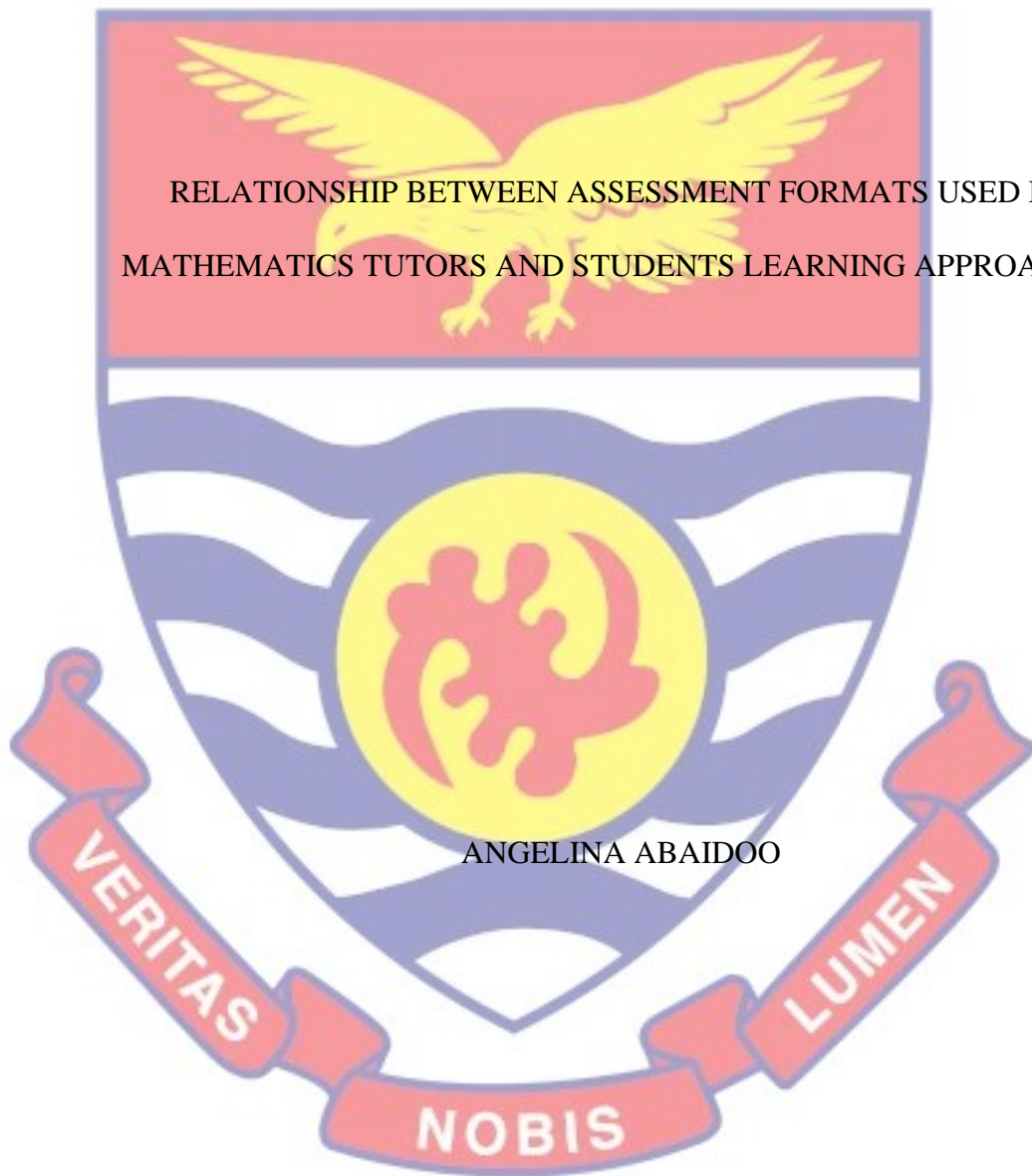UNIVERSITY OF CAPE COAST

RELATIONSHIP BETWEEN ASSESSMENT FORMATS USED BY

MATHEMATICS TUTORS AND STUDENTS LEARNING APPROACHES

ANGELINA ABAIDOO

2022

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Angelina Abaidoo
University of Cape Coast

UNIVERSITY OF CAPE COAST

RELATIONSHIP BETWEEN ASSESSMENT FORMATS USED BY

MATHEMATICS TUTORS AND STUDENTS LEARNING

APPROACHES.

BY

ANGELINA ABAIDOO

Thesis submitted to the Department of Education and Psychology of the

Faculty of Educational Foundations, College of Education Studies, University

of Cape Coast, in partial fulfillment of the requirements for the award of

Master of Philosophy degree in Measurement and Evaluation

MARCH 2022

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature………………………….. Date……………...............

Name: ………………………………………………………………………..

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Supervisor's Signature…………………….. Date……………..……....

Name: ………………………………………………………………………

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ABSTRACT

The study examined the relationship between the assessment formats used by Colleges of Education Mathematics tutors and students learning approaches among Colleges of Education students in the Western-North Region of Ghana. The study employed a quantitative methodology embedded with a correlation research design. The purposive sampling techniques were used to sample 265 student-teachers in all the three Colleges of Education. The questionnaire collected data on the two research questions and three hypotheses to guide the study. Frequency and percentage, mean and standard deviation were utilized to answer research questions, Chi-square, Independent sample t-test and ANOVA were employed to test the hypotheses. The results showed that among the five assessment formats, four were predominantly used by mathematics tutors in assessing their students. These include; multiple-choice, essay, short-answers and true/false and with this multiple-choice item formats is mostly used among the four. However matching type is not used to assesses their students. The student-teachers used all the learning approaches but the most used learning approach is strategic learning approach. Tutors of the Colleges of Education mostly use multiple-choice item and short- answers whiles the student-teachers use strategic approach when being assessed with those formats. Female students tend to adopt the surface learning approach than their male counterparts. The age of students did not influence the learning approaches adopted by student-teachers. The study concluded that mathematics tutors in the three selected Colleges often used multiple-choice test format while student-teachers were more interested in the use of the strategic learning approach due to its multi-purpose nature.

KEYWORDS

Assessment Format

Deep Learning Approach

Surface Learning Approach

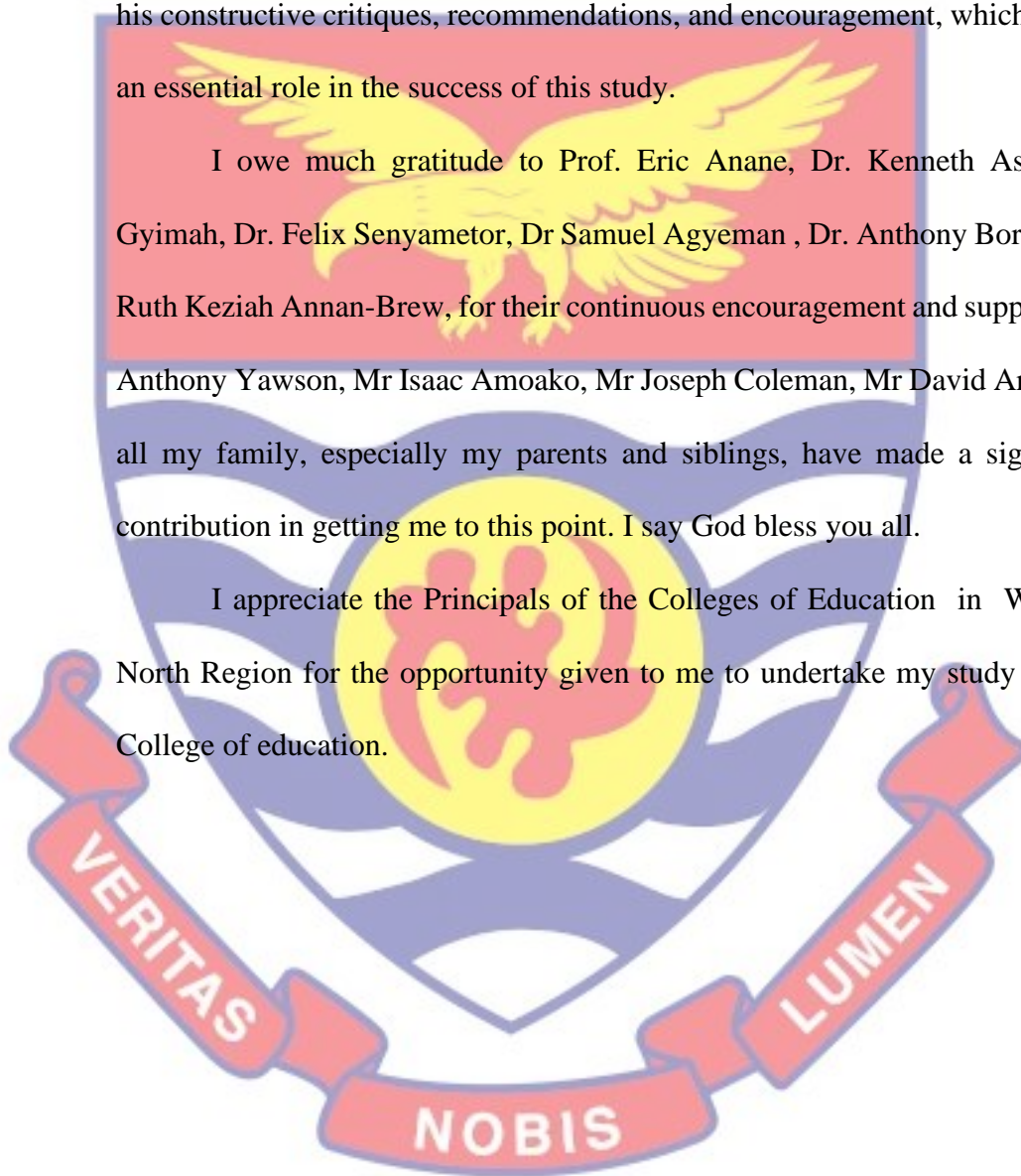Strategic Learning Approach

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I owe much gratitude to Prof. Eric Anane, Dr. Kenneth Asamoah-Gyimah, Dr. Felix Senyametor, Dr Samuel Agyeman , Dr. Anthony Bordor, Dr. Ruth Keziah Annan-Brew, for their continuous encouragement and support. Mr. Anthony Yawson, Mr Isaac Amoako, Mr Joseph Coleman, Mr David Arhin and all my family, especially my parents and siblings, have made a significant contribution in getting me to this point. I say God bless you all.

I appreciate the Principals of the Colleges of Education in Western-North Region for the opportunity given to me to undertake my study in their College of education.

DEDICATION

To my parent and husband.

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CHAPTER ONE

INTRODUCTION

Mathematics plays a crucial role in the establishment of a strong intellectual character. Therefore, it influences the private, civil, and social life of an individual. Nevertheless, both in the past and today, a lot of students are still finding it difficult to understand the concepts being taught in mathematics. It has therefore become a barrier for them in achieving good results in Mathematics.

A major objective of teaching mathematics is to promote meaningful learning, according to the National Council of Teachers of Mathematics (2014). In promoting this meaningful learning, there is the need to assess students during the teaching and learning process to ascertain the level of knowledge in the subject and also to shape students' way of thinking towards their learning.

According to Amedahe and Asamoah-Gyimah (2019), in assessing students, teachers uses different assessment formats which includes essay and objective type-test. Students' adopt different learning approaches whenever these formats are used to assess them.

Background to the Study

Students' achievement is a key component in persuading them to use deep learning approaches (Zhao, 2016). There is a growing need to make more efficient use of test results to improve education; yet in the literature, the skills, and abilities of professionals in analysing and using test results are little known to strengthen classroom instruction and student learning (Benzehaf, 2017). To

build an efficient learning environment, educational institutions such as Colleges of Education should address the differences among students performance. When confronted with a learning situation, individual differences in a student's intentions and the strategies by which these intentions are realized which is known as "approaches to learning."has a relationship with the type of assessment formats. Learning approaches are based on Marton and Saljo's (1976b) original research, which used qualitative analysis of student learning to identify individual differences in learning approaches. "The student's intentions before studying determined the learning approach and the learning outcome in terms of understanding they discovered" (Diseth, 2001, p. 41). Individual students are unique and have a way of learning. Some students read to understand the contents of what they read by paying detailed attention to the contents, whilst others are concerned with memorizing facts and principles without necessarily understanding the material being read. These discrepancies have resulted in different approaches by which students learn; these approaches include deep learning, surface learning, and strategic learning (Biggs, 2001).

In teaching mathematics its requires students and teachers to update themselves since it involve ever-evolving procedure. The challenge of imparting a large amount of knowledge within a limited time in a way it is retained, remembered, and effectively interpreted by a student is considerable (Ernest, 2012). This has resulted in crucial changes in the field of mathematics education, with a shift from didactic teacher-centered and subject-based teaching to use of interactive, problem-based, student-centered learning. It has been argued that knowledge of learning approaches of students can tailor pedagogy and assessment format (Lubawy et al, 2003). Similarly, students who

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identify their learning approach are being empowered to use it and this result in highly education satisfaction.

There has been suggestions in education theory that, students' success in mathematics has to do with the relationship between the test formats and learning approach they will adopt in studying. Student performance has been shown to correlate pooly at the universities (Steinmayr et al, 2014), possibly because mathematics involve concepts, theories and formulas which required more of the strategic and deep learning approach has compared to simple factual memorization required for some activities. Not restanding it has been a challenge for some students to adopt deep learning approach but these students feel comfortable in adopting surface learning approach and this hinders their performance. Students learn by relying on understanding, by recalling and reproducing recalled information, or by a combination of these methods to varying degrees (Marton, & Saljo, 976b). Leite et al (2010) identify three different learning approach which students adopt in studying, these were; surface approach, deep approach, and strategic approach. Surface Learning approach is whereby student memorized specific facts or pieces of knowledge to demonstrate sufficient comprehension to execute a recognized task,

deep learning approach is a learning that give rise to a thorough grasp of the content being studied and applying principles to real-life situations. Strategic learning approach refers to an approach whereby learners organise their learning to achieve high or positive outcomes and it uses both surface and deep learning.The surface learning is mostly result in students failing in university final examinations and deep and strategic approach mostly result in students' success (Leite et al, 2010). In constructing test item, the assessment formats to

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be used in measuring students achievement is the first thing that assessors consider (Flucher & Davidson, 2007).

Items differ in their degree of the freedom given to the students to express themselves and the skills and knowledge they acquired (Allam, 2007), so, examiners must choose the best items to assess students' achievement. Allam (2007), cited these rules for selecting the item formats: assessment format must march the learning outcomes, age of students, item difficulty, learning objectives, content, and teachers' experience. Phipps and Brackbill (2009) indicated that test items should correspond to the content and the learning objectives and suitability match the instructional methods.

The test developer's task was characterized as requiring two major types of decisions: what to measure and how to measure, according to that they must concentrate upon the following when developing the pool of items: selecting an appropriate item format and verifying the proposed format which is feasible for the intended examinees. Sex and age of students has a significant contribution in education. Studies conducted by Scoullar (1998) reveal that female students adopt surface learning approach when assessed with multiple test item format. Again literature review that surface learning approach is being adopted by young ones while deep learning approach is being adopted by students who are old hence,the assessment format used by tutors will inform the approach student will adopt in studying (Baeten, Kyndt, Struyven & Dochy, 2010).

Statement of the Problem

Mathematics is one single subject whose indispensable concepts, skills, generalizations, and applications permeate many fields of study: science, technology, economics, geography, commerce, engineering, medicine,

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business, and management studies, in industry and several other fields of human endeavors (Zhang & Xin,2012; Bueno & Colyvan,2011). It is of this that the government of Ghana has realized the significant role of mathematics to nation building and has made the subject compulsory at the Basic and Secondary levels and Colleges of Education. This was aimed at ensuring the inculcation of mathematics literacy and the associated equipment with logical and abstract thinking needed for living, problem solving and educational furtherance, (Asante, 2010). But there has been poor performance of students regarding mathematics from the basic schools to the Colleges of Education. The result for 2018/2019 end of first semester examination (Algebra 1) for the four-year Bachelor of Education, the report from Chief- Examiner indicate that out of a sample of 9,804 candidates who wrote the paper 4,161 representing 42.44%, sored 50% or more while 167 representing 1.7% of them scored 80% or more. A total of 5476 candidate representing 55.86% scored below 50% which indicate grade E, thus fail. The result for 2018/2019 end of second semester examination (Geometry and Trigonometry) for the same programme, the Chief-Examiner's report shows that a sample of 6,029 candidates who took part in the exams, 4,426 (73.4%) of them scored less than 50 % of the marks with less than one percent representing 54 (0.9%) candidates obtaining at least 80%. However, 365 (6.1%) who scored below 20%. This drop of performance keep on whenever result are release and this has baffles the tutors because during quizzes, performance turns to be better than their result at the end of the semester. The question that brought to light is what assessment format does the mathematics tutors use in assessing these student- teachers and what approach do these students use in studying Mathematics.

However, studies have shown that instructors' assessment format directs students' learning approaches (Gijbels & Dochy, 2006; Thawabieh, 2016) Again, some scholars have argued that the assessment format used by the instructors informal testing has a relationship with the overall test difficulty and how well students will perform (Culligan, 2015; Simbak et al., 2014). The literature suggests that the assessment format relates to how students' study and subsequently perform on the test used (Gijbels & Dochy, 2006; Cullingan, 2015). However, studies by Gijbels and Dochy (2006) and

Cullingan (2015) on the issue of how the assessment format relates to student learning approaches were most conducted outside the shores of Ghana. Relationships were observed between the the learning approaches in Tertiary Education and Perceptions of Collaborative Learning (Mansouri, Soltani, Rahemi, Nasab, Ayatollahi, & Nekooeian, 2006) and Nursing and Midwifery Students' Approaches to Studying and Learning (Mansouri, Soltani, Rahemi, Nasab, Ayatollahi, & Nekooe (Mansouri et al., 2006; Rutherford, Limorenko & Shore, 2016).

This could be because Ghanaian scholars have paid close attention to Colleges of Education Tutors' assessment processes (Anhwere, 2009), instructors' skills for constructing assessment instruments (Quansah, Amoako, & Ankomah, 2019), influence of knowledge test construction among tutors' of College of Education (Asamoah -Gyimah,2022) and students approaches to learning (Mogre & Amalba, 2015; Adusei, 2017).

Unattended to this is the issue of assessment formats used in the Colleges of Education and their relationship with students' learning approaches. Aside lack of information in the literature about the relationship between

assessment format and student learning approaches, most of the Ghanaian research cited in the previous paragraph focused on only one of the two variables. That is, some studies focused on assessment format only whiles other studies focused on learning approaches.

The current study, therefore, investigated the relationship between College Mathematics tutors' assessment formats and students' learning approaches in learning mathematics. This in effect, helps determine the types of assessment methods that the teachers can adopt at the Colleges of Education. In addition to this, it also investigated different learning approaches of College students and the type of assessment approaches that can be adopted to meet the individual learning needs.

Purpose of the Study

This study aimed to look at the relationship between tutors' assessment formats and College of Education students' learning approaches in learning mathematics in the Western-North region of Ghana. The study's specific purposes were to look into:

1. Assessment formats often used by mathematics tutors in Colleges of Education.

2. The learning approaches often used by students of the Colleges of Education in the learning of mathematics.

3. Relationship between assessment formats often used by tutors and the learning approaches of students.

4. Difference in the learning approaches of students based on sex.

5. Difference in learning approaches of students based on the age of the students.

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Research Questions

The study was achieved through the following questions:

1. Which assessment formats are often used by mathematics tutors in Colleges of Education?

2. Which learning approaches are often used by students in the College of Education in the learning of mathematics?

Research Hypotheses

To guide the investigation, the following hypotheses were formulated:

1. H_0:   There is no statistically significant difference between assessment formats used by tutors and learning approaches used by students in the learning of mathematics in C, olleges of Education.

   H_1:   There is a statistically significant difference between the assessment format used by tutors and learning approaches used by students in learning of mathematics in Colleges of Education.

2. H_0:   There is no statistically significant difference between the learning approaches used by male and female students in the learning of mathematics in Colleges of Education.

   H_1:   There is a statistically significant difference between the learning approaches used by male and female students in learning of mathematics.

3. H_0:   There is no statistically significant difference among students learning approaches based on the age of the students.

   H_1:   There is a statistically significant difference among students learning approaches based on the age of the students.

Assumptions

1. Tutors adopt variety of assessment formats in assessing their students.

2. Every student uses one of the learning approaches in learning.

3. The type of assessment format will informed the learning approach students will adopt in learning.

Significance of the Study

The research is significant because it clarifies the link between tutors' assessment formats and students' approaches in learning mathematics. The study would be beneficial to the College of education tutors and teachers within the basic education level in Ghana. The study would equip the Colleges of Education tutors with knowledge of assessment formats to employ to enhance teaching and learning effectively.

Finally, the study would contribute to current information on assessment format and student learning approaches by serving as a source of literature for future researchers.

Delimitations

The study focused on assessment formats for mathematics courses (essay and objective) and students' learning approaches in the Colleges of Education. Only second year student-teachers of the Colleges of Education in the Western-North region were included in the study.

Limitations

A questionnaire was used for the data collection. Therefore, the possibility of respondents providing responses to some of the questions, perhaps, without correct understanding of the questions was high. Hence, the tendency of introducing errors into the findings of the study. Another limitation

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of the study was the tendency of respondents giving socially desirable responses to the questions on the questionnaire, and that therefore, could affect the results of the study as well as the interpretations and uses therein.

Definition of Terms

Assessment Format: This refers to different assessment forms to assess students' performance.

Learning Approaches: This refers to learners' skills and behaviours to engage in learning.

Surface Learning Approach: refers to memorization of specific facts or pieces of knowledge to demonstrate sufficient comprehension to execute a recognized task.

Deep Learning Approach: The types of learning that give rise to a thorough grasp of the content being studied and applying principles to real-life situations.

Strategic Learning Approach: refers to an approach whereby learners organise their learning to achieve high or positive outcomes.

Organisation of the Study

The study was organised under five chapters. Chapter one consists of the background of the study, statement of the problem, the purpose of the study and the research questions and hypotheses. The chapter also include delimitation of the study, limitation of the study, definition of terms as well as the organisation of the study.Chapter two discusses theoretical, conceptual and empirical literatures that have informed the design and execution of the study.

Chapter three describes the methodology that was employed for the study this includes; the research design, population, sampling procedure, research instrument, validity and reliability of the instrument, pre-testing of

instrument for data collection as well as procedure of data analysis. In Chapter four, results and discussion of the findings were presented. Finally, the summary of the study, including the key findings, conclusions and recommendations for policy and practice and suggestions for further research formed the concluding chapter (chapter five) of the report.

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CHAPTER TWO

LITERATURE REVIEW

Introduction

The study aimed to examine the relationship between tutors' assessment formats and students' learning approaches in learning mathematics among Colleges of Education students in Western-North region. As a result, this chapter focused on a literature review reporting on the study is based on the theoretical framework, conceptual framework, and empirical review as follows:

Theoretical Framework

1. Constructive Learning Theory (Beck and Kosnik (2012).

2. Revised Learning Approach by Duff (2004 model)

Conceptual Review

3. The Concept of Assessment and its purposes

4. Validity and Reliability of Achievement Test Results

5.   Teacher-made Test

6. Essay-type test and its advantages and disadvantages

7. Objective type test and its advantages and disadvantages

8. Methods of Scoring students' work

9. The concept of learning

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1. Assessment formats often used by College Mathematics Tutors.

2. The learning approaches are often used by the College of Education students.

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3. Relationship Between Assessment formats and Students' Learning Approaches.

4. Difference in learning approaches of students base on sex.

5. Difference in learning approaches of students base on age of students.

Theoretical Framework

This part of the review concern with relevant theories that place the construct under investigation into its rightful theoretical viewpoint.

Constructive Learning Theory

According to the learning theory by the constructivism, it says, individuals can freely create their own knowledge, with everything shaped by the learner's own experiences (Elliott, Stemler, Grigorenko & Sternberg, 2006). According to Beck and Kosnik (2012), constructivism holds that the interaction between current knowledge and new experiences influences an individual's development of understanding through experience. Human learning is formed, according to constructivism's main principle and humans build new information on top of old knowledge. As a result of new learning opportunities, an individual's past knowledge influences the new or modified knowledge he or she obtains (Phillips, 2005).

He believed that learning is an active rather than a passive process. In the passive approach of education, the student is viewed as an empty vessel that has to be filled with information, whereas constructivism believes that learners can only construct meaning by active engagement with the environment such as experiments or real-world problem solving. Understanding also necessitates the establishment of significant connections between present information, new knowledge and learning processes, which are not absorbed subconsciously.

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Constructivists believe that knowledge exists only in the human mind and is not bound by external reality (Bada & Olusegun, 2015). Students will aim to develop a mental image of the real world based on their discoveries at all times.

The work of the constructivism are as follows; Jean Piaget work on cognitive , Vygotsky work on social and radical (McNulty, 2015). The cognitive constructivism are of the believe that knowledge is something that learners actively construct depending on the current cognition. As a result, their cognitive development shapes their learning environment. Cognitivist teaching methods aim to help students integrate new content into their prior knowledge while also changing their current cognitive framework.

Social constructivism are of the view that learning is a collaborative process in which people's relationships with society and culture generate knowledge. According to Vygotsky (as cited in McNulty,2015), "every function in the child's cultural development originates twice: first on the social level and then on the individual level; initially between humans (inner psychological) and then inside the child" (intrapsychological). Von-Glasersfeld (as cited in Joldersma, 2011) invented the phrase "radical constructivism," which asserts that all knowledge is constructed rather than perceived through the senses. He thought students learn new things by building on what they already know.

According to radical constructivism, the information we get as people teaches us nothing about reality and just assists us in navigating our surroundings. As a consequence, knowledge is generated rather than facts gathered. Human-made reality is constantly updated and interacted with

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ontological reality, despite the fact that it can never produce a "genuine representation" (Ernest, 2012).

Moreover, constructivist learning environments have seven educational goals, as summarised by Honebein (2006) as follows:

1. To provide students with hands-on experience with the knowledge generation process while also enabling them to choose their learning approach.

2. Students should be exposed to a range of ideas.

3. Integrate learning in real-life situations.

4. Promote ownership and participation in the learning process.

5. Learning should be integrate in a social context.

6. Promote the employment of various representational styles in teaching and learning.

7. Make students informed of the process of knowledge production.

According to the constructivism principle, learning is a personal activity for each student. The theory claims that learners would try to make sense of all they observe, and as a result, each learner will construct their idea from that information received. Constructivism is a foundational educational philosophy that has far-reaching consequences for how teachers teach and learn to teach.

Furthermore, if we want to reform education for all children, we must focus on students. Constructivism instils a sense of personal agency in pupils by allowing them to guide their learning and assessment. The emphasis on student-centred learning is now constructivism's most significant contribution. Constructivist ideas, which are becoming more prevalent in classroom and curriculum design in schools, may be used in teaching and learning. Although

the ideas appear to be based on our present knowledge of learning and comprehension, they contradict older approaches.

Constructivist professors frequently ask their students to evaluate how the activity benefits them in better comprehending the material. Students become expert learners in a constructivist classroom by pushing themselves and their gifts to their maximum. Because they have ongoing access to fresh learning resources, students learn more successfully in a well-designed classroom setting. The theory's consequence for this research is that constructivists accept the active role of learners, and indicate that learners can choose their learning approach. Student-teachers can be compared to scientists who carry out experiments regularly, make hypotheses, and actively attempt to confirm or reject them in finding and interpreting knowledge, meaning that students are using a deep learning technique. Gradually, they expand their understanding of the world that children come into contact with knowledge based on their preferences, culminating in the employment of a strategic approach to learning.

The Revised Learning Approaches by Duff (2004)

Duff (2004) has pointed out that the revised approaches or learning style place emphasis on how students learn on "the combination of typical cognitive, emotional and psychological factors that serve as an indicator of how a person interacts with and responds to the learning environment" (as cited in Hawk & Shah, 2007, p.10). The term "levels of processing" was expanded to encompass "approaches to learning" (Richardson, 2015).

Marton and Saljo (1976b) classified learning approach as "deep" or "surface," while Biggs (1987) identified "strategic" as the third approah. Based on what has been said , three learning techniques are proposed: deep, surface,

and strategic (Duff 2004, p.10). Indeed, according to Marton and Saljo (as cited in Hawk and Shah ;2007, p.10);, the concept of "approaches to learning" has long been useful in studying student learning outcomes. Developing effective measurements of students' learning processes is a tough task, and determining whether such measures successfully transfer across contexts is an empirical question.

Surface and strategic approaches and other factors such as workload predict students' test grades by Marton and Saljo(1976b). Students that choose deep approach to learning attempts to find significance in what they learn and appreciate the learning experience. They provide references to prior material. They employ logic reasoning, and evidence well. They can critically evaluate and examine what they have learned (Duff, 2004). Students who employ the surface approach of learning, on the other hand, largely learn through remembering. They struggle with logic, reasoning, and evidence. They have trouble studying because they can draw fewer connections to earlier information. Finally, students who adopt strategic learning in studying tend to arrange their study routines, manage their time, and become experts in what is necessary to obtain the good grades (Hawk & Shah, 2007). According to a series of research conducted by academia at the University of Gothenburg , students use one of the two qualitatively different learning approach : surface learning, in which students focus on the words in the text, or 'deep' leearning, in which students concentrate on the meaning underlying the words (Hynd, Holschuh & Nist, 2000). Unlike the Gothenburg study, which focused on students' responses to specific tasks, the enlarged field looked at students' predisposition for following specified processes. Biggs' research, for example, measured

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students' motives for learning as well as the approaches they favored, providing a two-factor 'motive-strategy' model analogous to the 'deep/surface' model presented by the Gothenburg study (Biggs, 2001). The literature on approaches to learning has profoundly impacted educational research, especially in tertiary, by emphasizing the role of student motivation as a crucial component determining learning processes and results. As a result, the idea has become an important predictor in research, with empirical studies using it to explain disparities in student learning outcomes (Diseth, 2002). In contrast to other individual variables known to influence learning (for example, IQ level), 'approaches to learning' tend to be less static or fixed and less stable (Biggs, 2001) and consequently are potentially more malleable.' There is substantial evidence that the components of the teaching environment directly affect whether students use 'deep' or surface approach in learning (Biggs, 2001). As a result, the topic has generated great attention as a viable action area. However, the concept has been the subject of some legitimate criticism. Despite substantial data suggesting kids employ some ways to learn depending on the environment , there has been a major controversy concerning the basic concept that children have only one general 'approach' to learning (Ramsden, 1979).

More research has been done base on the factors that influence students' motivation to learn, as well as the techniques they are highly likely to use when faced with a wide range of academic activities and environments, has resulted in a slew of interventions in schools and universities intended to encourage students to repeatedly adopt 'deep' approach to learning throughout their educational careers (Biggs & Tang, 2007). According to Entwistle (2000), by

adopting planned study tactics and time management, students who take a strategic approach to learning achieve the highest potential grades.

Students' learning habits at any academic institution might be influenced by the type of test they will take and their topic of study. Students commonly experience two sorts of exams during their studies: objective (multiple-choice) and essay type test. Objective-type test, according to Nitko and Brookhart (2007) motivate memorizing and subsequent counting of how many objects are recalled. This emphasizes rote learning (with limited emphasis on comprehending) to effectively retain the knowledge learnt and alleviate low cognitive levels. The surface learning is ideal for this learner.

Essay type-tests, according to Nitko and Brookhart (2007), are design to foster higher cognitive levels of student learning by encouraging greater thinking, self-expression, and judgment. When given an essay-test, most pupils study extensively or plan ahead of time. As tutors use both assessment formats (objective and essay type tests) to assess their students, objective type test items should be written to measure both lower and higher-order thinking skills of Bloom's taxonomy in order to aid students in reading for the understanding of any material being taught, this intent helps them to understand the concepts learnt to aid them to impact on the learners when they pass out as professional teachers in order to build on their education.This model is suited for this study since it aims to investigate Duff's (2004) learning approaches and determine whether the proper assessment format is dependent on the student's learning approaches.

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The Concept of Assessment and Its Purposes

Depending on the area of study, several scholars and organizations worldwide have defined the term assessment in various ways. Assessment has long been associated with evaluation, testing and measurement (Ghaicha, 2016). According to Ghaicha (2016), they are sometimes used interchangeably to refer to a way of gathering information on student learning. The terms "assessment," "testing," and "evaluation" are utilised to explain the results of an educational experience (Mandrake, 2000). Educators use several methods to assess, measure, and record students' academic ambition, learning growth and skill performance from pre-school to tertiary (Afflerbach, 2008). It is the gathering of data as process of evaluation.The method of proving what children and adolescents understand, know and can do is known as Assessment. Assessment is required to keep track of progress, plan future steps, give report of students progress to parents. (Afflerbach, 2008).

The appraisal of academic achievement serves several objectives. At one level, assessment is applied to evaluate national standards. This is commonly accomplished to provide statistics on modifications in a country over time, such as the National Assessment of Educational Progress program in the United States or the Assessment of Performance Unit in England and Wales, or compare achievement standards with those of other countries (Goldstein, 1996). Educational assessments are also used to provide data that may be used to hold teachers, educational administrators, and politicians accountable to the public.

Purpose of Assessment

Assessment refers to locating, gathering, and assessing data on student progress. According to the Quality Assurance Agency (2006), an assessment may be used for a number of purposes, including the following:
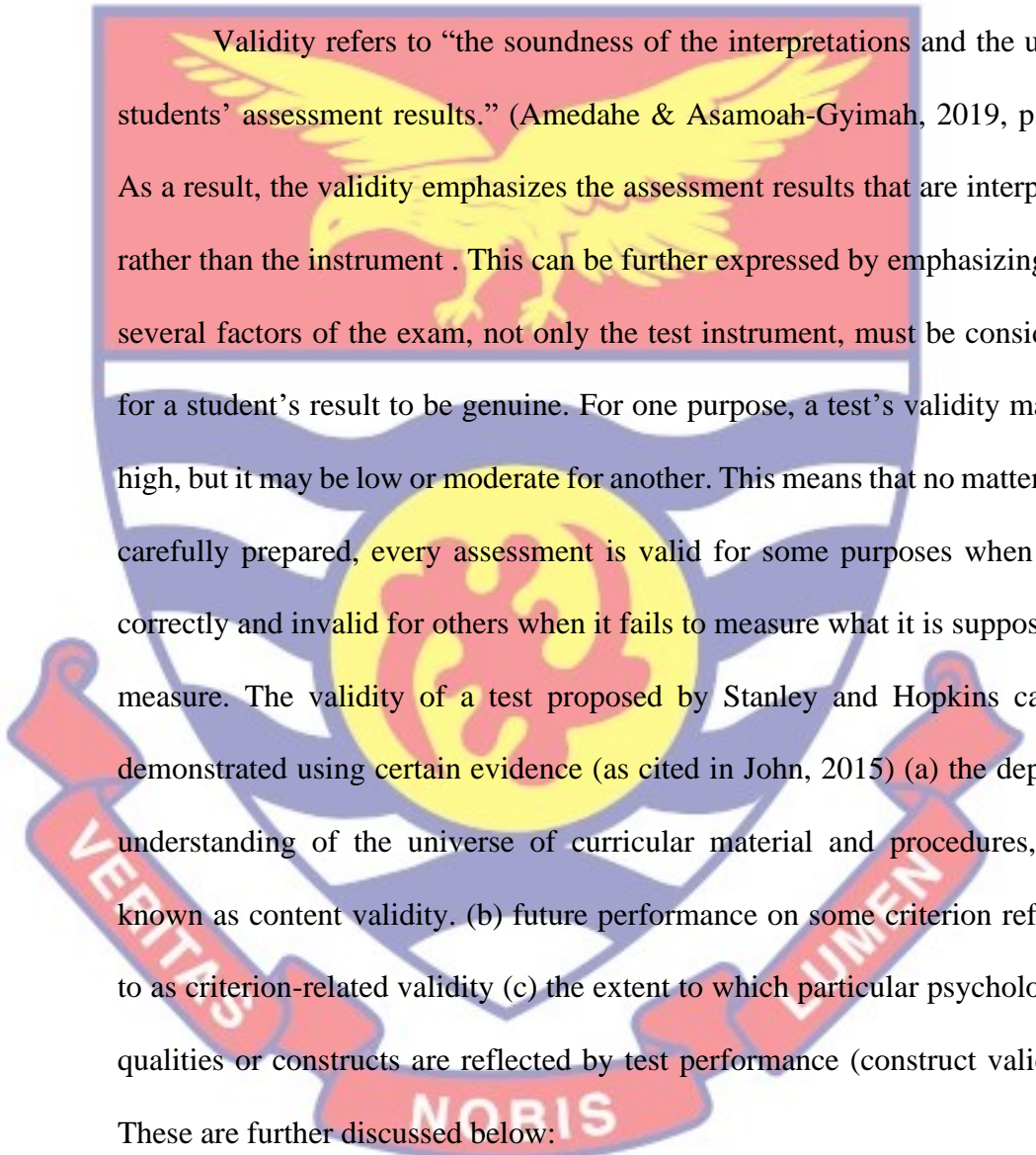
1. Pedagogy: Promoting student learning by offering feedback, usually to assist the student better his or her performance, and identifying what and how learners learn.

2. Measurement: Evaluating students' knowledge, understanding, abilities or skills.

3. Standardization: Providing a mark or grade that can be used to assess a student's performance. The grade or mark can also be used to assess progress.

4. Certification: Allowing the general public, notably employers and higher education providers, to recognize that an individual has achieved academic accomplishment that meets the academic requirements defined and agreed to by the authorized institution, including the framework for higher education qualification. This can require exhibiting physical fitness for practice or communicating with other lecturers.

Validity and Reliability of Achievement Test Results

Because student-teachers are required to account for all they have learned at the College before moving on to the next level of their study, accountability has gotten much attention. The extent to which student-teachers success on teacher-made assessments predicts their future performance on standardized achievement tests such as end-of-semester exams is one method

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for investigating such accountability. In such debates, where accountability standards are at stake, the fundamental concepts of assessment, measurement validity and reliability, cannot be overlooked and when creating items for evaluating students, the concept of validity and reliability must be emphasized.

Validity of Assessment Results

Validity refers to "the soundness of the interpretations and the use of students' assessment results." (Amedahe & Asamoah-Gyimah, 2019, p. 51). As a result, the validity emphasizes the assessment results that are interpreted rather than the instrument . This can be further expressed by emphasizing that several factors of the exam, not only the test instrument, must be considered for a student's result to be genuine. For one purpose, a test's validity may be high, but it may be low or moderate for another. This means that no matter how carefully prepared, every assessment is valid for some purposes when used correctly and invalid for others when it fails to measure what it is supposed to measure. The validity of a test proposed by Stanley and Hopkins can be demonstrated using certain evidence (as cited in John, 2015) (a) the depth of understanding of the universe of curricular material and procedures, also known as content validity. (b) future performance on some criterion referred to as criterion-related validity (c) the extent to which particular psychological qualities or constructs are reflected by test performance (construct validity). These are further discussed below:

Content-related Validity-Evidence of Achievement Tests

This type of evidence refers to the content representativeness and relevance of tasks or items on an instrument. The assessment tasks are evaluated for content representativeness to see if they are a representative sample of a larger

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performance domain. When standardized tests are used, content relevance judgments are made based on whether the assessment tasks are included in the domain definition of the test user. According to Lievens (2002), content validity is evaluated by comparing the operationalization to the construct's proper content domain. That is, how effectively the test items represent the course information. This should include a domain description and the definition of the target group. This validity responds to the essential question: Is the measurement of a test representative of the substance of the attribute being measured?

Content validity determines whether an item appropriately reflects a psychological construct's performance classification. Because the accuracy with which an evaluation samples the learning objectives has a strong bearing on the quality of classroom assessment findings (Nitko & Brookhart, 2007). Exam items should appropriately sample the realm of relevance or interest when it comes to content validity. This can be accomplished by establishing the fundamental learning objectives and ensuring that the assessment method sufficiently samples them. The activities included in an evaluation, as posited by Nitko and Brookhart (2007), which should represent the appropriate material and learning goals as stated in the school and state curricular frameworks. They also mentioned that the assessment content should be of high value or relevance to students' future learning or practical skills.

Amedahe and Asamoah-Gyimah (2019) stated that the content and universe of circumstances must first be specified to prove content validity. You must examine the 'subject content' and the behaviour or task you want pupils to perform. They say that when it comes to classroom assessments, the

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curriculum and teaching establish the domain of accomplishment task, which is what the lecturer has taught the pupils. They asserted that the domain of instructionally important activity to measure students' success must be expressly established to ensure test content validity. This refers to one of the assessment principles, which specifies that the examiner must explain what he or she wishes to evaluate.

As confirmed by Miller, Linn, and Gronlund (2009), Amedahe and Asamoah-Gyimah (2019) further noted that a test blueprint must be established in order to construct and pick tasks that would be a representative set of specified domains, assuring the representativeness of the items throughout the themes entailed and the accompanying academic achievement. The exam design is significant because it emphasizes various educational topics and goals, confirming the curriculum's relevance (Amedahe & Asamoah-Gyimah, 2019). At each level of Bloom's taxonomy, the examiner can then identify the learning material. According to Parr and Bauer (2006), developing the test blueprint contribute to the validity and reliability of the test and its shortcoming is that it takes time and effort to create and construct.

In practice, the substance of examinations has the greatest influence on students' learning approaches. Suppose the content validity is weak due to the test builders' incapacity to create questions from relevant domains or correctly tie the instructional objectives to the behaviours. In that case, students might prepare to employ the surface learning method and still receive good marks. Most students' poor performance on standardized achievement examinations could be related to their familiarity with low-content-validity assessments, which discourages them from using a good approach in learning.

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Criterion Validity-evidence of Achievement Tests

According to Amedahe and Asamoah-Gyimah (2019), "criterion-related validity is concerned with the empirical technique of examining the relationship between test scores or other measures and specific independent external measurements" (p. 61). They say that the test results are known as predictors, and the criteria are independent measures. Using empirical approaches, criterion-related validity, investigates the relationship between test scores and certain external criteria.

This is accomplished by comparing a student's exam score to a standard measure, which is a direct and independent evaluation of the exact behavior that the test is designed to predict. To put it another way, how well a test meets certain accepted criteria of the behavior under inquiry determines its criterion-related validity. Criterion-related evidence, on the other hand, examines how effectively an assessment's findings may be used to infer or predict a person's reaction to one or more discoveries that are unrelated to the assessment methodological criteria (Amedahe & Asamoah-Gyimah, 2019).

Whether the external criteria are provided during or after the test administration, the literature differentiates two types of criterion-related validity evidence. These two categories of criterion-related evidence are : concurrent and predictive validity evidence (Kinyua and Okunya (2014).

Concurrent Validity Evidence

Concurrent validity relates to how one's performance can be utilized to predict performance in another activity that is currently occurring rather than in the future (Amedahe and Asamoah-Gyimah, 2019). Concurrent validity is defined as the collection of data at about the same time to replace

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the score of a related variable for the assessment result. For instance, a test of swimming ability vs. swimming itself to be scored.

Predictive Validity Evidence

It is a technique for predicting the results of a subsequent test based on the results of the earlier one. For example, at the College of Education first year end-of-semester assessment, a student's performance in the West African Senior School Certificate Examination (WASSCE) is utilized to determine his or her Grade Point Average.

According to the review, if the test contains poor items, the internal assessment results may change assessors' expectations about students' performance in certain contexts. Students may use surface learning approach to prepare for such challenges if examiners do not ask fresh questions and instead rely on past questions students may adopt surface learning approach to solve the questions, such assessments may appear impressive, but when the same students are given external exams in which they must critically research themes before given solutions, they may find it challenging to provide answers and this will equip them to adopt deep or strategic approach in learning.

Construct Validity-Evidence of Achievement Test

Construct Validity- Evidence is the extent to which test performance can be interpreted in terms of certain psychological construct (Amedahe & Asamoah-Gyimah, 2019). They further said that the basic purpose of construct validity, is to explain a certain interpretation of a test score by articulating the behaviour that the test score indicated. This necessitates determining whether or not the test score interpretation accurately reflects the behaviour. To put it another way, a concept must be operationalized and syntactically represented to

be accurately measured. The operationalization process entails creating a set of measurable behaviours or characteristics that are thought to correlate to the concealed notion.

Construct validity ensures that the test assesses only the specified attribute and no additional factors to recapitulate. For example, if a mathematics examination uses tough terminology beyond the student's capabilities, the test is said to have low construct validity since it tests constructs other than the intended construct of mathematical competence. If the desired topic is what is being measured, students may use an appropriate learning approach.

Factors Affecting Validity of Assessment Results

The degree of validity of assessment result is determined by several factors and these factors make the validity of the results to be low, influencing how they are used and understood. Some of these determinants were identified by Amedahe and Asamoah-Gyimah (2019, p. 70) as:

1. Unclear instructions: Unambiguous instructions must be provided for the testee to respond meaningfully to test items. The validity of the findings will be reduced if the directions do not correctly convey to the test taker the way to respond to the tasks and how to record their responses. Students may be unsure how to respond to the assignment and materials, which may have an impact on their performance.

2. Ambiguous statements in assessment tasks and items. It gives more than one interpretation when assessment tasks and items are ambiguous. This confuses students, and they may not understand the item well to provide the correct answer, reducing the validity.

3. Reading vocabulary and phrase structure that is too difficult: The language and sentence structure should not be too difficult to understand when students are reading. When the vocabulary and phrases on the tests are too complex for the students, the evaluation will focus on their reading comprehension rather than their achievement in the subject matter material, lowering the validity.

4. Insufficient time limits: Students must be given ample time to finish a test. Too short a test time may deprive testees of the opportunity to think and respond accurately, while too long a duration may encourage testees to finish excessively early and misbehave, cheating or changing the correct answer, and therefore introduce massive bias into their results. Validity suffers the consequences.

5. Poor Construction of Items: Unintentional clues provided by poorly constructed test items may induce pupils to perform over their real level of achievement.

6. Improper arrangement of items: Test items must be arranged from easiest to most difficult, however, putting items which are difficult at the beginning may deter some testee, causing them to become unstable and affect their performance to be low, lowering validity.

7. Identifiable pattern of answers. The placement of answers for test items should vary. When testees understand the pattern for answers to multiple-choice and true/false questions, they can more quickly guess the correct answers, which lower validity.

8. Difficulty of the test items: When testees read test items and do not know answers, it puts them off and performs below their standard. Again when

items are too easy that they can answer, it does not provide a way to discriminate between the low and high achiever, thus lowering the validity.

Reliability of Assessment Results

The consistency of the scores obtained is referred to as reliability . To put it another way, how consistent are each person's scores from one instrument administration to the next and from one item to the next? When evaluating the same object repeatedly, reliability relates to how stable, dependable, trustworthy, and consistent a test is (Amedahe &Asamoah-Gyimah, 2019). Reliability of teacher-created exams is essential due to the importance of judgments based on these examinations (Amedahe & Asamoah-Gyimah (2019). This assumption is especially important in Ghana, where standardized assessments are non-existent and critical choices concerning pupils and learning are relied on the results of teacher-made examinations.

Internal tests, such as those created by teachers, must be well-crafted if students' test results are accurate in both internal and external examinations. Deep and strategic learning approaches can help students consistently score well on teacher-made test, whether on things within the same exam, across administrations, or from one item to the next. Internal examination outcomes may be congruent with external examination results if students score well in internal tests with well-crafted test items. This will enhance good performance.

Methods of estimating Reliability of Test results

The following are the numerous strategies used in estimating reliability that Amedahe and Asamoah-Gyimah (2019) found and explained:

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Test-Retest reliability: This is a measure of how consistent scores are across time. Students are given the same exams multiple times, ranging from minutes to years. When the results of the two executions are added together, a rough approximation of the test's reliability is obtained.When a person receives similar results in both tests, the test is considered more reliable, and vice versa. Although some measurement experts acknowledge that the test-retest method is not without problems, it appears to produce the most accurate estimate of test reliability (Tamakloe, Atta & Amedahe, 2005). The most important issue with this approach of measuring reliability is the possibility of a carryover effect between tests: the first testing may impact the second testing

Alternate/Equivalent forms reliability: This approach evaluates the validity of generalizations regarding student performance from one evaluation to the next. A test's alternate/equivalent forms are composed of tasks meticulously created from the same specifications table. As a result, the alternate form technique entails designing two identical test forms with comparable content and difficulty levels and giving both to the same group of examinees. It is recommend that the two forms be given as soon as possible, with only enough time between exams to ensure that the examinees are not weary. It is felt that randomly assigning half of the examinees to the first test form, followed by the second, and vice versa.

The Pearson Product Moment Correlation is used to find the correlation coefficient between the two scores. The coefficient of equivalence is the name given to this correlation coefficient. Test consumers are more likely to assume that scores from different test versions can be used alternately if the coefficient of equivalence is high.

Split-Half reliability: This is a statistic for determining internal consistency. Students are given a single test. After then, the test is separated into two sections for scoring. To get the estimate of reliability, the two scores for each student are linked. There are various methods to divide the test into two half. Among these are (i) odd-even numbered items and (ii) first half-second half. To calculate the reliability coefficient, the Spearman-Brown prophecy formula is frequently employed. This is given by:

$$r_{yy}(\text{Whole test reliability}) = \frac{2 \text{ x correlation between half test scores}}{1 + \text{correlastion between half test scores}}$$

Suppose correlation between half test scores was 0.75.

$$r_{yy} = \frac{2 \text{ x } 0.75}{1 + 0.75} = \frac{1.50}{1.75} = 0.86$$

When testees' performance on each item matches their total test performance, this is internal consistency.

Kuder-Richardson reliability: This reliability approach also considers the test's internal consistency. They are concerned with the students' ability to do tasks consistently. The K-R20 is a reliable method for assessing the reliability of dichotomously scored items, such as multiple-choice answers, with 0 or 1. The following is the formula:

KR20 = $[n/n -1]$ $[1- \Sigma pq/SD_x^2]$ where

  n = the number of items

         SD_x^2 = the total variance of the test

         p= proportion of examinees who got an item correctly q=

         percentage of examinees who got a question wrong

The formula above was eventually changed to be more universal so that it could encompass created answer items. Cronbach's generalized version was given the coefficient alpha (the formula is as follows:

Coefficient alpha $(\alpha) = [n / n-1] [1- \Sigma Sdi)^2 / (Sd_x{}^2]$

Where; n = the number of items

Sdi^2 = the variance of the item i

The relevant data is calculated and entered into the formulae to establish the reliability coefficient by the use of single test which has been administered. The reliability coefficient shows how much of the variance in the scores can be attributable to the construct.

Inter-Rater reliability. This type of reliability estimate is widely used when dealing with essay-type exams. Each of these two raters scored the same test of a particular student. Both raters appear to have the same or almost the same score, the result is regarded reliable.

Factors Affecting Reliability of Assessment Results

 The following factors affect assessment outcomes by Amedahe and Asamoah-Gyimah (2019, p. 96):

1. Poor wording, confusing directions/instructions, or ambiguity of the items are all examples of test item shortcomings: These variables make it more difficult for students to grasp what is being measured or what they should achieve, making their performance less consistent. Ambiguity in test items, for example, might lead to many interpretations of the same item, as well as guessing, lowering reliability.

2. Difficulty of items: Items that are too difficult or too easy create minimal variation in test scores. As a result, reliability suffers. The assessment tasks should be of difficulty corresponding to the student's skill level.

3. Test Length: A test with only a few items is unlikely to accurately and comprehensively measure the skills or behaviors in question, resulting in measurement mistakes.

4. Sole marking: The assessment results are more reliable when many markers are used. When a single individual grades essay tests, term papers, and performances, there is a risk of low reliability. The reliability of a test is improved by averaging the findings of many markers.

5. Duration to complete the test item: Tests with too little time allocation result in lower reliability since most students do not complete the items due to insufficient time allotment. Students should be given enough time to answer the items. However, if the time given is too long students may get time to cheat and this may result in inconsistency in assessment and reduce reliability.

6. Subjectivity in Scoring: Inconsistencies are allowed to exist when a test is subjectively assessed, resulting in random errors in the scores, lowering the test's reliability.

7. Testing Condition: Students' scores may not reflect their true level of performance if test administrators do not follow uniform test regulations and methods, which reduces reliability. This is a major concern when using the test-retest approach to estimate reliability.

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8. Group Variability: Group variability has an impact on reliability since reliability coefficients are directly formed by the dispersion of scores in the group analyzed. In the absence of other factors, the higher the reliability estimate, the wider the range of results. Because persons in a group tend to stay in the same relative position from one evaluation to the next, anything that reduces the likelihood of people moving around in the group contributes to greater reliability coefficients.

When the group being researched is heterogeneous, the scores show a high level of consistency. According to Afful (2014, p. 45), it is clear why assessors have longed for consistent assessment scores of students over time; they assist define a construct and maintaining the validity of assessment outcomes. The scores of students' will be more reliable if they adopt a more deep or strategic approach in studying rather than using surface learning approach. This is because it will increase students' understanding of problems and, as a result, ensure a high level of consistency in achieving a construct across time. Although high reliability is not an indication of authenticity, an assessor with high reliability is more likely than his or her counterpart with low reliability to acquire high validity.

As a result, assessment format that foster a more deep or strategic approach for student to learn rather than assessment format which will foster surface learning approach will make measuring constructs easier.

Teacher-made Tests

According to Brown (2003), test is the process of measuring the ability of a person and his/ her knowledge in a given task. Gronlund and Linn (2000) define test as an instrument that measures a sample of peoples behavior by

posing a set of questions in a uniform manner. It can be concluded that a test is a measurement process that aim to gather information about student attitude, interest and achievement at the course of his/her study. Test can be constructed into two folds, Standardize test and Teacher-made test. According to Basuki and Heriyanto (2014) standardize test is of high reliability and validy and constructed by an expert. Arfin (2016) stated that teacher-made test is a test constructed by the classroom teacher to measure students' mastery on material taught. Tutors of Colleges of Education assess their student-teachers by constructing teacher -made test. They assess them through formal and informal procedures. The informal procedure may include observation and formal procedures involve paper and pencil which most tutors often conduct quizzes for their student to measure their attainment in the course of teaching.

The constructivist learning paradigm underpins the rationale for teacher-made tests, thus it build a student's understanding of knowledge, it is critical to comprehend what they understand and express it in this paradigm. Learning with comprehension is crucial and knowledge of present concepts and abilities is required to achieve this goal. According to studies, its is often used as an evaluating tool to determine students' progress in schools (Asamoah-Gyimah, 2002). Teachers in this regard must do everything necessary to provide the best education for their students. This means they must have a system to assess how effectively their students have learned what has been instructed reliably and legally, Mehrens and Lehmann (as cited in Anhwere 2009).

One such tool is the classroom or teacher-made test. Furthermore, they are more likely to represent current curricula. Exams generated by teachers can also be altered to reflect a teachers' individual teaching objectives to provide

the student with the greatest possible learning experience. Those specific objectives to a particular course may never be evaluated without classroom or teacher-created exams. It is frequently emphasized that instructors must be able to construct exam items using fundamental measuring and assessment procedures.

Stiggins and Bridgeford (as cited in Anhwere, 2009) looked into the usage of the tests, these are: (a) for awarding grades and evaluating the success of an instructional treatment, (b) for diagnosis, (c) for remedial teaching, (d) for motivating students to learn to improve their work, (e) for providing the foundation for assistance in employment selection and placement, and (f) for certification

According to studies, tests created by the teacher can take many different forms, these include; objective type tests or essay type tests (Amedahe & Asamoah -Gyimah, 2019). Some studies argue in favour of using objective type-test (Narwaria & Lin, 2010), others advocate using essay-type tests (Anatol & Hariharan, 2009).

Tutors at the Colleges of Education use both because they are responsible for assessing all learning outcomes. Amedahe and Asamoah -Gyimah (2019) outline two types of essays that a classroom teacher can employ depending on the purpose of the assessment: extended response and limited response types. In other words, objective type items such as short-answer/fill-in-the-blanks, multiple-choice, true/false, and matching are regularly employed by instructors in Ghanaian schools (Bartels, 2003).

Essay-Type Tests

Tamakloe, Atta and Amedahe (2005) posit that an essay test is one in which the examinee generates many logically structured and connected phrases as solutions to the items. Because of this, it is hard to provide a single correct solution. Because no legitimate answers are presented to the testee, the student cannot select the appropriate responses. An essay test allows learners or test-takers to develop and compose responses to questions while staying within the item's parameters. An essay test item, can also be said to be a test that allows respondents to create their their own words (Amedahe &Asamoah-Gyimah, 2019). The essay test topics are modest in number but each requires a lengthy answer. Essay exam items are classified into two categories. There are two types of responses: limited and extended. The limited response type reduces participants to a predetermined response length, whereas the extended response type allows respondents to express themselves in any way they like. Swartz (2006) listed the following as merits and demerits of essay type test:

Merits of Essay Type -Test

1. It enables more complicated students qualities to be assessed and higher degrees of attribute attainment.

2. Instead of being misunderstood, the teacher can see what the student knows.

3. Writing an essay may be more effective for students who struggle with test-taking.

Demerits of Essay Type Test

1. Students who cannot write well may feel at a disadvantage, for example, someone with a learning disability.

2. It can be more difficult and expensive to administer an essay test. The essay will not be graded by a bubble sheet optical reader equipment that grades scantrons instantly (Swartz, 2006).

Objective-Type Tests

An objective test require the testee to offer a brief response of not more than a sentence and in certain cases, the respondent is given an options from which to choose the key. The objective test items are usually composed of many things and the replies are objectively evaluated to the level that professional observers can concur on how to score the responses (Amedahe & Asamoah-Gyimah, 2019). The two types of objectives are the supply type and the selection type. The selection types consist of true/false, multiple-choice and matching-type. Supply types has variation as completion, fill-in-the-blanks, and short-answer. According to Amedahe and Etsey (2003), it is appropriate to use objective-type test when there is large class size and little time to submit test results, objective-type test items are the best option. Objective tests are more prone to guesswork, and the distribution of the exams is virtually totally predetermined.

A true or false test item is a true or untrue statement. A response must demonstrate the respondent's understanding of the topic by determining whether or not the supplied assertion is correct. One consequence of developing this form of the objective exam is that guessing has a 0.5 probability of producing the correct answer. Only a specific number of educational objectives, such as definitions, facts, meaning of expression and interpretation of chart/graph . The true-false method has the advantage of being excellent for classroom short-term evaluation.

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A matching-type test consists of two columns. The respondent must match an item in Column A with an option in Column B on the basis of a well-defined relationship. The premises are in Column A while the responses in Column B. A multiple-choice test item is a type of objective test in which the testee is given a stem and asked to choose from three or more options that best complete the stem. Foils or distracters are incorrect response and the key is the correct response (Amedahe & Asamoah-Gyimah, 2019).

There are two types of multiple-choice tests. Single "best response" and " multiple response" . The single best response form contain a stem and three or more responses from which the respondent select just one to complete the stem. In the multiple responses format, a stem is followed by a series of true or false phrases or sentences. The respondent must choose which statement(s) will be used to complete the stem.

In the cognitive field of learning, the multiple-choice format can be used to assess educational objectives (Bloom, 1956). This term is frequently used in schools, particularly in Colleges of Education and national or public exams. It is vulnerable to guessing, but as the number of choices grows, the likelihood of correctly guessing drops.To reduce the likelihood of assuming, it is typically advised that options contain roughly five possibilities (Bloom, 1956).

The completion type is one of the objective type test that virtually eliminates guessing. The brief response is the supply, completion and fill-in-the-blank objective type test . It comprises a statement or question to which the response must respond with a short, one-line response. It helps measure factual knowledge or recollection of certain information (for example, "knowledge aim" in Blooms' taxonomy of educational purposes. One disadvantage of the

format is that there may be more than one correct answer, making test scoring subjective.

Advantages of Objective Type Test

McAllister and Guidice (2012) listed the following as advantages and disadvantages of objective type test:

1. These test items are appropriate for current educational procedures since the scoring is more objective. Objective type test hold a unique position because there is no prejudice in their scoring. An objective-type test item is distinguished by its entire objectivity and lack of scoring uncertainty. There is just one right answer. Full scores are awarded for a unique, accurate response and no marks are awarded for an incorrect response.

2. The teachers characteristics do not influence these questions. One significant advantage of selected-response tests is that they may be used to assess knowledge of specific information. In a highly organized testing environment, selected-response exams allow for a large sample of the topic matter. The questions can be designed to assess knowledge in any field. The scoring is straightforward, generally objective, and dependable. The raters relationship with the testee has no bearing on the scoring.

3. The examiners' mood has no bearing on test scoring: No matter how tense the examiner is, it has no bearing on test scoring.

4. This exams item allows students to become well acquainted with the topic matter: The selected-response exam is more effective in measuring knowledge of factual facts. The selected-response test is also beneficial

when a high degree of specificity is required, such as determining whether information must be retaught.

5. Although intellectual guessing carries for the learner, chance elimination is lowered in this test.

6. It is easy to score. An objective type test may be scored by anybody, even a machine (computer), if the evaluator is given a key containing correct answers to questions or supplied into the machine. As a result, they are commonly employed in competitive examinations when many applicants attend, and results must be published in a short period. Objective-type test items may also be utilized effectively in the classroom if the instructor is well knowledgeable in their composition because creating a solid objective-type test item is as tough as scoring it.

7. Pupils prefer this form of test question because there is no risk of the instructor showing personal bias or favouritism: Extraneous considerations, such as the scorers preferences, have no bearing on the results.

8. Because students are more engaged in responding this sort of exam, these test items are educational for them: Most testees prefer objective type tests, particularly selection type tests since they can guess and occasionally get it right even when they do not know the answer.

9. Objective-type exam items faustrate cramming and promote critical thinking, observation and investigation. The assessments goal is to examine knowledge of facts; these tests can offer a reasonably accurate assessment of such information.

10. These test items are more reliable and valid: With an objective-type test, the examiner can cover much of the content being taught for the semester, enabling him/her to write more items, making validity and reliability high.

11. Objective type test items may be readily standardized by administering them to a large number of students of the same age group prior to the real examination: Because of its simple scoring style and the fact that a computer can score it, it is excellent for usage when you have a big number of pupils.

Disadvantages of Objective Type Test

1. Students' ability to organize the content they have studied is not valued in these exam items: Students will not need to structure their responses because they will be given options to choose the key or provide a long sentence. Instead, they will need to choose an answer from the possibilities presented.

2. It is susceptible to guessing: It allows students to guess and if their predictions are true, they gain credit for what they do not know.

3. Pupils are not asked to write summaries of the information or to established principles and theories, both of which are important skills in this type of test: most often, it measures lower-order thinking skills.

4. This type of test item is not used to diagnose students' learning challenges because teachers cannot see their students' shortcomings because they cannot produce their responses.

5. It is a common misconception that objective-type test items do not check for cramming: most students learn by memorizing to help them pass

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tests but this way of learning is not used with objective-type test because students are not allowed to create their answers.

6. These test items, like essay-type tests, fail to measure character-building aspects: they do not allow for the improvement of an individuals mental and moral attributes.

7. It is sometimes said that creating and using objective type exams items is an expensive and time-consuming process: More supplies, such as A4 sheets for printing, will be required, and the test items will require a significant amount of time and skill to make.

Amedahe and Asamoah-Gyimah (2019) brought out the following contrasts between the essay and objective tests while analyzing some of the discrepancies:

1. Testee organize and express their thoughts in their own words in essay exams but in objective tests require the student to respond quickly or select the key from options given.

2. An essay-test has few questions and this does not give opportunity to write items to cover much of the contents being taught whiles an objective-tests have many questions and give opportunity to write items to cover much of the contents taught.

3. An essay test's quality is determined by the competency of the scorer whereas an objective test's quality is determined by the expertise of the examiner.

4. Essay tests are easy to create but they are more difficult to ascertain successfully because they are scored by humans (who may be subjective) but objective test are difficult to write but easy in scoring and can be scored by machine (computer).

5. Individualism is encouraged in essay assessments for both students and teachers. Only the test maker has this freedom of expression (item authoring) in objective test.

In conclusion, with the objective test item students may adopt more of the surface learning approach than deep and strategic learning approaches since objective motive memorization and recalling of fact (Nitko & Brookhart, 2007) But with the essay type test students need to organise and compose their own response so they will adopt deep or strategic approach in learning to aid them understand the concept and apply them when being assessed . A similar view is shared by Nitko and Brookhart (2007) who attest that essay test is designed to foster higher cognitive levels of student learning by encouraging greater thinking, self-expression and judgment.

Method of scoring students work in Assessment

This is the process of determining score reliability and compatibility across teachers and schools, as well as the strategies used by training instructors or assessors to evaluate pupils consistently within and between schools. These strategies are score approaches that are holistic, analytic, and trait-based. The following methods are discussed:

Holistic Scoring Methods

Holistic scoring assesses a piece of writing to establish a student's overall competency-based on an individual's assessment of the writing sample's quality (Hyland, 2010). Rather than focusing on failure, this model emphasizes student achievement. Although this method is straightforward, according to Hyland (2010), diagnostic information is lost when writing to a single score, making it hard to offer a washback effect on instruction.

Furthermore, because the technique needs a reaction to the text, pupils must be carefully educated to respond in the same way to the same aspects. One advantage of this technique is that the emphasis is not on a specific ability but the whole impression, promoting students accomplishments rather than their weaknesses. Other advantages include the ability to emphasize certain criteria and, last but not the least, it stimulates instructor debate and consensus. Teachers lack diagnostic information, lengthier essays obtain higher scores, and writing skill is conflated with language competence, to name a few downsides (Hyland, 2010, p. 227).

When two or more raters judge each paper, the reliability of a holistic scoring approach rises. It is critical to provide instructions to instructors; otherwise, it may be difficult to agree on the quality and specific characteristics of exceptional writing (Hyland, 2010). According to White (as stated in Weigle, 2002), holistic scoring is more valid than analytic scoring procedures since it portrays the readers true and personal emotions, whereas analytic scoring methods do not. Scoring rubrics help with overall scoring. They represent the course aims and what professors consider effective writing in various circumstances (Hyland, 2010).

Analytic scoring methods

Analytic scoring approaches are based on separate scales of overall writing elements, that is , sets of criteria thought to be essential for successful writing. Teachers must assign a score to each category, which provides more information than a single overall score. Analytic scoring isolates independent components and hence clarifies the attributes to be evaluated. As a result, it is more successful at distinguishing between weaker texts. Rubrics often include

distinct topics, organization, and grammar scales, with vocabulary and mechanics occasionally added separately. Analytic approaches are valuable as diagnostic and instructional tools because they give more specific information (Hyland 2010). The rubric performance standards can be presented early in the course to describe to students how their writing will be judged and which writing skills are valued.

The analytic assessment method has the following advantages over the forms of scoring methods: the scores are more reliable; it allows more diagnostic methods of reporting scores, and it helps teachers address the same features across students. One disadvantage of the analytic method is that it requires more time than the holistic method because writing is more than the sum of its parts (Hyland, 2010).

Trait-based scoring method

A trait-based scoring technique is context-sensitive and measures performance attributes related to specific activities. The overarching purpose is to create writing standards specific to each activity and the writing produced in response to it, using either primary-trait scoring or multiple-trait scoring. To score a piece of writing, primary-trait scoring concentrates on just one factor vital to the work. This allows teachers and students to concentrate on a single critical part of the activity (Hyland 2010). Hyland (2010), on the other hand, claims that instructors may find it difficult to respond to only specific aspects and hence incorrectly rate other traits. This grading method is used in classrooms where the emphasis is on examining specific writing abilities.

The multiple-trait scoring method is similar to analytic scoring in that it requires separate scores for many literary components. These must be relevant

to the particular assessment job. According to Hyland (2010), multi-trait scoring considers writing a complicated construct that must be placed in specific contexts and aims. This method is adjustable because each activity is assigned a scale with a score that is suited to the context, purpose, and genre. One drawback is that planning and administration take a long time. This burden can be lessened if teachers share the job of developing new rubrics or revising key content, structure, and language analytic templates to match the unique demands of new assignments (Hyland 2010). It is not always obvious which rating scale to use. According to Weigler (2002), the best approach is to find the best possible combination of the many features and select the most important attributes in a given situation.

The Concept of Learning

Learning has been a prominent theme in a psychological study, almost from establishing psychology as a separate discipline (Ebbinghaus 1962). It was even the most extensively researched issue in psychology throughout the preceding century. Similarly, problems regarding learning are addressed in almost all fields of psychology today. As a result, it is surprising that academics are rarely clear about what they mean when using the term "learning." Even the most well-known learning textbooks rarely define their topic area (Bouton, 2007; Schwartz, Wasserman, & Robbins, 2002). This could be owing to the fact that there is no universal consensus on what constitutes learning. To a degree, the lack of consensus on the concept of learning is unsurprising. It is difficult to describe ideas effectively, especially ones as wide and abstract as learning.

The definitions of learning vary greatly among fields, owing mostly to the many methodologies employed to quantify its prevalence. These definitions

can be reconciled better if each is acknowledged as understandable with a shared framework of learning while understanding the practical relevance of diverse learning definitions in different circumstances. Various psychologists and educators have defined the notion and meaning of learning in their unique ways. According to Cook and Crossman (2004), learning is the acquisition and retention of knowledge. It aids in acquiring diverse habits and knowledge to fulfill life needs.

According to Mazur (2013), learning is a change that occurs due to an individuals experience. This lends support to the constructivist view of learning. In learning students adopt different approaches in studying some study by memorizing the facts and others study by understanding the concepts which then help them to reproduce and achieve better grade when being assessed. After students complete a term of study, there should be a relative shift in the learners behaviour. Students behaviour should represent the three primary domains: cognitive, affective, and psychomotor domains.

The Cognitive domain

Bloom (1956) was one of the first psychologists to suggest a learning taxonomy based on developing intellectual skills and the importance of problem-solving as a higher-order ability.

Blooms Taxonomy of Educational Objectives Handbook (1956): Cognitive domains are still regarded as basic work and required reading in the educational world. Blooms taxonomy is built on six fundamental elements: knowledge, understanding, application, analysis, synthesis, and evaluation. Anderson and Krathwohl (2001) amended it as follows:

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Creating: You can put components together to produce a cohesive or functioning whole, as well as reorganise components into a specific structure or framework by creating, planning, or producing.

Evaluating: Making decisions based on criteria and norms through checking and criticizing.

Analysing: Differentiating, ordering, and assigning material into constituent pieces, as well as determining how the parts connect and a larger structure or objective.

Applying: You can carry out or use a method by executing or implementing it.

Understanding: Interpreting, demonstrating, describing, summarising, inferring, comparing, and explaining oral, textual, and pictorial communications to create meaning.

Remembering: Getting information out of long-term memory, recognising it, and recalling it.

As tutors write items for administer they prepare blue-print to aid them cover the domain of educational objectives . This aid them to also cover the objectives taught for the semester and not to write items outside the course outline. Again when tutors write items base on remembering, its allows student to memorized what has been taught and this make students to adopt surface approach in learning and when tutors write items which inculcate understanding and application, it equip students to adopt deep or strategic approach since these approaches demand students thoroughly to understand the concept learnt to apply when being assessed.

The Affective domain

This was developed by Krathwohl David, Bloom Benjamin, and Masia in 1964.

They classified educational objectives in the affective domain into 5 categories.

1. Receiving: It is the most basic degree of learning to specific phenomena/stimuli (e.g., classroom activities, reading textbook or library books, doing class assignments, etc.). Listens carefully and pays close attention to classroom activities are two examples of broad educational objectives. Illustrative verbs ask, select, follow, give, hold, and name.

2. Responding refers to a students or pupils active engagement in specified activities. The student/pupil not only attends to certain stimuli but also responds to them in some way. The student/pupil may be required to read specified material or complete an assignment or project. Completion of given assignments adherence to school rules and regulations are examples of broad educational objectives. Answers, assists, complies, conforms, discusses, greets, practices, and writes are examples of illustrative verbs.

3. Value is the worth or value that a student or learner attaches to a given object, phenomenon, or behaviour. The value might range from basic acceptance to a more complicated degree of commitment. Shows care for the results in the emotive domain, as an example of a generic educational aim. It is a students or pupils willingness to attend.The welfare of others appreciates the role of science in everyday life. Illustrative verbs include completes, describes, differentiates, explains, follows, initiates, invites, joins, reads.

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4. Organization: It is the capacity to bring multiple values together, resolve conflicts between them, and start to form an internally consistent value system. Students/pupils begin to form life philosophies. Accepting responsibility for own behaviour acknowledges and accepts own strengths and limitations are examples of broad educational objectives. Illustrative verbs are adhered to, modifies, organises, combined, compared, completed, and defended.

5. Characterization by a value or value complex: This is the most advanced level in the emotional domain. At this stage, the individual student/pupil has a value system that has influenced his/her behaviour for a long enough period for him/her to build a distinctive lifestyle. General educational objectives include, for example, practising collaboration in group activities and maintaining excellent study habits. Illustrative verbs are acts, discriminate, display, influences, listens, modifies, performs, practices, proposes, and qualifies.
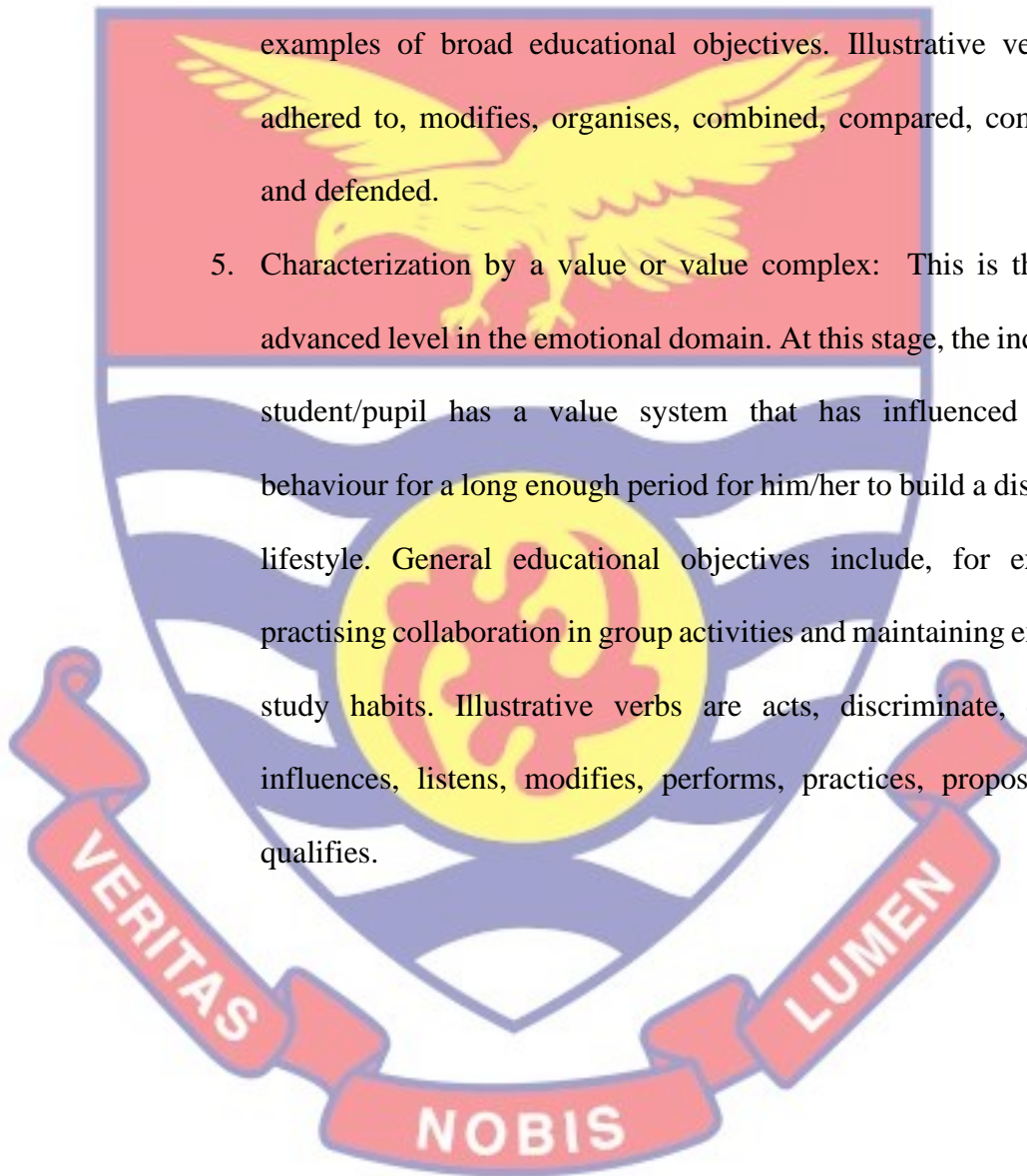
The Psychomotor domain

Simpson (as cited in Hoque, 2016) created categories in this sector. Simpson had seven categories listed as follows;

1. Perception: This is the most basic level. It is the capacity to employ one's sensory organs to gather signals that direct ones motor action. For instance, linking the sound of drums to the genre of dancing. Choose, describe, detect, and identify are some examples of illustrative verbs.

2. Set: It is the willingness to engage in a specific form of action. In a soccer game, demonstrate the appropriate posture to save a penalty kick. Begin, display, explain, show, and start are examples of illustrative verbs.

3. Guided response: It is concerned with the early stages of acquiring a complicated skill. For instance, starting a car when learning to drive. Assemble, build, create, and exhibit are examples of illustrative verbs.

4. Mechanism: When a learnt action becomes habitual, and motions are executed with confidence and skill, this occurs. For instance, typing or using a video recorder. Sketch, fix, fasten, dissect, and assemble are examples of illustrative verbs.

5. Complex Overt Response: It is the capacity to carry out difficult tasks. For example, operating an articulator truck or playing the piano expertly. Assemble, build, create, and arrange are examples of illustrative verbs.

6. Adaptation is the ability to modify movement patterns from well-developed skills to fit special requirements or situations. For example, modify piano rhythms to suit local songs. Illustrative verbs include adapt, alter, change, reorganize.

7. Origination: This is the highest level. It involves the ability to create new movement patterns to meet a specific need or particular problem. Creativity and originality are emphasized. For example, design new computer software, create a new musical dance. Illustrative verbs include arrange, create, design, originate.

Learning Approaches

According to Biggs (2001), the term "learning approach" is used in this study to describe how children learn in a specific learning environment. Elements such as the type of test and the subject of study may influence students learning patterns in any academic institution. Students are likely to encounter two sorts of exams during their studies: objective and essay-type tests.

According to Biggs (2001) , in objective assessments, pupils are tested on a largely knowledge-based and relatively specific material, where the learner is required to produce a precise answer or pick the proper solution from options presented. According to Nitko (2001), objective assessments tend to foster memorization and subsequent tallying of how many things are recalled.

Multiple-choice testing, according to Biggs (2001), evaluates the lowest of three cognitive indices of student learning. Low cognitive learning, high cognitive learning, and transfer learning are the three levels.

Low cognitive learning requires memorization of facts and information in order to recall them correctly, whereas high cognitive learning entails

integrating and synthesising concepts in order to comprehend the presented content. The extension/application of knowledge and understanding gained in one setting to a new situation is referred to as transfer of learning. In a multiple-choice exam, Biggs advises pupils to employ a convergent technique that emphasizes factual information and details.

This style of test, according to Biggs, encourages students to learn by rote (with little emphasis on comprehension) in order to optimize proper recall of the material given. As a result, multiple-choice questions may encourage students to adopt surface learning approach, this was Entwistle(2001) point of view. An essay evaluation, according to Biggs (2001), emphasizes higher cognitive levels of student learning. According to Ramsden (1988), essay tests develop more analytical reasoning, identity, and judgment.

Deep Learning

Deep learning is a component of an internal motivation that stems from peoples desire to begin work meaningful and correctly (Biggs, 2001; Curzon, 2004; Biggs & Tang, 2007). As a result, when a student completes a task, he or she makes an effort to employ the most optimal cognitive process conceivable. Students are drawn to fundamental meanings, main ideas, challenges, principles and effective ways when they need to learn. Deep learning in this case, focuses on key concepts, themes and principles rather than specific details that are not conceptually supported (Biggs, 2001).

While studying the details of a topic area, students that use this method build multiple study methodologies to identify principles, underlying causes, and their significance. Students can construct hypotheses and investigate them to discover how they relate to the rationale of a topic when they are trying to

comprehend the rationale of a subject (Curzon, 2004). Students employ meta-cognitive talents such as self-assessment, self-questioning, mistake detection, error repair, dealing with extreme facts, considering multiple ideas and the constraints throughout this process (Chin & Brown, 2000).

Maintaining the interaction between students and tasks throughout the learning process with student satisfaction is the foundation of a meaningful learning approach in this process (Biggs, 2001). Deep learning is thus a method of connecting new concepts to current knowledge and experience, looking for patterns and underlying principles, logically discussing these patterns, using evidence, being aware of one's understanding, and having self-assessment abilities (Entwistle, McCune & Walker, 2001).

Students that use the deep approach to learning strive to grasp the content while also demonstrating active involvement and enthusiasm in their studies. They interact critically with the perspectives and evidence by drawing on prior knowledge and other resources. They also keep track of their learning progress (Entwistle, McCune & Walker, 2001). For these students, learning is an internal process. According to Entwistle and Ramsden (1983), a deep approach is more likely to result in a high level of knowledge and successful learning.

Surface Learning Approach

According to Biggs and Tang (2007), Surface learning is a type of learning strategy in which students are more concerned with memorizing facts than understanding the content presented. A surface learning strategy is defined as a mirror of an external incentive fulfilled by the task's true purpose (Biggs, 2001; Curzon, 2004). The current learning assignment is viewed as an

impediment that the learner must overcome during this process. Surface learners, as a result, prefer to sidestep this barrier by devoting less time and effort to low-level intellectual pursuits (Biggs, 2001; Biggs & Tang, 2007).

As a result, pupils solely focus on identifying crucial areas when studying. Because students do not understand the learning job, they interpret the material as isolated fragments. Students typically focus on repeating and remembering knowledge (Curzon, 2004; Biggs & Tang, 2007) and this strategy includes memorizing without understanding the subject (Biggs, 2001).

As a result, knowledge is passively acquired rather than actively acquired (Curzon, 2004). Students who study on the surface are more prone to memorize facts without comprehending them. To repeat previously learned knowledge, they intend to use a variety of rote learning methodologies. They are primarily limited by the learning task and do not extend beyond it. The fear of failing and the desire to complete a course are the primary motivators in this method. A thorough approach is likely to lead to a lack of understanding and poor learning (Entwistle & Ramsden, 1983).

Strategic Learning Approach

The strategic learning strategy is based on applying deep and surface learning approaches (Entwistle, 1996). The primary goal of the strategic learning method is for students to perceive themselves as successful in all aspects of their lives and to be self-motivated (Entwistle, 1996). Furthermore, the strategic approach emphasizes the structure of learning techniques and time management (Entwistle, 1996). Students who employ this strategy are primarily interested in achieving the greatest possible grade. These competitive students use both deep and surface strategies as they see proper. The primary

goal of this technique is to achieve the highest possible marks through disciplined study methods and time management (Entwistle & Ramsden, 1983).

A strategic learning approach also includes monitoring one's study efficacy and paying attention to the evaluation (Entwistle, McCune, & Walker, 2001) and metacognitive awareness and self-regulation (Entwistle, 2001). The following are some of the advantages of using a strategic learning approach: It helps students get good grades, comprehend the learning process better, be more efficient and successful in their learning, and, last but not least, encourages students to learn independently. One flaw with strategic learning is that it focuses solely on higher marks or scores, neglecting substance, and causing students to forget the information as soon as the exam is over.

Conceptual Framework

Assessment formats	Learning Approaches

The conceptual framework indicate that there is a relationship between students learning approaches and the type of assessment formats tutors employ in assessment.

Empirical Review

This section of the review concentrates on previous studies on assessment formats often used by College Mathematics Tutors, learning approaches that are often used by the college of education students, the relationship between assessment formats often used by tutors and the learning approaches of students, differences in the learning approaches of students based

on gender and differences in the learning approaches of students based on their age.

Assessment Formats often used by Tutors

In the review process, the researcher found various studies that are not necessarily on only assessment formats often used by College Mathematics Tutors; some are on assessment formats that teachers in other fields use. In a study, Singh, Lebar, Kepol, Rahman and Mukhtar (2017) employed a classroom observation of 15 lectures. They found that the lecturers assessment practices included oral questioning and peer assessment. Their feedback modes were giving comments and correcting student answers.

Dandis (2013) investigated the assessment procedures used by mathematics tutors in Granada to evaluate their students. Data was gathered through interviews with teachers. The data found that teachers mostly employ written tests to assess their students, with alternate evaluation methods utilized less occasionally.

Umugiraneza and Bansila (2017) investigated the approaches used in assessing mathematics and statistics by 75 KwaZulu-Natal (KZN) teachers. Teachers were asked to freely write on the many assessment approaches they utilized in the classroom. The data found that, in terms of assessments, instructors typically reported using a single technique, implying that the traditional approach to testing students competence in mathematics and statistics was used.

Amoako (2018) investigated formative evaluation methodologies typically employed by Distance Education teachers in Ghana during course model content facilitation. The study looked into whether course tutors used a

variety of formative assessment approaches. The study included 150 participants and it was discovered that observation, oral questioning, peer-evaluation, student self-assessment and teacher-made tests were the current formative assessment procedures of on-site course instructors of Distance Education in Ghana. It was also shown that the majority of tutors used a variety of formative evaluation approaches.

The findings of Amoako (2018) was inconsistent with the findings of Umugiraneza and Bansila (2017), whose result indicated that teachers preferred the use of a single method in assessing students. Bekoe, Eshun and Bordoh (2013) investigated formative assessment strategies tutors employed to evaluate teacher-trainees in Social Studies at three Colleges of Education in Central Region of Ghana: Komenda, OLA, and Fosu. There were nine (9) Social Studies tutors in attendance, representing all three colleges of education. The study indicated that, because of the rushed nature of formative evaluation and scoring, tutors overemphasized the cognitive domain at the expense of the equally essential affective and psychomotor domains.

Van de Watering, Gijbels, Dochy and Right (2008) explored students assessment choices, perceptions and links to study results. According to the findings, students preferred traditional written testing and questions as specific as feasible in assessing a number of cognitive functions. Because both Bekoe et al. (2013) and Dematriou et al. (2020) tested cognitive ability, their results were comparable.

Learning Approaches often used by Students

Student Approaches to Learning (SAL) incorporates insights and concepts obtained from in-depth qualitative interviews with university students

about their learning, studying, and inspiration. Marton and Säljö (1976b) undertook an ecologically valid assessment of students reading methods and identified two distinct approaches to understanding text material to be learned: deep, and surface learning approaches.

A student who studies deeply focuses on the underlying principle or message of the subject. When learners employ the surface learning technique, they focus on the texts surface elements and attempt to memorize them word for word. If the learners primary purpose is to remember and repeat what is written in the book, he or she will not develop the active problem-solving and critical thinking abilities required to fully absorb the content. The goal becomes to imitate other peoples thoughts.

Entwistle and Ramsden (1983) and Biggs (1987) suggested a third strategy, strategic or achieving. Students who use this method put in much effort to get good grades. They select a learning method to increase their chances of academic success: they appear to be cue-aware and educated about evaluation processes.

The connection between a thorough approach and academic success has been well documented. A deep approach, according to Marton and Säljö (1976b), is linked to qualitatively improved learning results. This conclusion has been verified by further quantitative analyses (Watkins, 2001). Academic success has been linked to the achieving strategy (Watkins, 2001).

Learning ideas, motivational orientations, and learning regulation are all related to students learning approaches (Lonka, Olkinuora, & Mäkinen, 2004). Other orientations have been introduced, with the two major orientations, meaning and replicating, being the most widely utilized (Richardson, 2015). A

meaning orientation has been linked to academic success (Watkins, 2001) and is distinguished by a combination of self-regulated learning and the deep approach to learning.

It is worth noting that the prior studies compared evaluations differed in form (multiple-choice and essay) and assessment situation (assignment and examination). As a result, the additional variable (assignment/examination) will likely confuse the results, throwing doubt at them. Tang (1992) emphasized the importance of investigating the settings in which students studied and prepared for various sorts of evaluation. According to these researchers, students utilized a surface technique while studying for a test and a deep method when preparing for an assignment.

Beyaztaşlhan and Senemolu (2015) investigated successful undergraduate students' learning approach (deep, surface and strategic) and the factors that impact and shape their learning approaches. In the study, 90 Turkish students who scored in the top 1% on their university placement test in 2013 were included. Three groups of students were formed from Colleges of Education, Law and Medicine: Literacy-Social (LS), Literacy-Math (LM), and Math-Science (MS). Data was collected through semi-structured interviews with students, which were then documented on a form provided by the researchers. According to the study, students preferred surface learning, their teacher had rote learning education knowledge, the course content was quantitative, and examinations were multiple-choice or used a true/false technique. Students preferred to use a deep learning technique when the teacher had both research and interrogation-based objectives, the course material was qualitative, and the evaluation method was writing an essay or filling in the

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gaps.Furthermore, prior courses and social groupings influenced how students integrated strategic learning strategies.

Senemolu (2011) investigated Turkish and American college students learning methods and study skills. The study included 206 American first-year college students, sophomores, juniors, seniors, and 806 Turkish college freshmen, sophomores, juniors, and seniors. The Approaches and Study Skills Inventory for Students (ASSIST) was adapted for this study to assess Turkish students learning approaches and study skills, whereas the original ASSIST was utilized to describe those of American students. According to the findings, most Turkish and American students prefer deep and strategic learning methods to surface learning approaches. As the school year progressed, the use of the deep approach improved, while the surface approach decreased. Male students preferred deep techniques, but Turkish and American female students preferred strategic approaches.

Jensen (2008) looked at school-based assessment and how it improved students learning strategies. The study's context was to create and evaluate a tool that raises awareness about learning in schools and, as a result, improves learning. According to the survey, when asked about their learning practices, students assessed their use of diverse strategies as incredibly gratifying.

When students use of learning methods was examined against more objective and specific criteria, the picture grew more complex, indicating that students growth and use of learning strategies should be given more weight. According to the survey, students value learning and contribute to the evolution of the learning community. On the other hand, cooperative learning and the metacognitive aspect of learning may be given more attention.

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Rastegar and Golestanian (2015) looked at the connections between Iranian EFL (English as a Foreign Language) students' learning styles and their preferences for different assessment methods. One hundred and ten junior and senior EFL students from Kermans Shahid Bahonar University who specialize in English translation and English literature took part. There were both males and females among the participants.The data was collected using Biggs, Kember, and Leung's Revised Two Factors Study Process Questionnaire (R-SPQ-2F) and Birenbaum's Assessment Preferences Inventory (API) (Birenbaum, 1997). According to the data, deep learning approach users exhibited strong positive connections with both summative and formative evaluations, but surface learning had a large positive link with summative evaluations. Students' learning strategies are influenced by assessment processes, teacher style, and curriculum material. Tests requiring fact recall encourage a superficial approach, but tests requiring deeper knowledge encourage a thorough approach (Marton & Saljo 1976b).

Scoullar (1998) discovered that learning techniques changed depending on the type of evaluation . Students rated the essay assignment as requiring high levels of cognitive processing and they were more likely to use deep procedures and reasoning when composing their essay than when studying for their multiple-choice exam, according to these researchers. Students saw a multiple-choice exam as a test of their ability to retain factual information (lower levels of cognitive processing) and they were more inclined to use surface learning and deep learning when studying for an essay assignment.

According to the research discussed above, learning outcomes are not the only factors determining learning approaches. It is critical to note that the

assessment formats employed may be just as essential as the learning outcome in terms of the method used. Previous research suggests that the impacts may be attributable to the stakes involved and the manner of the evaluation. Final examinations, for example, may be a significant motivator of learning, but the impact is not always favorable for all students (Cilliers, Schuwirth, Adendorff, Herman, & Van der Vleuten 2010; Alias, Alias, Ibrahim, Attan, and Al-Kadir, 2012).

Relationship Between Assessment formats and Learning Approaches

Hamin Naziha Hasnor, Zaiton Ahmed and Norshida Nordin (2012) investigated the association between learning styles and academic accomplishment among Intec students. Uitim Shah Alam was among the 233 people who answered. They were given a questionnaire. According to the findings, students are more inclined to take a deep learning approach. Individual differences in working capacity and attention and their relationship to students' learning styles are investigated in 128 university students by Kyndt Eva, Cascallar Eduardo, and Philip (2012). The Two-Factor Study Process Questionnaire has been updated (Biggs, Kember & Leung, 2001). Deep learning approaches have been found to have a negative impact on attention.

Difference in Learning Approaches of Students based on Sex

Sex has been found to influence the adoption of any of the three learning approaches. A comparative study of the perceived learning strategies Junior and Senior High School students adopt when assessed with different item formats a study conducted by Adusei (2017). The researcher use descriptive survey design, 600 respondents answer the questionnaire. Frequencies and percentages were used to analyze the data and chi-square to test the hypotheses. According

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to the findings of the study in English Language female students adopt surface learning strategy while male students adopt deep learning strategy. Again there was no difference in the students' adoption of the learning strategies in multiple-choice items in Core Mathematics and Integrated Science.

Marrs and Sigler (as cited in Wang, 2013) found that among American colleges, female students tended to adopt deeper strategies to learning than males, even though, Baeten, Kyndt, Struyven and Dochy (2010) assert that the relationship between gender and approaches to learning cannot be conclusively established. Severiens and Dam (1994) did a narrative review and quantitative meta-analysis of studies that used the Kolbs Learning Style Inventory and the Entwistles Approaches to Studying Inventory to investigate gender differences in learning styles among Amsterdam university students. Data was collected and analyzed from twenty-six (26) research. On the Kolbs test, males were more likely than females to prefer the abstract conceptualization mode of learning, although gender differences only showed up on the emotional component of learning approaches.

On a group of Hong Kong secondary school students studying computer programming, Lau and Yuen (2010) assessed the gender sensitivity of a learning style instrument, the Gregorc Style Delineator (GSD). According to the research, females prefer Concrete Sequential (CS) and Abstract Random (AR) to males. The men prefer Concrete Random (CR) to the women.

Choudhary, Dullo, and Tandon (2011) investigated gender differences in India's first-year medical students learning style preferences. The study included first-year medical students from the Government Medical College in Kota, India. The survey received responses from 116 students (59 females and

57 males). The VARK questionnaire was used to determine one component of student learning styles, the sensory modality they preferred to receive information. Males (92.98%) and females (76.27%) prefer knowledge displayed in multiple sensory modalities. Furthermore, only 15.52% of all students (6.25% of men and 23.75% of females) preferred obtaining information through a single sensory modality. The percentage of male and female students who preferred multimodal or unimodal information presentation strategies varied significantly by gender.

Mucet (2017) investigated the learning styles preferences of engineering students in Malaysia and the teaching methods of their technical communication teachers. The descriptive survey collected pertinent data from 588 engineering students from four engineering faculties and Anthony, Grasha, and Sherly Riechmana Utrskias teaching style survey for 10 technical communication teachers. To assess the data gathered and respond to the study objectives, descriptive statistics were used. The study found no significant variations in learning approach across genders. They preferred the visual learning styles aspects.

Differences in Learning Approaches base on Age of Students

Learning styles among Ghanaian medical students were explored by Mogre and Amalba (2015). The researchers used a cross-sectional survey method to distribute a questionnaire to 189 people (revise two-factor study). The researchers use descriptive statistics like mean and standard deviation to analyze the data. According to the findings of the study, those of a higher age aligned themselves with the deep learning technique, while those of a lower age aligned themselves with the surface learning strategy.

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Mogre and Amalbas (2015) study were insightful; nevertheless, they did not evaluate how professors organized the questions to influence students' learning. The way a student studies should not be confusing or too influenced by their characteristics. How teachers posed the questions had an impact on how students learned. It is not necessary to be young or old to participate. When students know that multiple-choice tests will be given, they pay less attention to understanding the concept. As a result, I have a target to meet.

Baeten, Kyndt, Struyven and Dochy (2010) have shown that age is one of the reasons for students' choice of specific learning strategies. In their study, they contended that older students, mostly adopt deep learning strategies while younger students tend to focus on the intake of knowledge and adopt surface strategies.

Chapter Summary

In the review, educators employ a range of ways to evaluate, measure, and document students academic willingness, learning growth and skill achievement from preschool to College. It is the process of obtaining information methodically as part of an evaluation. The importance of teacher-made tests, which can be either essay or objective in nature, was emphasized.

The Contructivist learning theory and Revised learning Approach by Duff provided the theoretical foundation for this work. Overall, the principles referred to the idea that children have varied learning styles and that teachers should critically evaluate the learning opportunities typically provided to pupils and aid them in establishing more appropriate learning approach. Educators should also make sure that activities are designed and implemented so that each student may engage most comfortably. Several studies on the

relationship between students learning approaches and assessment formats were found in the reviews of empirical studies; however, the knowledge gap exists in the context of Colleges of Education tutors assessment formats and their relationship with how students learn mathematics in Ghana. This study, therefore, is conducted to fill such a gap.

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CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter dealt with the methodology for the study, which include the design for the research, the study population, the sampling procedure, instrument use in collecting the data , the procedures for data collection, and how the data was processed and analyzed.

Research Design

A design in research is a roadmap for the inquiry. The design serves as the framework for the investigative process. Mouton (2002) described research design as a collection of principles and instructions that must be followed to answer the research problem, whereas De Vos (2002) defined research design as the complete research process, from problem conceptualization through narrative writing. The study employed a correlational research design. A correlational research design is a quantitative method of inquiry that evaluates the relationship between two variables by determining the pattern of how the two variables covary, that is change together (Kite & Whitley, 2018). The correlational research design aim at identifying variables that have some sort of relationship to the extent that a change in one creates some change in the other and it is descriptive in nature. This study aim at finding relationship between assessment formats used by College mathematics tutors and students learning approach in learning mathematics. This obviously involve relationship between two variables, that is assessment format and learning approach. It also sought to find out the assessment formats mathematics tutors employ in assessing their students. Again the learning approach student-teachers adopt in learning

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mathematics. The strengths of the correlation research design is that it help in studying the statistical relationship between the two variables, It is less expensive and less time-consuming, variables are seen in their natural setting and large data can be gathered in a short period. Correlational design has it own shortcomings, thus the research is limited in its nature; It can only determine the relationship between two variables and not more than two variables and also it cannot have control over the variables that is, it only allows you to observe or spot the variables and their statistical patterns (Kite & Whitley, 2018).

These limitations were carefully evaluated and regulated to guarantee that the study's validity and reliability were not effected. The researcher uses items on the questionnaire that serves as a check to the others to ensure that respondents do not provide untrustworthy data. In addition, the researcher gave the individual set of questionnaires unique codes comprised of the College and the program so that the questionnaire that was not well completed or the questionnaire that was not collected were easily traced and collected.

Study Area

The study took place at three different locations throughout the Western-North Region. Enchi in the Aowin District, Debiso in the Bia-West District and Sefwi-Wiawso in the Sefwi-Wiawso Municipality. Per the 2014, Population and Housing Census, Aowin District has 117,886 people, representing 5% of the total region's population of the Western-North region with the total of 2,376,021. Females constitude 48% of the population, while males made up of 52%. Rural areas are made-up of more than 90% of the Districts population.

The District has a young population, with 40.8% of the inhabitants under 15. As a result, the district's demographic pyramid has a fairly broad base that

tapers off with a modest proportion of older people (4.4%). There are 114 pre-schools in the district, including 87 public schools and 27 private schools. The district also contains 112 elementary schools, 95 public and 27 private. The district has a total of 66 Junior High Shools (JHS), including 48 public and 18 private elementary schools, as well as one Senior High/Technical school and one College of Education, which was established in 1965 and started awarding Cert B (Post Middle), then to the award of Cert A (Post middle) in 1987 the College started the ward of 3 years (Post-Secondary) certificate, in 2005 the College started with diploma Certificate (Ghana Statistical Service, 2014). Currently, the College is operating degree programmes that started in 2018.

Debiso is also located in the Bia-West district. The Bia-West District has an estimated population of 88,939 individuals, accounting for 3.7% population of the region. Males made up of 51.4%, while females made up of 48.6%. Rural areas have a population of 73.4% higher than urban areas, which is 26.6% lower.

The district's population is predominantly youthful, with a big base demographic pyramid that tapers off to a small number of adults. The overall reliance ratio for the District is 79.1, with male and female dependency rates of 79.0 and 79.2 respectively. The district also has one College of Education, established in 2016. The College started with a diploma awarding institution and currently running a degree program.

The Sefwi-Wiawso Municipality has 139,200 people, with men accounting for 50.1% and women for 49.9%, respectively (Population and Housing Census, 2014). With 41.2 percent of the inhabitants under 15, the municipality has a young population. The elderly (those over the age of 65)

make up 5.2% of the population. The sex ratio in urban areas is 94.2, while in rural areas, it is 104.1, showing that although men prevail in rural areas, females predominate in urban areas . One College of Education is situated in the municipal and established in 1952 under Wiawso Body Corporate Training College. The College started awarding Cert B post middle, then Cert A Post middle, then Cert A in 1987, in 2005 it started with Diploma (Ghana Statistical Service, 2014) and is currently pursuing a degree that started in 2018.

Figure 1: A combined map of the three study areas

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Population

The total number of people about whom the researcher collects data and generates conclusions is known as population (Bless, Higson-Smith & Kagee, 2006).

The study's target population was all the Colleges of Education in the Western-North region student-teachers. There were 2,708 student-teachers in all, with 1,552 male and 1,156 females. All second-year students at the Colleges of Education in Western-North region namely: Bia Lamplighter College of Education, Enchi College of Education and Sefwi-Wiawso College of Education made up the studys accessible population. According to the Colleges report, there were 865 students in total among the three Colleges (College Data 2020)

Table 1 shows the demographic distribution from the (3) three Colleges of Education.

Table 1-*Distribution of Population by Colleges*

Population Colleges	Male	Female	Total
Bia	74	64	138
Enchi	186	149	335
Sefwi-Wiawso	258	134	392
Total	518	347	865

Source: College Data (2020)

Sampling Procedure

Utilising a sample size determination table developed by Krejcie and Morgan (1970), a sample of 265 was picked using a multi-stage sampling technique.

Stage one: The purposive sampling technique was used to select the three Colleges of Education in the Western-North region, for the study.

Stage two: the level 200 students of the three Colleges of Education were purposively selected because at the time I visited the Colleges for their data (population) for the study the level 300 student-teachers were on out-programme, level 100 student-teachers were fresh on campus and the level 200 student-teachers were those available and have been in the system for long.

Stage three: The sample size for each College was then determined using the proportionate stratified sampling technique based on gender. To obtain the sampling ratio for the selection of the respondents for each College the researcher divided the sample size (265) by the accessible population (865) and had 0.3064. This ratio was then multiplied by the total number of student-teachers in each of the Colleges to obtain the sample for each College.The lottery method of the simple random selection was used to determine the number of participants from all strata from the various Colleges to determine the sample size. Table 2 shows the number of participants chosen from each College.

Table 2- *Distribution of Sample Base on Colleges*

Colleges	Male	Female	Total
Bia	22	20	42
Enchi	57	46	103
Sefwi-Wiawso	79	41	120
Total	158	107	265

Source: Field Data (2021)

Data Collection Instrument

The questionnaire was the primary tool used in the research. This is due to the fact that large amounts of data can be obtained from a large number of people in a short amount of time and at a low cost (Creswell, 2013).

A researcher can typically measure questionnaire findings efficiently and easily and they may be reviewed more systematically and comprehensively than the results of other research instruments. Quantitative data according to positivists, is a data that can be employed to develop new ideas or test preconceived notions (Creswell, 2013). The information was gathered utilizing a three-part self-reporting questionnaire methodology. (Section A: Study demographics, Section B: Student learning approaches and Section C: Assessment formats)

Section A: (Demographics of the Respondents)

In this section of the questionnaire, the demographic characteristics of the participants were collected, including sex, age and programme offered. There were 9 items under this part categorized into sex (2 items), age range (5 items) and programme offered (2 items).

Section B: (Students Learning Approaches)

The questionnaire used to determine students learning approaches was derived from Entwistle, Trait, and McCunes (2000) surveys to assess learning approach. This was done because it is customary to employ an existing instrument for a complex and multidimensional variable if one exists (Punch, 2009). There are 25 items under this part categorized into three student learning approaches. These three types of learning approaches are: deep learning (8 items), surface learning (10 items) and strategic learning (7 items). Each

question was answered using a four-point Likert kind of scale: strongly disagree (1), disagree (2), agree (3) and strongly agree (4).

Section C: (Assessment Formats)

This section dealt with assessment formats, which contained five (5) items. The participants were to choose the test format base on the four likert kind of scales that is: not used (1), not often used(2), often used(3) and most often used (4).

Validity and Reliability

To verify the instrument's reliability, I pre-tested the questionnaire at Komenda College of Education before carrying out the actual study in the Western-North Region to establish the reliability. This was designed to decrease ambiguities in the wording of the instrument and distinguish repetitive items.

The researcher chose Komenda College of Education because their characteristics are similar to those of the Colleges chosen for the study. The instruments reliability was determined using Cronbach alpha, a measure of internal consistency. The cumulative reliability score of the student learning approach was 0.71 and the sub-section reliability ratings were: deep learning approaches (0.73), Surface learning approach (0.69) and Strategic learning approach (0.71). When the reliability coefficient value is closer to 1, the test is more reliable, but when the reliability coefficient value is closer to 0, the test is less reliable (Rasmussen, Fiore, Naik, Horowitz, McGinnis, & Schultz, 2012).

The purpose of the pre-testing was to identify any flaws in the instrument, double-check the validity of the test or items and get feedback from respondents to enhance and modify the instrument. The questionnaire items that were deemed to be confusing or unsuitable were recreated. Pre-testing allowed

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me to identify and correct problems in the instrument. The necessary changes were made prior to the questionnaire's final administration. Before the final construction of the questionnaire, item numbers 4, 9, 12, 20, 23, and 25 were rephrased.

Ethical Considerations

The researcher followed the most important ethical research standards (Bless, Higson-Smith & Kagee, 2006).

Informed Consent: a form the respondents were made to fill indicating their willingness to be involved in the research.

Voluntary Participation: The respondents were also advised of their opportunity to opt-out of the study. Participants would be allowed to withdraw from the program with no repercussions.

Right to Privacy: Participants were guaranteed their privacy and the researcher inform them not to make known their identities . Concealment was also enforced by safeguarding all collected data and not making it available to others.

Protection from Harm: The researcher would reassure the respondents that their participation in this study would bring them no bodily discomfort, embarrassment, or mental hardship.

Data Collection Procedures

The researcher obtained an introductory letter from the department of Education, that explained the study's goal, the importance of individual participation and the anonymity and confidentiality of respondents remarks. The collected letters and proposals were presented to the Institutional Review Board (IRB) for review and ethical clearance. A letter from the Institutional Review Board and an introduction letter from the Department of Education were sent to

the Directors of each district and the Principals of the institutions, for them to grant the researcher permission to administer the questionnaire. The researcher then trained two tutors to assist with distributing and collecting of the questionnaires.

Together with the two assistants, the researcher visited the Colleges of Education to familiarise themselves with and obtain the consent of students for data collection. The researcher also informed respondents to seek any clarification if the need be. The researcher then scheduled a date with the Principals. The researcher administered the questionnaire on the stimulated date to the respondents. The process lasted for 30 minutes with a period of 2 weeks.

Data Processing and Analysis

Before the analysis, the data for this study was double-checked, updated and transcribed. The data was entered into the required software to generate the results (SPSS, version 22), then cleaned to remove any errors that may have been overlooked. The respondents background information was analyze using descriptive statistics like frequency and percentages. The responses to research question one were analyzed with the use of frequency and percentages. The second study research issue was analyze using means and standard deviation. Hypothesis one was tested with the use of Chi-square. Research hypothesis two was tested using an independent sample t-test and research hypothesis three was tested using an ANOVA .

Chapter Summary

This chapter presented the methodology used in conducting the study in detail. It examined the research design, the study area, population, sampling procedures and data collection instrument. The chapter further presented the

validity and reliability of the instrument and ethical considerations. The pre-testing, data collection procedures, were detailed and the statistical analysis used to test the hypothesis of the study.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the findings and debates from the research questions and hypotheses. The study looked at the relationship between College Mathematics tutors' assessment formats and students' learning approaches in learning Mathematics in Western-North Region . In this study, the correlational research design was adopted. Purposive sampling was used to choose a sample of 265 participants. After the collection of the data, the return rate was 98% of the sample size. Two research questions and three research hypotheses guided the study. After that, frequency and percentages was used to analyze research questions one, means and standard deviation to analyze research question two, Chi-square to test hypothesis one, data on hypothesis two was tested using the Independent Sample T-test and the data on hypothesis three was tested using ANOVA. A total of 260 student-teachers from the three Colleges of Education answered the questionnaire. Bia Lamplighter College of Education (42), Enchi College of Education (101), and Sefwi-Wiawso College of Education (117).

Background information of Respondents

This section related to the demographic information of the student-teachers who took part in the study. Demographic variables for the student-teachers include, their sex, age and progamme of study. The data was analysed using frequencies and percentages to indicate how the demographic data represented the student-teachers in the Colleges of Education in the Western-North region.

Table 3 offers the sex distribution of the selected student-teachers in the Colleges of Education in the Western-North region for the study.

Table 3- *Distribution of the Respondents by Sex*

Gender	Frequency	Percentage
Male	153	58.8
Female	107	41.2
Total	260	100.0

Source: Field Data (2021)

Table 3 demonstrates that the majority of the participants were males (n=153, 58.8%) while few were female student-teachers (n=107, 42.2%). This implies that more of the male student-teachers answered the questionnaire than the female student-teachers.

Table 4 presents distribution of results on the respondents by Age of student-teachers in the Colleges of Education in the Western-North region.

Table 4- *Distribution of the Respondents by Age*

Age Range	Frequency	Percentage
Below 21	7	2.7
21-25	200	76.9
26-30	45	17.3
31-35	5	1.9
36-40	3	1.2
Total	260	100

Source: Field Data (2021)

Table 4 reveals that most of the College student-teachers were between 21- 25 (n=200, 76.9 %) and fewer were aged between 36-40 (n=3, 1.2%). This implies that more of the students age between 21-25 answered the questionnaire and fewer between the age 36-40, also answered the questionnaire.

Result for the programme of study by the student-teachers are presented in table 5.

Table 5- *Distribution of the Respondents by Programme of Study*

Programme	Frequency	Percent
Primary Education	41	15.8
J.H.S Education	219	84.2
Total	260	100.0

Source: Field Data (2021)

Table 5 reveal that the majority (219) of the College student-teachers representing 84.2% offered Junior High School Education and fewer (41) College student-teachers representing 15.8% offered Primary Education. This implies that more of the student-teachers offering J.H.S education programme answered the questionnaire than those offering Primary education.

Research Question One: What assessment format is often used by mathematics tutors in Colleges of Education?

One of the aim of this study was to find the assessment formats often used by mathematics tutors in Colleges of Education in assessing their student-teachers. To achieve this, the student-teachers were made to choose from the following likert kind of scale; not used, not often, often , more often for the differents assessment formats. The scales was scored as Not Used =1,

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Not often=2, Often = 3 , More often = 4. The responses of the respondent were then put into two , not used and used (not often, often and more often). Frequency and percentages were then calculated for each assessment format. The results are presented in Table 6.

Table 6- *Test Format used by Mathematics Tutors in Colleges of Education*

Test format	Not Used		Used	
	Frequency	Percentages	Frequency	Percentages
Multiple choice	51.0	19.6%	209	80.4
Essay	92.0	35.4%	168	64.6
Short Answer	100	38.5%	160	61.5
True/False	104	40.0%	156	60.0
Matching	167	64.2	93.0	35.8

Source: Field Data (2021)

The results showed that among the five assessment formats, four were predominantly used by mathematics tutors in assessing their students. These include; multiple-choice (n= 209, 80.4%), essay(n= 168, 64.6%) , short-answers (n= 160, 61.5%) and true/false(n= 156, 60.0%) but among the four multiple-choice item was mostly used by the tutors. However, most students said matching type (n=167, 64.2%) was not used by their tutors in assessing them.

Research Question Two: What learning approaches are often used by the College of Education Students in the learning of mathematics?

Another aim of this study was to find the learning approaches often used by the College of Education Student-teachers in learning mathematics .To achieve this, the student-teachers were made to choose from the following likert

kind of scale; Strongly Disagree =1, Disagree =2, Agree=3, Strongly Agree=4. The researcher set 2.50 has criterion value (CV) for the scale. To calculate the (CV=2.50), the scores were sum up and divided by the total number of scale (4+3+2+1= 10/4=2.50). It must be noted that all the items were positively worded. Therefore, to interpret the means, any item that scored a mean of 0.0 to 2.50 was regarded as student-teachers disagreeing to the items indicating that they do not used that learning approaches and a mean of 2.60 to 4.0 was interpreted as student-teachers agreeing to the items as indicating that they use that learning approaches. The results are presented in Table 7.

Table 7- *Students Learning Approaches*

Learning Approaches	N	Mean	Standard Deviation
Strategic Learning	260	3.01	.08
Deep Learning	260	2.99	.10
Strategic Learning	260	2.81	.13

Source: Field Data (2021)

Table 7 shows that students use all the learning approaches when assessed in mathematics with strategic learning approach ($\bar{X} = 3.01$, SD = .08) , deep ($\bar{X} = 2.99$, SD = .10) and surface learning approaches ($\bar{X} = 2.81$, SD = .13) but among all the learning approach the most used one is strategic learning approach($\bar{X} = 3.01$, SD = .08).

Research Hypothesis One: H₀: There is no statistically significant relationship between assessment formats often used by mathematics tutors' and students learning approaches.

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The first hypothesis is to find the relationship between assessment format often used by mathematics tutors and students learning approach in learning mathematics. The relationship was tested using Chi-square. The result after analysis is shown in Table 8.

Table 8- *Assessment formats and learning approaches cross tabulation*

Assessment Formats		Learning Approaches			
Multiple-Choice		Deep	Surface	Strategic	Total
	Count	12	65	151	228
	% within AF	5.3%	28.5%	66.2%	100%
	Adjusted R.	-1.6	1.9	-1.0	-
Short-answer Type	Count	4	4	24	32
	% within AF	12.5%	12.5%	75%	100%
	Adjusted R.	1.6	-1.9	1.0	
Total	Count	16	69	175	260
	% within AF	6.2%	26.5%	67.3%	100%

Table 9-*Chi-Square Test of assessment formats and learning approaches*

Pearson's χ-value	F	Df	Asymptotic Sig. (2-sided)
.144	5.419	2	.047

The aim was to examine the relationship between assessment formats used by tutors and learning approaches that students adopt in responding to the

formats. The results showed a significant relationship between assessment formats and learning approaches, $F(2) = 5.419$, $p = .047$. The connection was positive (χ-value = .144), however weak. This implies that certain assessment formats have higher probability of being seen with certain approach of students learning.

Post hoc analysis of the data further showed that two assessments formats were predominantly used by College Mathematics tutors, that is, multiple-choice and short-answer type (refer to Table 8). Multiple-choice assessment formats were found to be aligned with strategic learning approach among majority of the students (n= 151, 66.2%). This was followed by substantial number of students (n=65, 28.5%) who also tend to use surface learning approach when responding to multiple-choice test items. For the deep learning approach, few students reported to use it when responding to multiple-choice tests items. In the case of the short-answer format, majority (n = 24, 75%) of the students reported to use strategic whereas few (n = 4, 12.5%) reported to employ deep and surface learning approaches when dealing with short-answer type items.

Generally, the findings appear to indicate that among the numerous assessment formats, multiple-choice and short-answer type test tend to dominate in the college for the teaching and learning of mathematics. For the foregoing formats, students tend to employ strategic approach in responding to test items of that nature.

Research Hypothesis Two: H₀: There is no statistically significant difference between students in their learning approaches based on sex.

An independent sample t-test was used to test hypothesis two. The assumptions of the independent sample t-test was tested. The normality and homogeneity test of variance were run. The results of the normality test had a sig. value greater than 0.05. The homogeneity test were as follows: Deep learning approach (p = .083) , Strategic learning approach (p = .507) which are greater than .05, hence equal variances were assumed but for surface (p = .003) which is p < .05 hence assumption was violated. Table 10 shows the results of the analysis.

Table 10- *Descriptive Statistics of Learning Approaches based on sex*

Learning Approaches	Gender	N	Mean	SD	t-value	Df	p-value
Deep	Male	153	3.0074	0.51264	0.681	258	0.496
	Female	107	2.9614	0.56490			
Surface	Male	153	2.7458	0.49484	-2.111	195.484	0.036*
	Female	107	2.8972	0.61605			
Strategic	Male	153	3.0271	0.62265	0.425	258	0.671
	Female	107	2.9933	0.63929			

Source: Field Data (2021) p < 0.05

Table 10 reveals no significant difference between male and female students when employing the deep and strategic learning approach. However, on surface learning approach, there was a statistically significant difference in how male and female students learned. Female students appeared to be more interested in the use of surface learning approach than their male colleagues.

3. **Research Hypothesis Three: H₀: There is no statistically significant difference among students learning approaches based on the age of the students.**

Hypothesis three was tested using ANOVA. The analysed result is shown in Table 11 below:

Table 11- *Learning approach based on the age of students*

		Sum of Squares	Df	Mean Square	F	Sig.
Deep Learning	Between Groups	1.101	4	.275	.964	.428
	Within Groups	72.802	255	.285		
	Total	73.903	259			
Surface Learning	Between Groups	.674	4	.168	.549	.700
	Within Groups	78.219	255	.307		
	Total	78.893	259			
Strategic Learning	Between Groups	.132	4	.033	.082	.988
	Within Groups	102.190	255	.401		
	Total	102.322	259			

Field Data (2021)

From the Table above, it could be seen that there is no statistical difference in the students learning approaches based on age of the students. With deep learning approach there is no statistical difference with respect to the age of the students ($P > 0.05$). In addition, there exist no statistical difference in students' surface learning approach based on age of the students ($P > 0.05$). Finally, there is no statistical difference in students that learn by strategic approach based on age of the students ($P > 0.05$). This means that the learning approach that a student adopt do not depend on the age of the student.
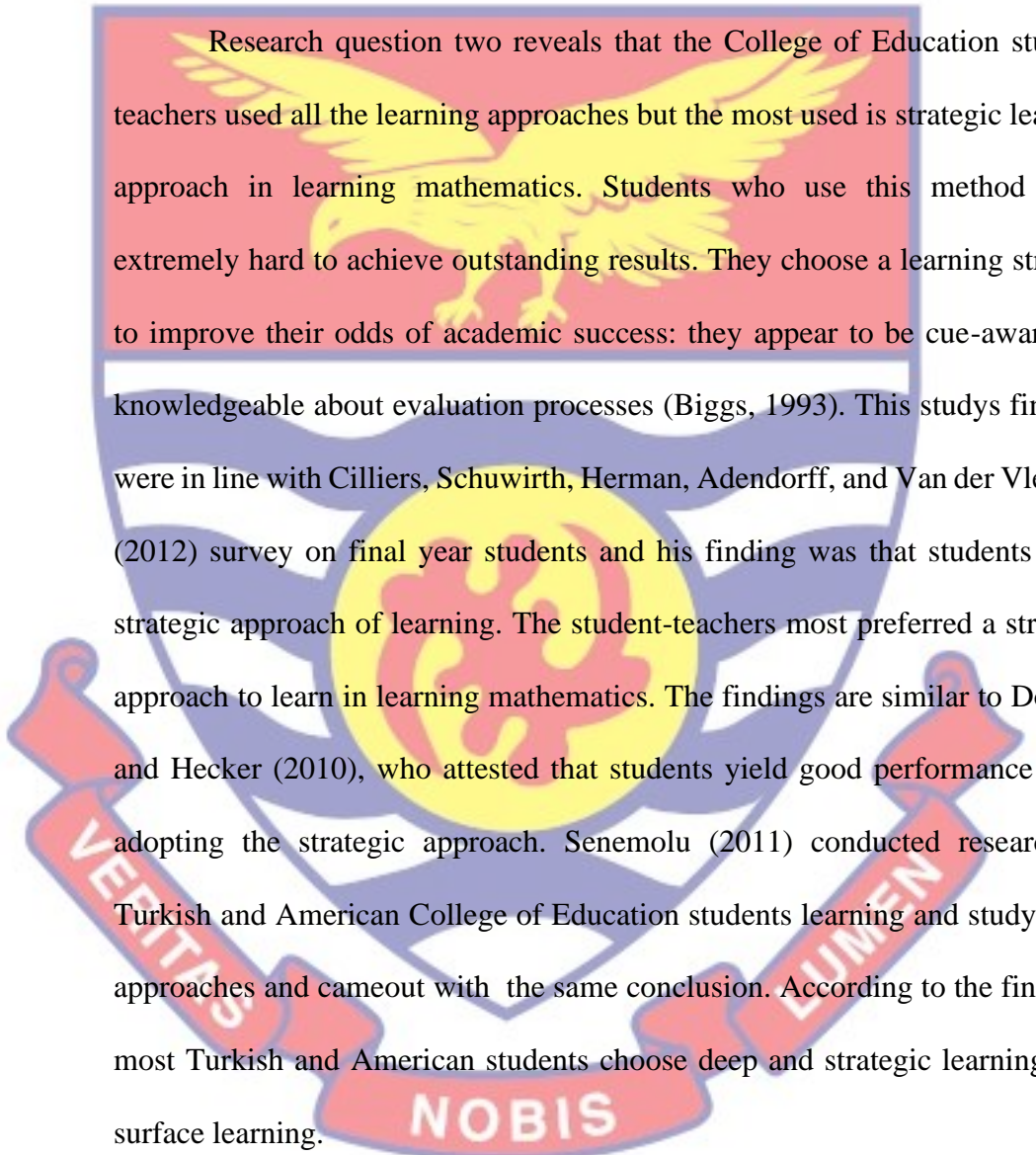
Discussion of Findings

Assessment format often used by Mathematics Tutors at the College of Education

Research question one was about the assessment formats often used by Mathematics Tutors at the Colleges of Education in assessing their students. The results showed that among the five assessment formats four were predominately used by the tutors in assessing their student-teachers. These include: multiple-choice type tests, essay, short-answers and true/false but multiple-choice was often used by the tutors (n= 209, 80.4 %) and matching - type item was not used. The finding in the current study is in line with Singh, Lebar, Kepol, Rahman, and Mukhtar (2017), who explored the assessment format adopted by lectures at Malaysian higher learning institutions and pointed out that lecturers most used multiple-choice items mostly when assessing their students due to its numerous advantages such as easy in marking, being able to cover much of the topics being taught. Notwithstanding the finding also agrees with Amoako (2018), who investigated the assessment format used by distance tutors at the University of Cape Coast; he found that tutors preferred using

multiple choice in assessing students. However, the findings contradict with that of Dandis (2013), who found that course tutors preferred using essay-type tests than multiple-choice types in assessing the students.

Learning Approaches often used by students of the College of Education in Learning Mathematics

Research question two reveals that the College of Education student-teachers used all the learning approaches but the most used is strategic learning approach in learning mathematics. Students who use this method study extremely hard to achieve outstanding results. They choose a learning strategy to improve their odds of academic success: they appear to be cue-aware and knowledgeable about evaluation processes (Biggs, 1993). This studys findings were in line with Cilliers, Schuwirth, Herman, Adendorff, and Van der Vleutens (2012) survey on final year students and his finding was that students adopt strategic approach of learning. The student-teachers most preferred a strategic approach to learn in learning mathematics. The findings are similar to Donnon and Hecker (2010), who attested that students yield good performance when adopting the strategic approach. Senemolu (2011) conducted research on Turkish and American College of Education students learning and study skills approaches and cameout with the same conclusion. According to the findings, most Turkish and American students choose deep and strategic learning over surface learning.

Relationship Between Assessment Formats and Student's Learning Approach

The findings on the relationship between assessment formats and student learning approach reveals that among the numerous assessment formats,

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multiple-choice and short-answer type test tend to dominate in the College for the teaching and learning of mathematics. For the foregoing formats, students tend to employ strategic approach in responding to test items of that nature.This findings contradict with the findings of Scoullar (as cited in Adusei, 2017) who discovered that students adopt surface learning when assessed with multiple-choice item. Also Scoullar and Prosser (1994) find out that student use deep learning approach when assessed with multiple-choice test. The findings of Scoullar and Prosser differ due to the individual differences.

Differences in Students Learning Approaches Based on Sex

The findings on students learning approach based on sex reveal that female students prefer to learn using the surface learning approach than their male counterpart. This implies that female students prefer root learning to learn with understanding. Students that take a deep approach to learning try to discover meaning in what they are learning and embrace the learning process, according to Duff (2004). Tests that only require a recall of information encourage a surface approach, but tests that demand a deeper knowledge stimulate a deep approach. This findings was in line with the findings of Adusei (2017) who discover that the female students adopt surface learning approach when assessed with English language and male adopt deep learning approach .

Finally, students that take a strategic approach to learning want to organize their study schedules, manage their time, and learn what it takes to get the best grade possible (Hawk & Shah, 2007, p.11). They also employed rote learning to retain things they thought would be necessary for exam success (Marton & Saljo 1976b).

Differences Between Students Learning Approaches Based on Age

The result of students learning approach based on age shows that the learning approach students adopt does not depend on the age of students. This findings differ from Baeten et al. (2010), who discovered that age is one of the factors impacting students learning approach. Younger students are more concerned with memorize and utilize surface learning approach, whereas older students are more interested in deep learning approach. Lower-level teachers should create essay questions that target higher-level behaviors to encourage pupils to learn more deeply about the subjects.

Chapter Summary

The findings on assessment formats often used by mathematics tutors reveal that out of the five assessment formats, four were predominantly used by the tutors these include the following ; multiple- choice item format, essay, short-answers and true/false but among the four they use multiple-choice item frequently. The result on research question two base on learning approach used by student-teathers in learning mathematics reveals that student-teachers adopt all the learning approach but the one that dominate is strategic learning approach. The hypothesis testing on the relationship between assessment formats and students learning approach reveals that multiple-choice item format and short-answers are mostly used by mathematics tutors in assessing their student-teachers and they also adopt strategic approach in learning mathematic when those formats are used in assessing them. The results of the hypothesis on students learning strategy based on sex demonstrate that female students prefer surface learning. Finally, the findings on the learning approach based on age demonstrate that students learning approach is independent of their age.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

Overview

This study aimed to look at the relationship between tutor's assessment formats and students learning approaches in mathematics among student-teachers in Colleges of Education in Western-North Region. The study objectives were to look into the following:

1. Assessment formats often used by mathematics tutors in Colleges of Education.

2. Learning approaches often used by students of the Colleges of Education in the learning of mathematics.

3. Relationship between assessment formats often used by tutors and students learning approaches.

4. Difference in the learning approaches of students based on sex.

5. Difference in learning approaches of students is based on the age of the students.

The investigation was directed by two research questions and three hypotheses. The study was carried out using a correlational research design. The questionnaire served as the primary means of acquiring data for the research questions and hypothesis testing. A sample of 265 student-teachers was chosen using a multi-stage selection approach. Frequencies, percentages, descriptive statistics (mean and standard deviations), Chi-square, independent sample t-test and ANOVA were used to examine the data collected.

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Summary of Key Finding

1. Among the five assessment formats, four were predominantly used by mathematics tutors in assessing their students. These include; multiple-choice (n= 209, 80.4%), essay(n= 168, 64.6%) , short-answers (n= 160, 61.5%)and true/false(n= 156, 60.0%) but among the four multiple-choice was mostly used by the teachers. However matching-type was not used to assesses their students.

2. Student-teachers adopt all the learning approaches in studying mathematics but the one most of them adopt is strategic learning approach.

3. Multiple-choice and short-answer type test tend to dominate in the College of Education for the teaching and learning of mathematics. For the foregoing formats, students tend to employ strategic approach in responding to test items of that nature.

4. Female students use the surface learning approach more than their male counterparts studying mathematics.

5. The age of students did not influence the type of learning approaches adopted by students in studying mathematics.

Conclusions

It is concluded that mathematics tutors in these colleges make use of variety of assessment formats except matching type test. Again student-teachers were adopting all the learning approaches due to the variety of assessment formats that their tutors use in assessing them, this implies tutors test formats have a significant influence on students learning approaches.

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Tutors tends to use multiple-choice item format and short-answers and student-teachers use strategic approach when assessed with those assessment format. Student-teachers tends to use all the learning approach except surface learning approach which female tends to adopt it more than their male counterpart.

In respective of their ages student-teachers tend to adopt learning approach equally.

Recommendations

The following suggestions are offered as a result of the study findings:

1. Tutors are encourage to continue using the various type of assessment formats in other to improve student learning.

2. Tutors and academic counselors should organize seminers for student-teachers to continue the use of strategic learning approach since it aid them in gaining good grades in their academic and also equip them holistically in their profession.

3. Tutors must critically evaluate the test formats that are commonly available to students and assist them in developing more effective learning approaches.

4. Female student-teachers are advise to resist from the use of surface learning approach and adopt more of deep and strategic approach in learning to aid them understand the content of what being learnt .

Suggestions for Further Research

1. Researchers should explore adopting a qualitative approach to gather detailed information from tutors and students on test formats and learning approaches suitable for achieving maximum performance.

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2. A replication study can be done in other regions on test formats and learning approaches adopted by college students and their influence on academic performance.

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APPENDICES

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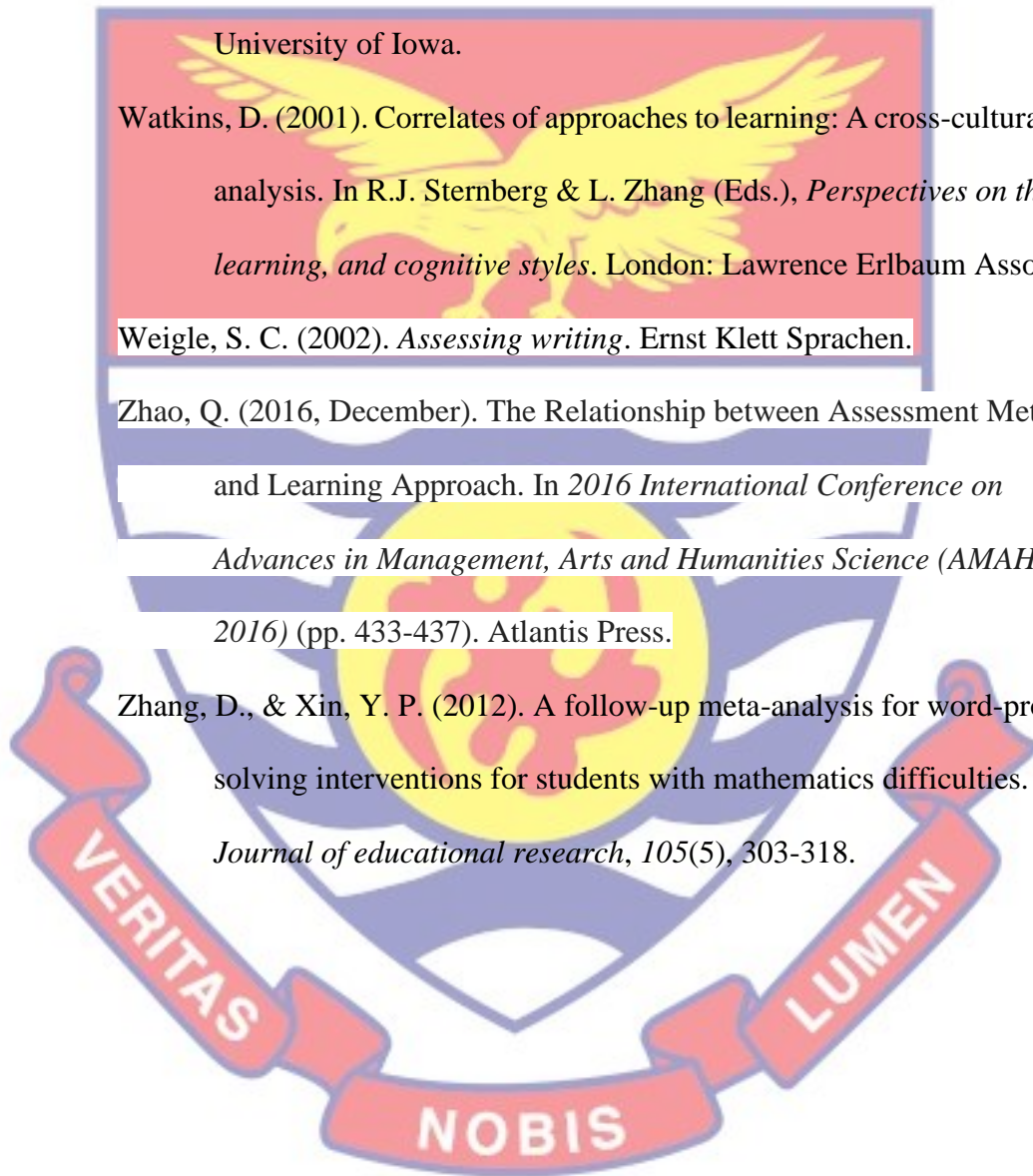
APPENDIX A

UNIVERSITY OF CAPE COAST

COLLEGE OF DISTANCE EDUCATION

DEPARTMENT OF EDUCATION

THESIS TOPIC:

RELATIONSHIP BETWEEN ASSESSMENT FORMATS USED BY MATHEMATICS TUTORS AND STUDENTS LEARNING APPROACHES.

QUESTIONNAIRE FOR STUDENTS

Dear Respondent,

This questionnaire aims at collecting data that will help the researcher to "**investigate relationship between assessment formats used by mathematics tutors and students learning approaches .** The exercise is for academic purpose only. Whatever information you will give will be kept confidential. The questionnaire measures your perception regarding the phenomenon under study. Instructions to fill out the questionnaire are given at the top of each section. Thank you very much for your cooperation.

Questionnaire Number -------------------------------

Date --

SECTION A:

BACKGROUND DATA OF RESPONDENT.

Please tick (√) or provide the appropriate response.

1. Gender

   Male   [   ]   Female   [   ]

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2. Age range

Below 20 [   ]   20 – 25 [ ]   26 -30   [ ]

31 – 35 [ ]

36 -40 [ ]   41-50 [ ]   51- 60 [ ]

3. Programme offered

Primary Education [ ]   J.H.S Education [ ]

SECTION B

STUDENTS LEARNING APPROACHES

For each of the statements, indicate by ticking (√) the extent to which you agree.

The responses are on the scale of **1-4**, where **1** = Strongly Disagree **[SD], 2** =

Disagree **[D], 3** = Agree **[A]** and **4** = Strongly Agree **[SA].**

NS	Statements	SD	D	A	SA
	Deep Learning Approach				
1	I am not prepared just to accept things I'm told in class; I have to think about every information carefully to understand what it actually means.				
2	Sometimes I find myself thinking about what I was taught in class even when I am outside the lecture room doing my normal house chores.				

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NS	Statements	SD	D	A	SA
3	I try to relate ideas that I come across in one course to other topics or courses whenever possible.				
4	When I am reading an article or a book, I try to work out for myself exactly what is being said.				
5	I always seek for an understanding of certain concepts on my own before we learn them in class.				
6	When I am working on a new topic, I try to see in my own mind how all the ideas fit together.				
7	It is important to me to be able to follow the argument or see the reasoning behind what I read.				
8	I look at the evidence carefully and try to reach my own conclusion about things I am studying.				
	Surface Learning Approach				
9	Often, I feel I am getting overwhelmed with course contents that are too much for me.				
10	I often have trouble making sense of the things I have to learn.				
11	Often, I lie awake worrying about the amount of work I think I will not be able to do.				

NS	Statements	SD	D	A	SA
12	Although I can remember the facts and details, I often can see the overall picture.				
13	Sometimes I worry about whether I will ever be able to cope with the academic work properly.				
14	I spend quite a lot of my time repeating or rewriting what I read to help me remember them.				
15	Often, I find myself reading materials without really trying to understand them.				
16	I am not sure of what is really important so I try to write down as much as possible notes during lectures.				
17	I think I have to concentrate on memorizing a good deal of what I have to learn.				
18	I often seem to panic if I get behind with my work.				
	Strategic Learning Approach				
19	One way or the other I manage to get hold of books or whatever I need for studying.				
20	I put a lot of effort into making sure I have the most important details at my fingertips.				
21	I organise my study time carefully to make the best use of it.				
22	I work hard when I am studying and generally manage to keep my mind on what I do.				

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NS	Statements	SD	D	A	SA
23	I think I am quite systematic and organised in the way I go about studies.				
24	I generally make good use of my time in terms of learning during the day.				
25	I work steadily throughout the course rather than leaving everything to the last minutes.				

SECTION C

ASSESSMENT FORMATS

Indicate with a tick ([√]) **how often** your tutors use the following test formats in assessing you in mathematics. The responses are on the scale 1-4. 1= Not Used (NU). 2= Not often (NO), 3= Often (O), 4= More often (MO),

NS	Test Formats	Not used	Not often	Often	More often
1	Essay				
2	Multiple-choice				
3	Short answer/Fill in the blanks/ supply				
4	Matching				
5	True and False				

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APPENDIX B

INTRODUCTORY LETTER

UNIVERSITY OF CAPE COAST
COLLEGE OF DISTANCE EDUCATION
GRADUATE STUDIES UNIT

Tel No: 03320-91217
Fax: 03321-13655
E-mail: codepos graduate@gmail.com

University Post Office
Cape Coast

Our Ref: CoDE/G.7/I/4/vol.1/

20th July, 2020

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

A LETTER OF INTRODUCTION – ANGELINA ABAIDOO (ED/MEP/18/0005)

Madam Angelina Abaidoo is a student of the College of Distance Education, University of Cape Coast with student registration number ED/EMP/18/0005. She is pursuing a Master of Philosophy in Measurement and Evaluation. She is working on her thesis on the topic **"Relationship between Assessment format and learning approaches in Mathematics among students in Colleges of Education in Western –North Region."**

We would be grateful if you could help her with the necessary assistance, please.

Thank you.

Yours faithfully,

Eddiebright J. Buadu (PhD)
(Co-ordinator)

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APPENDIX C

ETHICAL CLEARANCE

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
ETHICAL REVIEW BOARD

UNIVERSITY POST OFFICE
CAPE COAST, GHANA

Our Ref: CES-ERB/ucc-edu/v5/21-84

Date: 15th September, 2021

Dear Sir/Madam,

ETHICAL REQUIREMENTS CLEARANCE FOR RESEARCH STUDY

The bearer, Angelina Abaidoo, Reg. No. ED/MEP/18/0005 is an M.Phil. / ~~Ph.D.~~ student in the Department of Education and Psychology in the College of Education Studies, University of Cape Coast, Cape Coast, Ghana. ~~He~~/ She wishes to undertake a research study on the topic:

Relationship between assessment formats of tutors and students' learning approaches in Mathematics among students in Colleges of Education in Western-North Region, Ghana.

The Ethical Review Board (ERB) of the College of Education Studies (CES) has assessed ~~his~~/her proposal and confirm that the proposal satisfies the College's ethical requirements for the conduct of the study.

In view of the above, the researcher has been cleared and given approval to commence ~~his~~/her study. The ERB would be grateful if you would give ~~him~~/her the necessary assistance to facilitate the conduct of the said research.

Thank you.
Yours faithfully,

Prof. Linda Dzama Forde
(Secretary, CES-ERB)

Chairman, CES-ERB
Prof. J. A. Omotosho
jomotosho@ucc.edu.gh
0243784739

Vice-Chairman, CES-ERB
Prof. K. Edjah
kedjah@ucc.edu.gh
0244742357

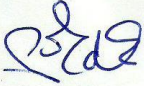Secretary, CES-ERB
Prof. Linda Dzama Forde
lforde@ucc.edu.gh
0244786680