should model higher order thinking in their instruction and provide concrete examples for illustrating abstract concepts that students will find salient.
- ✓ Teachers in different secondary schools should interact and exchange ideas through seminars on ways and means of improving the use of teaching methods, teaching learning materials and assessment practices that could lead to the development of

thinking skills and their own critical thinking skills in order to be able to disseminate it to their students.

To curriculum developers;

- ✓ That the measurement of students' thinking should be accompanied by a curriculum that includes thinking skills instructions. They should collaborate with cognitive psychologists and testing organizations to develop assessment of HOTS.
- ✓ If teachers are to be successful in encouraging the development of higher order thinking skills, explicit instruction in critical thinking needs to be included in the curriculum, whether that instruction occurs as a stand-alone course, is infused into subject-matter content, or both. Cooperative or collaborative learning methods hold promise as a way of stimulating cognitive development, along with constructivist approaches that place students at the center of the learning process.

To the government; That government should encourage training programs that enhance teacher's knowledge in the teaching of higher order thinking skills. Equally, the government should create special teacher training colleges to train teachers specifically for the development of HOTS in the teaching learning process.

- ✓ Lastly, the government should intensify and monitor quality assurance services in schools for the development of HOTS in the students. This will help in discovering how best these learners receive education, methods teachers are using and other challenges that are encountered during the teaching/learning process so that necessary steps can be taken.

5.3 SUGGESTION FOR FURTHER RESEARCH

Learning is a continuous process and it is for this reason that the researcher made suggestion for further findings.

- ✓ In regards to this study, further can be carried out on the training and professional development that teachers received in order to implement HOTS pedagogy.
- ✓ Further research should also be carried out on offering an insight into how teachers should look at the educational objectives of Bloom's Taxonomy and how teachers should assess learning base on the stages of the taxonomy for learners to acquire HOTS.
- ✓ As a result of the constrain in sample composition (that is only secondary school students in Yaounde VI), it is therefore suggested that further investigation be conducted in this area using a larger sample.

GENERAL CONCLUSION

Once again, all articles reviewed point to the importance of teaching HOTS effectively as a matter of fulfilling a national aspiration in education. And this noble responsibility descends upon the shoulders of none other than our fellow teachers. Teaches have to realize that the effectiveness of teaching HOTS will materialize only when the traditional view of transformation becomes secondary to a more constructivist view which affords students active learning that harnesses meaning-making in the learning process. To wrap up, effective teaching gives rise to effective learning and student's learning can come in all forms, one of them being learning to think at the higher levels. This naturally makes effective teaching of HOT imperative in issuing student's effective learning as a whole. The emphasis attributed to student's development of HOTS is titanic, so much so that Dewey posits (1916), "all which the school can or need do for students, so far as their minds are concerned is to develop their ability to think " (as cited in Fisher, 1999, p.59). Bearing such ambition in mind, the challenges are immense. Many have been trapped in the "why-try-because- nothing positive-will-happen-anyway" (p.275) dark hole and some may go to the extent of belittling other teachers' budding efforts in trying out new approaches to teach HOTS (Sparapani, 1998). As this review essay has deliberated, with the challenges identified and understood, with well-planned strategization and self- development, and with unwavering belief and perseverance toward the marked targets, we will sooner or later hit the bull's eye.

REFERENCES

Arter, J.A. (1991).*Performance assessment: What's out there and how useful is it really*? (ERIC Document Reproduction Service No. ED 333 051)

Anderson, L.W., $ Krathwohl, D.R. (Eds.) (2001).*A taxonomy for learning, and assessing: A revision of Bloom's Taxonomy of educational objective*. New York: Longman.

Amin, M.E. (2005).*Social Science Research: Conception, Methodology and Analysis*. Makere University: Kampala Uganda.

Ausubel, D.P. (1968). *Educational psychology: A cognitive view*. New York: Holt, Rinehart & Winston.

Bloom B. S. (1956). *Taxonomy of Educational Objectives, Handbook I*: The Cognitive Domain. New York: David McKay Co Inc.

Brookhart, S. (2010), How to Assess Higher Order Thinking Skills in Your Classroom, ASCD,

Brophy, J.,$ Good, T.(1986). Teacher-effects results. In: Wittrock, M.C., ed. *Handbook of research on teaching*. New York: Macmillan

Cambourne, B.L. (2002). *Literature-based\constructivist approaches to reading and language arts instruction*. In A.E. Farstrup and S.J. Samuels (Eds.), what research has to do about reading instruction (3rd edition). Newark, DE: International Reading Association.

chinedu, c.c,. Libunao, W.H., Kamen, Y.B., $ Saud, M. (2014).*Implementation Higher Order Thinking Skills in Teaching and Learning of Design and Technology Education.*

Crowl, T. K., Kamnsky, S., $ Podel, D. M. (1997). Educational psychology: *Windows on teaching. Madison, WI*: Brown and Benchmark

Facione, P. (2011). *Think critically*. Boston, MA: Prentice Hall.

Gough, D. (1991). Thinking about Alexandria, VA: *National Association of Elementary School Principals*, (ED 327 980).

Hampton, M. (1996).*The relationship of learning disabilities to the studies of self -efficacy, efficacy expectations, and academic achievement in high school students*.

Herrera, S. G., Murry, K. G., $ Cabral, R. M. (2007). *Assessment accommodations for classroom teachers of culturally and linguistically diverse students*. Boston, MA: Pearson Education Inc.

J. Looney (Ed.), Formative assessment: *Improving learning in secondary classrooms, Organization for Economic Cooperation and Development*, Paris, France (2005), pp. 241–264.

J.H. McMillan (Ed.), Formative classroom assessment: *Theory into practice*, Teachers College Press, New York, NY (2007), pp. 43–62

Kauchak, D., &Eggen, P. (1998), Learning and Teaching: *Research-based Methods* (3rd ed.), Boston: Allyn and Bacon

Kerka, S. (1992).Higher order thinking skills in vocational education: ERIC Clearinghouse.

King, F., Goodson, L., & Rohani, F. (2011). Higher order thinking skills: Definitions, strategies, assessment. Center for Advancement of Learning and Assessment. Tallahassee, FL: Florida State University.

King, FJ, Rohani, F., & Goodson, L. (1997).*Statewide assessment of listening and verbal communication skills, information literacy skills, and problem-solving skills*. Tallahassee: Florida State University

LAW No 98 /004 of 14 April 1998 to lay Down Guidelines for Education in Cameroon, Cameroon Tribune No. 6580 Friday 17th April 1998.

Lankes, A. M. (1995). Electronic portfolios: *A new idea in assessment.* (ERIC Document Reproduction Service No.ED 390 377).

Linn, R. L., & Miller, M. D. (2005). *Measurement and assessment in teaching* (9th Ed) Upper Saddle River, NJ: Prentice Hall.

McTighe, J., &Schollenberger, J. (1985). *Why teach thinking: a statement of rationale*. In A. L. Costa (Ed.), Developing Minds: *A Resource for teaching thinking* (pp.3- 6). Alexandria, VA: ASCD

McRobbie, J. (1992). *Using portfolios to assess student performance*. San Francisco: Far West Laboratory for Educational Research and Development. (ERIC Document Reproduction Service No.ED 351 378).

Mzeka, N. P. (1989). "*Legislation and School Administration*". The Ngem publishing Enterprise.

Paul, R., &Nosich, R. (1992).*A model for the national assessment of higher order thinking*.(ERIC Document Reproduction Service No.ED 353 296).

Penn, A., and Williams, D. *Integrating Academic and Vocational Education: A Model for Secondary Schools*. Alexandria, VA: Association for Supervision and Curriculum Development, 1996. (ED 407 731).

Presseisen, B. Z. (1986).*Critical Thinking and Thinking Skills*: State of the Art Definitions and Practice in Public Schools. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA. (ED 268 536).

piaget, J. (1958). *The Growth of Logical Thinking from Childhood to Adolescence,* trans. Pearsons and Stanley Milgram. New York: Basic Books.

Rajendran, N., & Idris, P. U. P. S. (2008). *Teaching & Acquiring Higher-Order Thinking Skills*: *Theory &Practice*: Penerbit University Pendidikan Sultan Idris.

Simpson, D. E., & Cohen, E. B. (1985). *Problem solving questions for multiple choicetests:* A method for analyzing the cognitive demands of items. (ERIC Document Reproduction Service No.ED 259 033).

sugrue, B. (1995). *A theory-based framework for assessing domain-specific problem solving ability*.Educational Measurement: Issues and Practices, 14(3), 29−36.University of Cambridge.

Tambo, L. I. (2003). *Principles and Methods of Teaching*, Limbe: ANUCAM Publisher.

Tambo, L. I. (2012). *Principles and Methods of Teaching*, Limbe: ANUCAM Publisher.

Tchombe, T. M. (1997)."Classroom Events: *Methods, Techniques and Psychological correlates".* (First Editions) Yaounde: Vita Press.

Thomas, A., and Thorne, G. (2009), *How to Increase Higher Order Thinking*, Metarie, LA: Center for Development and Learning, University of Cambridge, UK.

Vygotsky, L.S. (1978). Mind in society: *The development of higher psychological processes*.Cambridge, MA: Harvard University Press.

Vijayaratnam, P. (2012). *Developing HOTS and team commitment via group problem solving*: A bridge to the real world.

William, D. (2007). *Keeping learning on track: Formative assessment and the regulation of learning*. In F. K. Lester, Jr. (Ed), second hand book of mathematics teaching and learning (pp. 1o53-1088). Greenwich, CT: information Age publishing.

REVIEW

Beyth-Marom, R., Novik, R., and Sloan, M. (1987). "*Enhancing Children's Thinking Skills*:" An Instructional Model for Decision-Making Under Certainty." Instructional science 16/3: 215-231.

Beyth-Marom, R., Novik, R., and Sloan, M. (1987). *"Enhancing Children's Thinking Skills: An Instructional Model for Decision-Making Under Certainty*." instructional science 16/3: 215-231.

Bowey, J.A. (2000). *Recent developments in language acquisition and reading research*: *The phonological basis of children's reading difficulties*. Australian Educational and Developmental Psychologist, 17(1), 5-31.

Brown, A.L. (1994), "*The advancement of learning",* Educational Researcher, vol. 23, no. 8, pp. 4-2.

Bruner, J.S. (1961). *The act of discovery*. Harvard Educational Review, 31, 21-32.

Bruner, J.S. (1966). *Toward a theory of instruction*. London: Belnap Press.

Crunkilton, J. R. (November 1992) "*SCANS Report and Problem Solving: A Natural Alliance."* Agricultural Education Magazine 65, no. 5: 9.

David, B. (2008). *Assessing capability in design and technology*: the case for a minimally invasive approach. *Design and Technology Education*: An International Journal, 12(2).

Dewey, J. (1910). How we think. Boston, MA: Heath.

Engelmann, S. (1999). *The benefits of Direct Instruction*: *Affirmative action for at-risk students. Educational Leadership*, 57(1), 77-79.

Ennis, R. H. (1993). Critical thinking assessment. Theory into Practice, 32(3), 179–186. Enright, B. E., & Beattie, S. A. (1992). *Assessing critical thinking in mathematics. Diagnostique* 17(2), 137−144.

Flowers, J. (November 1992). "Problem Solving Instruction: *Making Students Gladiators Instead of Spectators."* Agricultural Education Magazine 65, no. 5: 4.

Gatto, D. (1993). *The use of interactive computer simulations in training*. Australian Journal Gearhart, M., Herman, J. L., Baker, E. L., & Whittaker, A. K. (1993).Whose work is it? A question for the validity of large-scale portfolio assessment(CSE Tech. Rep. No. 363). Los Angeles: University of California, National Center for Research on Evaluation, Standards, and Student Testing.

Gearhart, M., Herman, J. L., Baker, E. L., & Whittaker, A. K. (1993).Whose work is it? *A question for the validity of large-scale portfolio assessment* (CSE Tech. Rep. No. 363). Los Angeles: University of California, National Center for Research on Evaluation, Standards, and Student Testing.

Gokhale (1995). *Collaborative learning enhances critical thinking*. Journal of Technology Education.7 (I).

Ivie, S.D. (1998). Ausubel's learning theory: *An approach to teach HOTS*. The high School Journal, 35-42.

Linn, R. L., Baker, E.L., & Dunbar, S.B. (1991). Complex Performance-based assessment: expectations and validation criteria. *Educational Researcher*, 20(8), pp. 15-21.

Marso, R., Pigge, F. (1992), *A Summary of Published Research: Classroom Teachers' Knowledge and Skills Related to the Development and Use of Teacher-Made Tests, paper presented at the annual conference of the Midwestern Educational Research Association*, Chicago, IL

Mohamad, B. B., & Othman, W. B. (2010).*The Level of Higher Order Thinking Skills for Lower Secondary Students in Malaysia.*

Norris, S. P. "*Synthesis of Research on Critical Thinking."* Educational Leadership 42/8 (1985): 40-45.

Northwest Regional Educational Laboratory. (2003). *the catalog of school reform models*. Availableat:http://www.nwrel.org/scpd/catalog/index.shtml

Ristow, R. S. (1988). *"The Teaching of Thinking Skills: Does It Improve Creativity?"* Gifted Child Today 11/2: 44-46.

Robinson, K., Minkin. L., Bolton, E., French, D., Fryer, L., Greenfield, S., $ Green, L. (1999). All our futures: Creativity Culture and Education, Report for the Secretary of States.

Rosenshine, B.V. (1986). *Synthesis of research on explicit teaching*. Educational Leadership, 43(7), 60-69.

Rowan, B. et al. (2001).*Measuring teachers' pedagogical content knowledge in surveys*: An exploratory study. Consortium for Policy Research in Education.

Shepard, L. A. (1989). *Why we need better assessments*. *Educational Leadership*, 46(7), pp. 4-9.

Shulman, L.S. (1987), Knowledge and teaching: *Foundations of the new reform*. Harvard Educational Review, 57(1), 1-22.

Sugrue, B. (1994). *Specifications for the Design of Problem Solving Assessments in Science* (CSE Technical Report 387). Los Angeles: CRESST/University of California.

Wikipedia. (2010). The Free Encyclopedia Jump to :Navigation.

Yee, M. H., Jailani, M. Y., Razali, H., Widad, O., & Tee, T. K. (2010).*The Perception of The Level of Higher Order Thinking Skills among Technical Education Students.* Paper presented at the International Conference on Social Science and Humanity journal. Faculty of Technical Education, University Tun Hussein Onn Malaysia.

Yee, M. H., Widad, O., Jailani, M. Y., Tee, T. K., Razali, H., & Mimi Mohaffyza, M. (2011).*The level of marzano higher order thinking skills among technical education students*. *International Journal of SocialScience and Humanity*, 1(2), 121.

Zohar, A., &Dori, Y. J. (2003). *Higher order thinking skills and low-achieving students*: Are they mutually exclusive? *The Journal of the Learning Sciences*, 12(2), 145-181.

APPENDICES

APPENDIX I

ATTESSTATION DE MEMOIRE

REPUPLIQUE DU CAMEROUN
Paix-travail-patrie
*****
UNIVERSITE DE YAOUNDE I
*****

REPUBLIQUE OF CAMEROUN
Peace-Work-Fatherland
*****
THE UNIVERSITY OF YAOUNDE I
*****

Centre de Recherche et de Formation Doctorale en Sciences Humaines, Sociales et Educative (CRFD/SHSE)

BP : 337 Yaoundé
Email : uyi@uycdc.uninet.cm

Yaoundé, le 14/02/2017

ATTESTATION DU DIRECTEUR DE MEMOIRE

Je soussigné TANYI MAUREEN. Professeur à l'Université de Yaoundé 1, Département de Curricula et Evaluation atteste que M. LYDIA MWETI AKWO

inscrit en Master 2, a été accepté dans le Laboratoire de recherche et de formation Doctorale de l'Université de Yaoundé 1.

L'intéressé a déjà amorcé ses travaux de recherche dans le cadre de son mémoire sur le sujet

TEACHING PRACTICES AND HIGHER ORDER THINKING SKILLS AMONG SECONDARY SCHOOL STUDENTS IN THE YAOUNDE VI MUNICIPALITY

En foi de quoi la présente attestation lui est délivrée pour servir et valoir ce que de droit.

Le Superviseur de recherche

Le chef de Département

APENDIX II

REPUBLIC OF CAMEROON
****
PEACE WORK FATHERLAND
****
UNIVERSITY OF YAOUNDE I
****
FACULTY OF EDUCATION
****
CURRICULUM AND EVALUATION
****

REPUBLIQUE DU CAMEROUN
****
PAIX TRAVAIL PATRIE
****
UNIVERSITE DE YAOUNDE I
****
FACULTE DE SCIENCE
DE L'EDUCATION
****
CURRICULA ET EVALUATION
****

QUESTIONNAIRE FOR STUDENTS

I am a Masters 2 student in the Department of Curriculum and Evaluation, Faculty of Science of Education University of Yaounde I. I am carrying a research on "Teaching Practices and Higher Order Thinking Skills among secondary students in Yaounde VI of the Mfoundi Division, Centre Region of Cameroon". In view of this, I wish to solicit your help in completing this questionnaire. The exercise is purely academic and all information you provide will be strictly confidential.

Instruction: place a bold tick (√) where most appropriate

SECTION A: DEMOGRAPHIC INFORMATION

Gender: Male ☐ Female: ☐ Age Range: 16-19 ☐ 20-25 ☐

School: Public ☐ Denominational: ☐ Lay private: ☐

SD = Strongly Disagree, D = Disagree, NAND = Neither Agree Nor Disagree,
A = Agree, SA= Strongly Agree

SECTION B

S\N	Teaching method	SD	D	NAND	A	SA
Q1	We study in groups in most lessons.					
Q2	Our teachers often give us group assignments to do and present in class.					
Q3	During lessons, our teachers give room for discussion to get our own opinions.					

Q4	After every teaching episode, our teachers give us a task that requires us to discover something new.					
Q5	In class, we are assigned to act different roles such as doctors, bankers, journalists etc when given guide lines.					
Q6	Our teachers hardly give us problems that require us to discover knowledge by ourselves					
Q7	Our teachers often teach through guiding questions.					

SECTION C

S\N	**Teaching Learning material**	**SD**	**D**	**NAND**	**A**	**SA**
Q8	When teaching, our teachers make use of teaching learning materials					
Q9	Our school does not have a library					
Q10	Most at times our teachers projects lessons using computer or videotapes for us to observe and comment.					
Q11	Our school have a laboratory					
Q13	Our laboratory is not well equipped.					
Q14	Apart from the classroom, we do go for field studies.					
Q14	Audiovisual materials like motion pictures, televisions, videotapes are usually used in our classroom when teaching.					

SECTION D

S\N	**Assessment Activities**	**SD**	**D**	**NAND**	**A**	**SA**
Q15	We are always given questions that require us to look for solutions to problems.					
Q16	Our teachers mostly give us questions that require us to explain and not to merely state or define.					
Q17	Our teachers usually give us questions that require us to state why something is good or bad.					
Q18	Our teachers do not set questions that require us to justify or to comment.					
Q19	Our teachers do not set questions that require us to make a					

	critique of something.					
Q20	Our teachers usually set questions that require us to construct or design.					
Q21	We are always provided with questions that require us to distinguish and discriminate.					
Q22	Most at times we are presented with questions that require us to present facts in a step by step manner.					

SECTION E

S\N	**Higher Order Thinking Skills**	**SD**	**D**	**NAND**	**A**	**SA**
Q23	I always discover knowledge by myself.					
Q24	In class, I'm given activities that require me to think in abstract terms.					
Q25	I can look for solutions to problems.					
Q26	I'm always involved in brainstorming sessions.					
Q27	Through guiding questions, I'm able to formulate hypotheses to later answer the questions.					
Q28	In class I'm always involve in an activity that require me to be creative.					
Q39	I often think critically to come out with possible answers to a problem.					
Q30	I can make my own analysis to a problem.					
Q31	I can give my own opinion to a problem.					
Q32	I'm often involved in activities that permit me to look at the relationship that exist between concepts.					