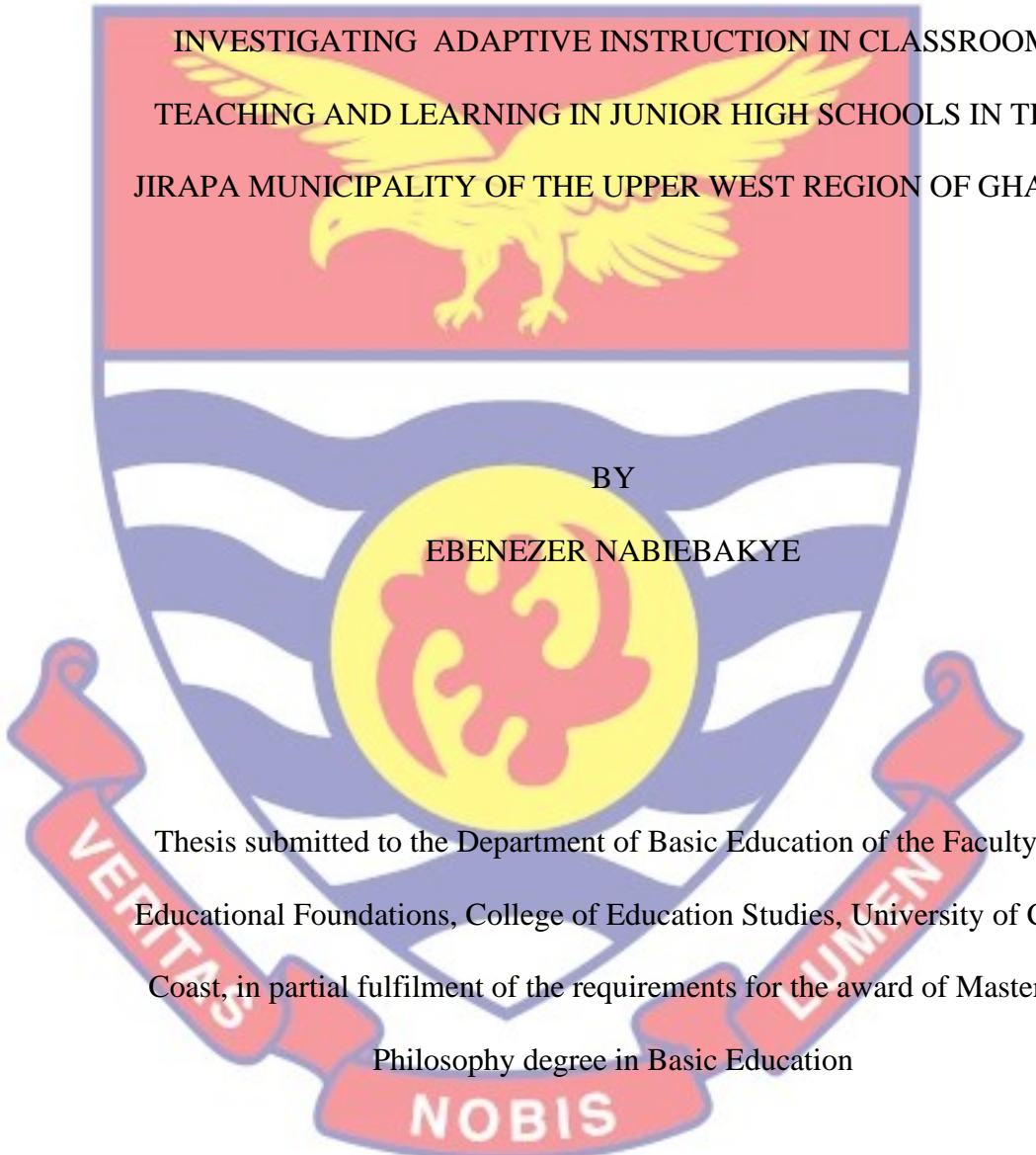© 2021

Ebenezer Nabiebakye

University of Cape Coast

UNIVERSITY OF CAPE COAST

INVESTIGATING ADAPTIVE INSTRUCTION IN CLASSROOM

TEACHING AND LEARNING IN JUNIOR HIGH SCHOOLS IN THE

JIRAPA MUNICIPALITY OF THE UPPER WEST REGION OF GHANA

BY

EBENEZER NABIEBAKYE

Thesis submitted to the Department of Basic Education of the Faculty of

Educational Foundations, College of Education Studies, University of Cape

Coast, in partial fulfilment of the requirements for the award of Master of

Philosophy degree in Basic Education

APRIL2021

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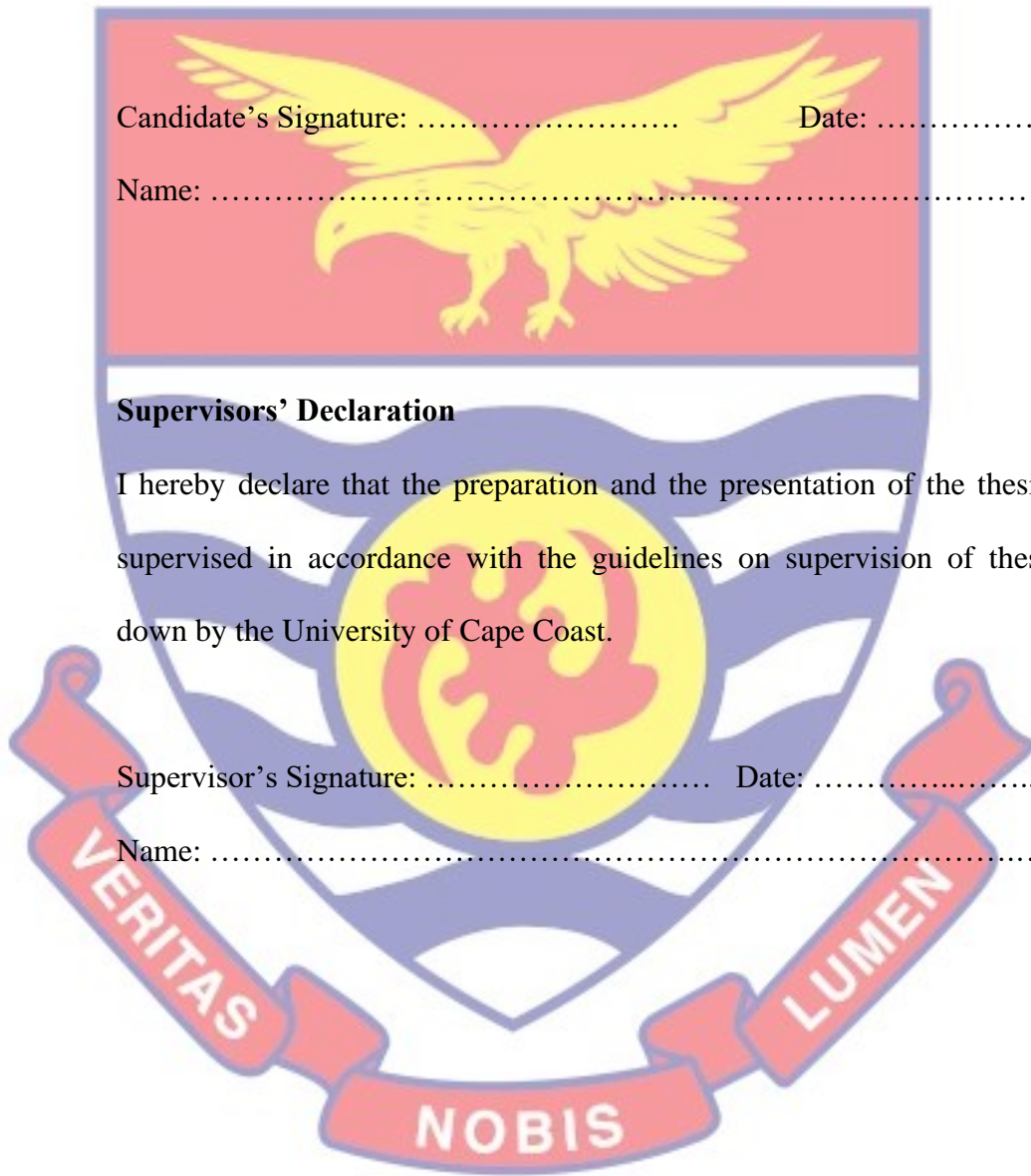
Candidate's Signature: …………………….   Date: ……………….…

Name: ……………………………………………………………………..

Supervisors' Declaration

I hereby declare that the preparation and the 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: ……………………………………………………………….………

ii

ABSTRACT

The study investigated adaptive instruction in classroom teaching and learning in Junior High Schools. Pragmatists philosophy, mixed method approach and cross-sectional research design was adopted for the study. The sample size of 239 made up of 148 trained teachers, 80 Junior High School learners, 10 Headteachers and one Municipal Education Training Officer were selected using cluster, simple random, census and purposive sampling technique. Three instruments were used for data collection: Questionnaire for Teachers and learners, Observation protocol and Interview guide. Descriptive statistics and inferential statistics were used to present results for the study. The key findings revealed that: Teachers considered learner variations when teaching in the classroom. Teachers agreed they employed adaptive instructional strategies in teaching learners with varied learning differences. It was also revealed that using adaptive instruction, learners would gained desirable learning outcomes in the teaching and learning process. Unfortunately, most teachers were not able to use adaptive instruction effectively in the classroom because of challenges such as time constraint, large class size, and overloaded curriculum. The study concluded that there is the need for teachers to use adaptive instruction in their teaching and learning process in the classroom. It is recommended that circuit supervisors and headteachers should ensure that teachers constantly vary their teaching and learning strategies in every single lesson. Also, organize regular in-service trainings for teachers on adaptive instructional concepts. This would ensure that the needs of every learner in the classroom is met.

KEYWORDS

Adaptive Instruction
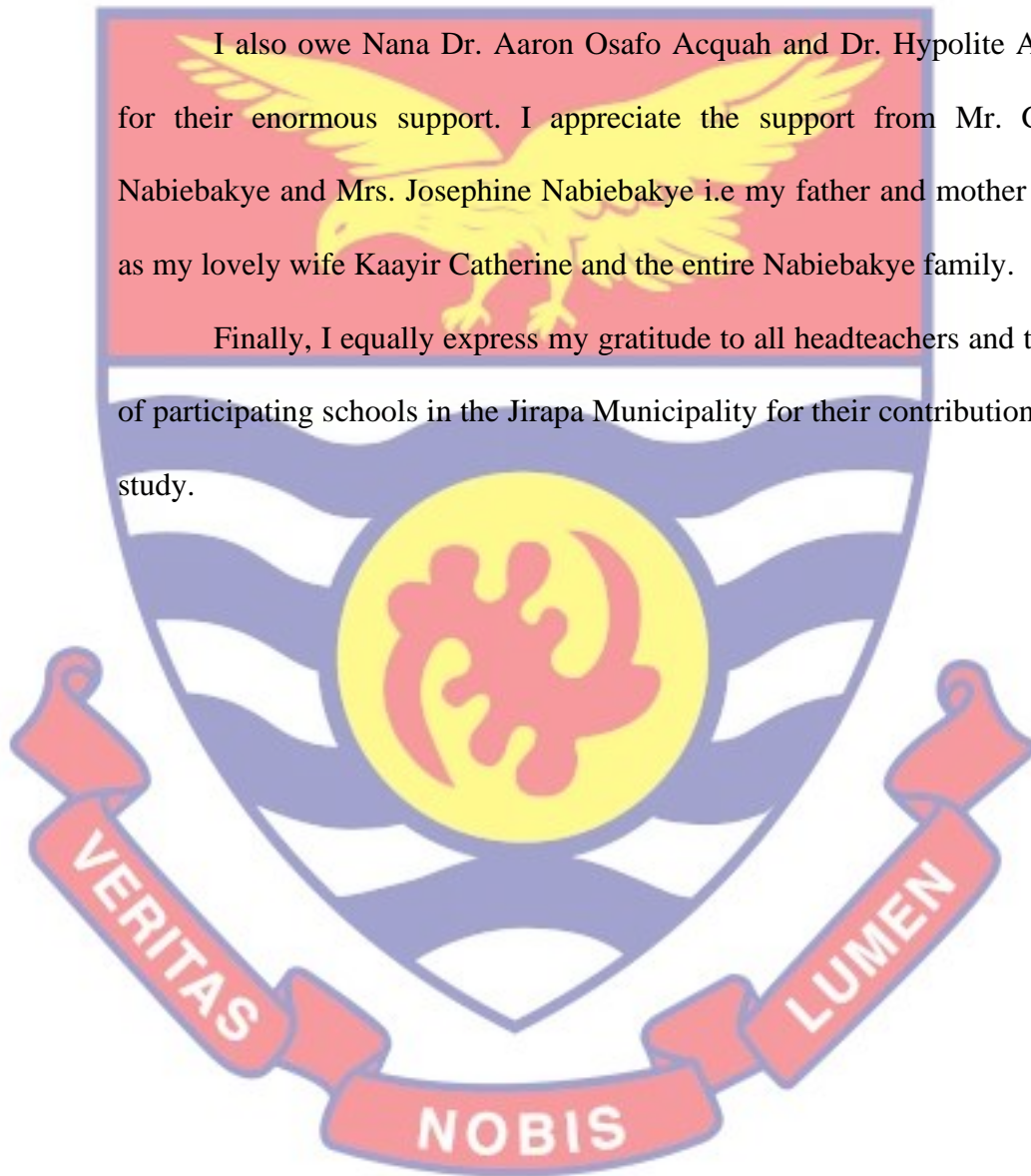
Classroom

Learning

Teaching

ACKNOWLEDGEMENTS

v

DEDICATION

This work is dedicated to Elstan, Nuo-Ire and Elita Nabiebakye

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ALEM	Adaptive Learning Environment Model
CPD	Continuous Professional Development
DI	Differentiated Instruction
IBL	Inquiring Bases Learning
IRB	Institutional Review Board
MI	Multiple Intelligence
METO	Municipal Education Training Officer
OCTP	On Campus Teaching Practice
RPK	Relevant Prior Knowledge
SDL	Self-Directed Learning
TTIs	Teacher Training Institutions
TLRs	Teaching Learning Resources
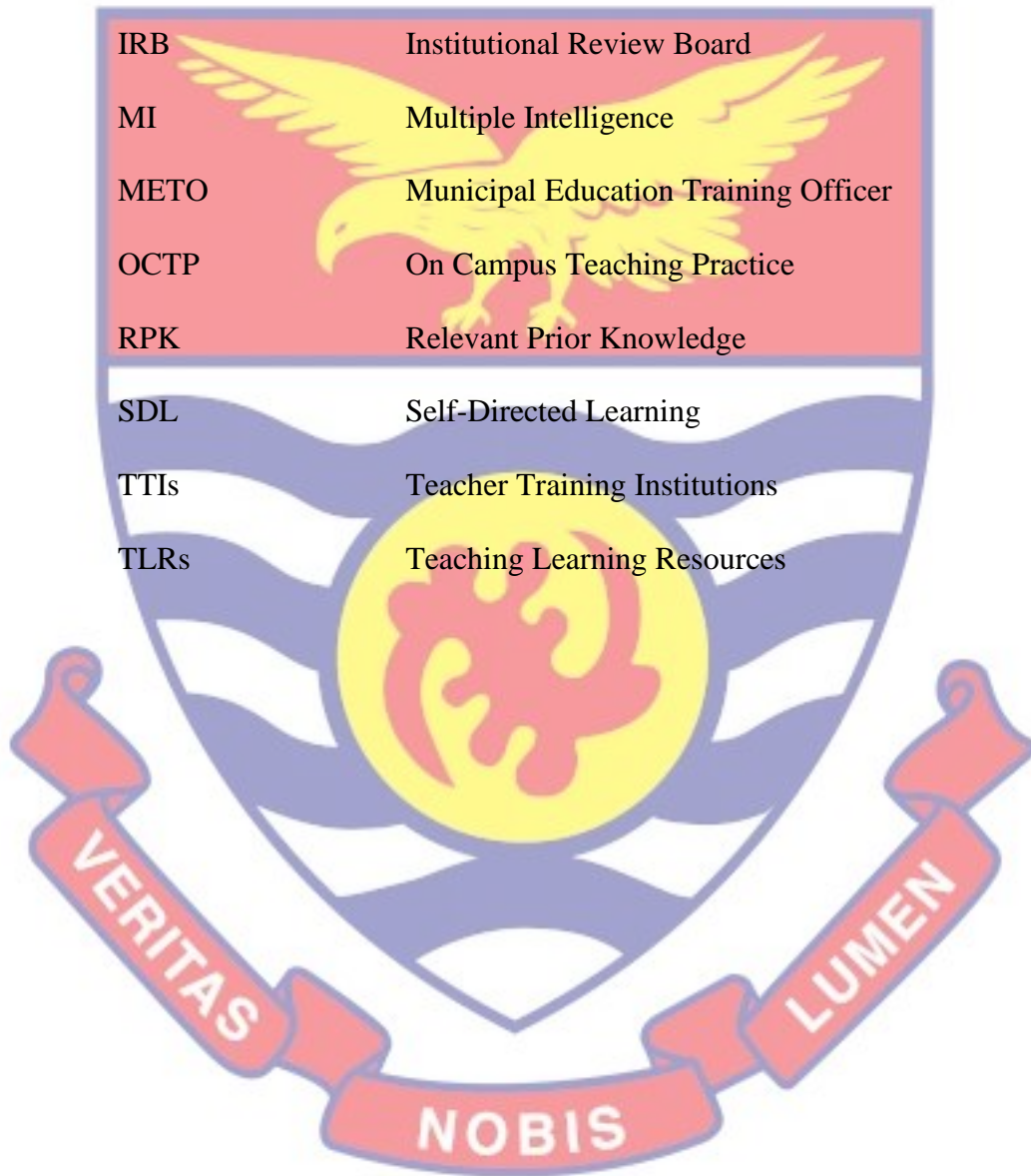
CHAPTER ONE

INTRODUCTION

Background to the Study

Many public schools across the world are faced with the problem of providing quality education to learners because of the ever increasing challenging task of how to teach all learners to understand. Classroom teachers headteachers, and all educationists have to respond to the increasing learner-variations in the classroom (Dumont, 2017; Singh, 2014). Teaching therefore has shifted from a teacher-centered approach to a learner-centered approach (Alshammari, 2016). This means teaching and learning must focus mainly on transmitting knowledge, values, principles, and concepts through active participation of all learners.

Bernard, Borokhovski, Schmid, Waddington and Pickup (2019) and (Corbin, 2017) affirmed that teacher-centered modes of delivery in classrooms are being challenged by educators and educational researchers, as they call for significant improvement on the quality of the teaching and learning process. Teachers and learners are pushed to employ broad repertoire of strategies and also exert expertise that will meet the teaching and learning needs in the classroom setting (Differentiated Instruction Educator's Guide, 2016) and (Saundersová, 2014).

Dorgu (2015) noted that varied use of teaching strategies is a must for teachers if teaching and learning is to be effective and efficient in the classroom. Dumont (2017) also asked this fundamental question, how can we

1

ensure that all learners have the opportunity to learn and reach their full potentials, regardless of the place of birth, family of origin, religion, gender or cognitive abilities? According to Randi and Corno (2015) individual difference in learners existed in the teaching and learning spectrum over a long period of time.

Butler (1920, as cited in Randi and Corno, 2015) observed that:

Some students are slack and need to be encouraged, others work better when given a freer rein. Some respond best when there is some threat or fear, others are paralyzed by it. Some apply themselves to the task and over time, learn best, others learn best by concentration and forces in a single burst of energy.(p. 2)

This suggests that teaching and learning should be varied at all time in order to cater for the many varied learners differences in the classroom.

Vygotsky (1978) holds the view that the opportunity for guidance from a mentor exist, therefore every learner depends on a teacher to facililate his or her learning processes. The dilemma on how to provide and promote individual learning within a classroom environment remains with us even in this century (Tomlinson, 2015). Teachers appear not to have the joy and the choice of reducing their class size to a preferred or ideal number, especially teachers in the public schools (Randi, 2017). A lot of learners are currently being funneled into schools as a result of government policies causing classrooms to have large class size (Burkett, 2013). All learners are expected to benefit from the teachers' teachings in the classroom of Junior High

Schools in the Jirapa Municipality despite the availability of varied range of learning needs and talents as well as societal conditions.

Bernard et al. (2019) and Haddad and Kalaani (2014) claimed that the concept of adaptive instruction is a learner-friendly approach to teaching and learning in the classroom.This implies that adaptive instruction offers the most efficient and effective teaching and learning approaches in the classroom. Adaptive instruction and differentiated instruction has been used interchangeably by researchers as underscored by (Sottilare, 2018; Ikwumelu, Oyibe & Oketa, 2015). The teacher and learner friendly nature of adaptive instruction in Junior High classroom's learning significantly assists in improving all learners' performance. Adaptive instruction provides an opportunity for an interaction between the learners cognitive abilities and the teacher's level of choice of instructions for the class (Haddad & Kalaani, 2014).

Bernard, Borokhovski, Schmid, Waddington and Pickup (2019) explained that adaptive instruction is the ability of the teacher to use different teaching and learning strategies to meet varied learners differences in the classroom. This indicates that adaptive instruction encompasses a multitude of instructional strategies ranging from specific to general strategies. The authors further uphold that adaptive instruction includes educational concepts mainly derived from elements of constructivism such as discovery learning, inquiring-based learning, activity-based learning, and collaborative learning. This indicates that numerous teaching and learning strategies, concepts, and principles will come to play in an adaptive teaching and learning classrooms in the Jirapa Municipality in the Upper West Region.

A case study conducted by Insana (2015) at the University of Illinois in Urbana-Champaign to investigate adaptive instruction in an elementary classroom viewed it as a complex adaptive system. The study indicated the following findings: (a) successful adaptive instruction occurred when the teacher recognized the unpredictability of the classroom settings, and appreciated that the classroom was comprised of working parts that required responding in varied ways that adapted to learners' social and academic choices, needs, and interests, and (b) there was a link between proficiency in teaching content with the teacher's confidence level. These findings affirmed that adaptive instruction may be an ideal approach to meeting the varied learning needs in most classrooms.

Bachari, Abelwahed and Adnani (2012) maintained that each learner has a preferred learning style that facilitates learning for him or her, some learn best by seeing or touching, others prefer group learning, or individual learning. All learners' are "special," and teachers are to be responsible for getting to know the needs of each learner and for providing classroom instructions that promote meaningful and successful learning of all learners in the classroom (Wang & Zollers, 2016; Tomlinson, 2015). It therefore suggests that classroom teaching and learning in the Jirapa Municipality should focus on the individuals learners' needs.

Implementing adaptive instruction has the propensity of making classroom teaching and learning a multifaceted and dynamic setting. The classroom has a composition of learners from different backgrounds with varied learning needs (Insana, 2015). This signifies that the teaching and

4

learning environment may become promising for most learners when teachers use learner-appropriate teaching strategies.

The classroom may become instructionally sophisticated for teachers who may not be able to immediately adjust (Wang & Zollers, 2016; Parson, 2012). However, every classroom instruction should move towards providing effective pedagogical content and knowledge to learners. This can be done by offering creative and innovative teaching strategies that meet the varied learning needs of the learners (Organisation for Economic Co-operation and Development [OECD], 2018). Any teaching and learning in the classroom that is short of these is what ushers in the traditional teaching methods which offer the grievous learning impediments to the learners.

Wang (2010) argued that limited teaching and learning resources, large class sizes, inadequate experience of the teacher, and rigid nature of curriculum makes it difficult for teachers to implement adaptive instruction effectively in most classrooms. This means that some teachers may tend to rely on the teacher centered traditional approach in their delivery.

Haddad and Kalaani (2014) explained that teachers bid to move away from teacher centered approach to leaner-centered approach has been met with myriad of challenges such as the difference in learner's ability, large class sizes, overloaded school curriculum and varied leaners' emotional status. This points to the inherent gap in the learning needs where teachers teaching styles are not in tandem with the learning needs of the learners in the classroom. This manifests that there is a gap in achieving teacher-learner-centered classrooms in the schools since the teacher-centered had being the norm. The "Chalk and Talk" teaching is a traditional style which seem to be in practiced in most

5

classrooms in the Jirapa municipality which may have negative consequences on learning outcomes. Haddad and Kalaani (2014) affirmed that most teacher-centered approaches to teaching and learning donot lead to desireable learning outcomes.

It seems there is a linking gap owing to the fact that teachers within the Jirapa Municipality and Ghana at large are mandated to prepare lesson plans and follow the planned activities systematically during lesson delivery in the classroom. This is against the fundamental principle of adaptive instruction which acknowledges teachers' ability to respond and adjust to an unanticipated learner contribution, a diversion from the already prepared lesson plan (Parson, 2012).

The need for adaptive instruction in the classroom teaching and learning can occur at any point in the lesson delivery depending on the situation and state of the individual learners at a time. The crux of the challenge is that it is not a single subject that needs adaptation, all the subjects that are been taught must be modified for the various levels of learner ability (Kreitzer, 2016).

An Adaptive teacher may not be able to follow the lesson plan strictly and systematically as prepared. Teachers may find it extremely impossible to factor in every single learner needs and interest into that single lesson plan.

Scott (2002) submitted that whilst it might be practically impossible for the classroom teachers to develop an individual learner programmes for each learner in the classroom, teachers are being encouraged to view their learners as individuals, each with personal collection of learning experiences, preferences and skills in the classroom.

6

Teachers are expected to monitor, supervise and interpret the learners learning domains and based on the information gathered they should be able to systematically facilitate and navigate teaching and learning process in the classroom (Matei & Gogu, 2017). The phenomenom of individual teaching in the entire class exposes the weaknesses in teaching and learning in classrooms of selected Junior High Schools in the Jirapa Municipality.

Teaching and learning is fast changing and also becoming a complex enterprise between the teacher and the learner in the classroom (Parson, 2012; Insana, 2015; Ikwumelu, Oyibe & Oketa, 2015). This is manifested in the limited time available for teachers in the classroom, limited teaching and learning resources, inadequate adaptations in the classroom, large class size, and overloaded school curriculum for teachers to implement and learners to obtain, yet, learners have to learn within their own pace. So the teacher has the responsibility to employ dynamisms, innovations and creative deliveries that will be beneficial to all learners though with their varied learning needs.

The right to education has not made learners to be homogenous, diversity exists amongst them in terms of physical, intellectual, emotional, psychological, geographical, religious, cultural, economic, family and political domains (Narh, 2015). As such, Jahan, Khan and Asif (2017) postulated that classroom teachers should not have a one-fit-all approach to teaching and learning. This underscored the necessity of adaptive instruction as key to responding to the learners with varied learning needs in the classroom. A complete paradigm shift is occurring in classrooms Welker (2017), triggering teachers to introducing varied forms of teaching and learning strategies. Insana (2015) argued that teachers use adaptive instruction to offer positive classroom

7

outcomes. Adaptive instruction integrates the individual differences of learners in the teaching and learning process in the classroom such that both the advantaged and disadvantaged learners profit (Bernard etal., 2019; Wang, 2010).

A study conducted by Alhassan and Abosi (2014) found that teachers possess limited to moderate competence in adaptive instruction. The study concluded that using adaptive instruction is strongly associated with teachers' competence. This assertion was affirmed by Narh (2015) study in Kwame Nkrumah University of Science and Technology (KNUST) primary school which revealed that classroom teachers were aware of learners with varied learning difficulties, but not the specific type of learning difficulties that the learners have and that, teachers were not having the expertise in adaptive instructions to meet the varied learners' needs (Narh, 2015). Therefore, the diversity of learners in the classrooms of selected Junior High Schools in the Jirapa Municipality requires teachers to use adaptive instruction as well, if each learner is to profit from the teaching and learning.

Most of the studies have concentrated on only primary schools (Scott, 2002; Alhassan & Abosi, 2014; Ikwumelu, Oyibe&Oketa, 2015; Narh, 2015). It is against this background of literature gap that this study sought to investigate classroom teaching and learning through adaptive instruction particularly, where none of such studies was cited within the Jirapa Municipality. This study sought to investigate the varied learners' differences, strategies of responding to the differences, the outcomes, and challenges in adaptive instruction in the classroom teaching and learning of selected Junior High Schools in the Municipality.

8

Statement of the Problem

Every learner in the classroom need help and guidance from a teacher to succeed. Teachers inevitably focus on helping under-achieving learners during teaching and learning in the classroom. However, there are myriad of varied learners that requires much attention from teachers as well. The Jirapa Municipality is a cosmopolitan area as a results large class sizes are common in most schools (Alhassan and Susan, 2017). Therefore, most of the classrooms are engulfed with varied learners from different cultural, geographical, religious and ethnic backgrounds. Teachers in the classrooms of Junior High Schools in the Jirapa Municipality are confronted with the challenge of teaching to meet the varied learning needs of ALL learners in the classroom.

Adaptive instruction appears to be the panacea to teaching in the classroom to meet the varied learning needs of each learner in the classroom. This is because it offers strategies that enhance teachers capacity to teach in ways that enable all learners in the classroom to profit from the teaching and learning.

This study therefore seek to investigate adaptive instruction in the classroom teaching and learning in Junior High Schools in the Jirapa Municipality of the Upper West Region of Ghana.

Purpose of the Study

The purpose of this study was to investigate adaptive instruction in classroom teaching and learning in Junior High Schools in the Jirapa Municipality of the Upper West Region of Ghana.

9

Research Questions

The following research questions were formulated to guide the study:

1. What varied learners differences among Junior High School learners in the Jirapa Municipality call for the deployment of adaptive instruction in the classrooms?

2. What strategies do the teachers of Junior High Schools in the Jirapa Municipality feel are helpful in responding to the varied learners differences in the classrooms?

3. What are the outcomes of the usage of adaptive instruction by Junior High School teachers in the Jirapa Municipality?

4. What challenges does the usage of adaptive instruction pose to Junior High School teachers in the Jirapa Municipality?

Research Hypotheses

1. H0: There is no significant difference in teachers employing adaptive instruction to meet varied learners' differences in the classroom.

2. H0: There is no significant difference in teaching outcomes between male and female teachers who employ adaptive instruction.

Significance of the Study

The study will bring to bear the varied differences that learners in the classrooms of Junior High Schools have to awaken teachers on their responsibility to accommodate all variations through innovations and creativity in their delivery in the classrooms such that every learner is given the chance and pace to learn based on his or her weaknesses and strengths. This will offer a win- win learning outcome to all learners in the classroom in Junior High Schools in the Municipality.

The study will also advocate for incorporation of adaptive instruction into the initial teacher training, in-service training, mentoring programmes, supervision, classroom teaching and in all forms of professional development of the teacher in Junior School in a way that teachings remain beneficial to all learners irrespective of their strengths and weaknesses. This will sustain the interest of learners in classroom learning, promotes receptive and retentive memories, facilitates regular attendance, induce performance of the learners as well as enhance retention of learners not only in schools but in the classroom as well.

The study adds on to the existing literature on adaptive instruction in Junior High Schools. Thus, providing district assemblies, education officers, circuit supervisors, headteacher, teachers and other educational partners with knowledge and skills on how to employ adaptive instructional approaches to meet learners' diversities in the classroom.

Delimitation

The study was delimited to Jirapa Municipality in the Upper West Region of Ghana. The content was focused on adaptive instruction in selected Junior High School classrooms. The study was also restricted to Junior High School teachers and learners in the Jirapa Municipality.

It covers varied learners differences for adaptive instruction, outcomes of adaptive instruction, challenges in adaptive instruction to the teacher and strategies of responding to the challenges in the classroom. Therefore, it may not be possible to generalize the findings of the study beyond the Jirapa Municipality but the study offers opportunities for further studies.

11

Limitation

The sample size and sampling methods made it difficult to generalize the findings to the whole population of teachers and schools in Ghana. However, the findings can be generalized to the schools within the Jirapa Municipality.

Definition of Terms

Terms used in this study were operationally defined as follows:

Adaptive Instruction: The ability of teachers to employ different teaching and learning strategies in a single lesson to meet the varied learners differences in the classroom.

Classroom: Any set up where teaching and learning takes place.

Learning: The acquisition of knowledge and skills by a variety of means, including education, experience and memorization.

Teaching: The steps and procedures teachers employ to facilitate and guide varied learners to construct knowledge, skills, attitudes and values.

Organization of the Study

This research is organized into five main chapters. Chapter One is devoted to the background to the study, statement of the problem, purpose of the study, research objectives that guided the study, research questions, significance of the study, delimitation of the study, limitation of the study, definition of terms and general organization of the study.

In Chapter Two, a review of related literature on adaptive instruction is reviewed under headings and sub headings. These include: the theoretical framework of the study, varied learners differences for adaptive instruction, strategies of responding to the challenges in the classroom, and outcomes of

adaptive instruction, challenges in adaptive instruction to the teacher and finally, summary of literature.

Chapter Three deal with the research methods in conducting the study employed on the study. The section covered the study area, the research design, population, sampling procedure, and data collection instruments. The rest are data collection procedures, data processing and analysis, hypothesis and finally, a summary of the chapter.

Chapter Four presents the results and discussion of the study's findings. The results were analyzed using descriptive statistics and presented in tables, charts and figures.

Chapter Five presents with summary, conclusion and recommendations.
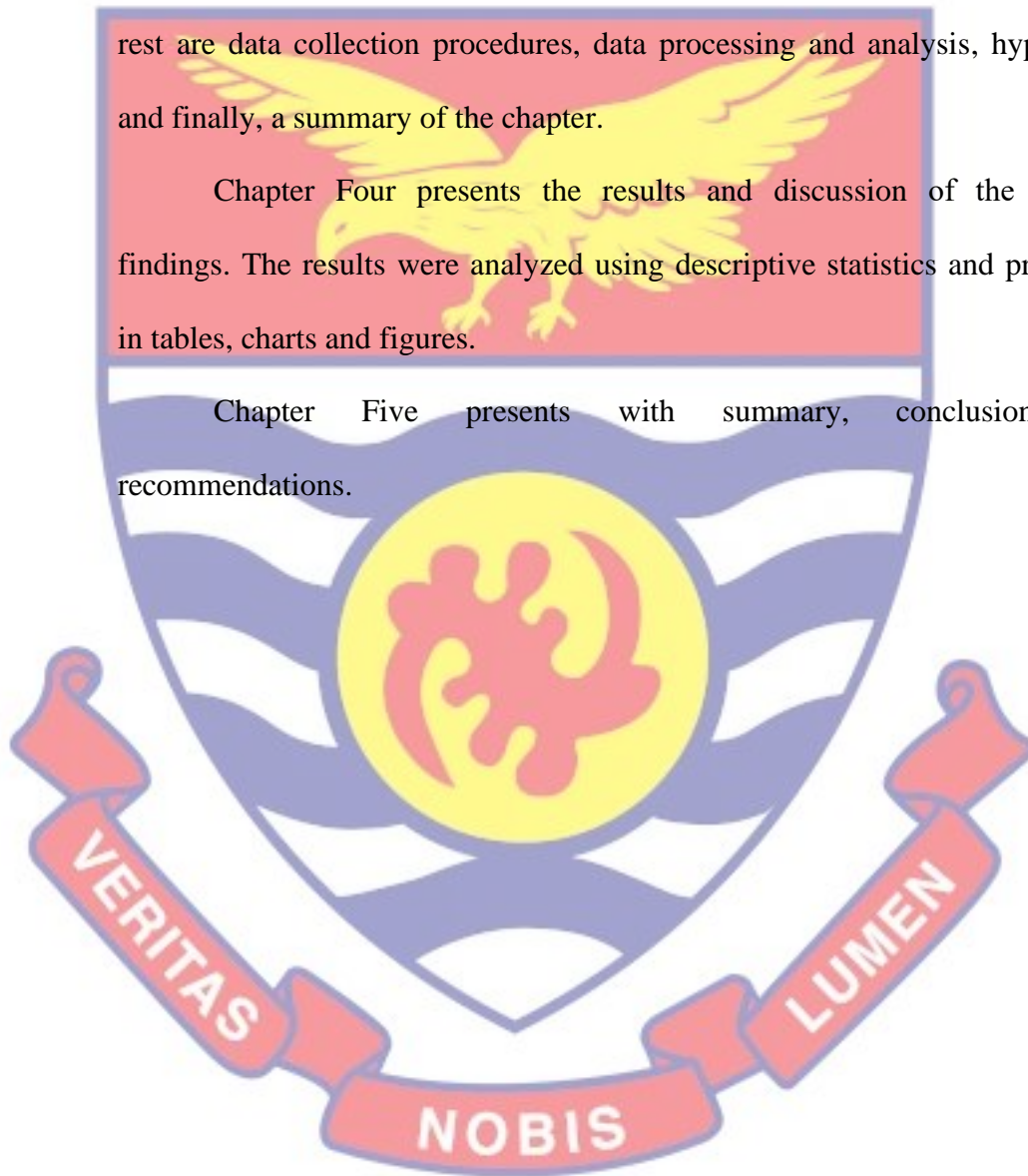
CHAPTURE TWO

LITERATURE REVIEW

Introduction

The chapter presents information on the theoretical framework, varied learners differences for adaptive instruction, outcomes of adaptive instruction, challenges in adaptive instruction to the teacher and strategies of responding to the challenges in the classroom and the conceptual framework.

Theoretical Framework

Differentiated Instruction (DI) theory is used to guide this study. Differentiated Instruction is a philosophy of teaching and learning that is mainly well-known in the German-speaking pedagogical literature (Pozas, Letzel & Schneider, 2019; OECD, 2018; Rasheed & Wahid, 2018).

In the United States, the theory is traced back to the 1600s when one-room schoolhouses were familiar in the educational settings (Taylor, 2017; Kreitzer, 2016; Saundersová, 2014). Thus, one teacher was basically responsible for teaching learners in different classes and ability levels without technology. Saundersová (2014) stated that the theory is still relevant because some class sizes are so large with varied learners but one teacher to impart knowledge to all. teachers will therefore need to differentiate the teaching and learning essentials in the class in order to meet each learner learning needs.

The choice of the Differentiated Instruction theory for this study originated from the constructivist point of view contained in the work of Vygotsky, Gardner, Sternberg, and Tomlinson (Bernard et al., 2019; Taylor,

14

2017; Gentry, 2013; Santamaria, 2009). Maslow (1987) in his theory of hierarchy of needs advocated that learners will learn if their basic needs are met. When each learner's basic needs are provided, learning will be improved. Vygotsky (1978; 2004) also proposed that learners must be challenged to construct knowledge in the classroom. Vygotsky further maintained that the individual learner must be the focal point in teaching and learning than the entire curriculum.

Gardner (1993) building upon Vygotsky's thought developed the theory of multiple intelligences. This theory is premised on learner-centred approach to teaching and learning, it emphasizes special concentration on weaker areas on the learners' intelligence. The theory of thinking styles by Sternberg (Sternberg & Williams, 2002) focused on the way in which an individual learns and processes information. Tomlinson (2003; 2000) draws inspirations from these early theorists proposed Differentiated Instruction which is responsive teaching and learning paradigm that adjusts content, process, and product for each learner in the classroom.

Differentiated Instruction according to Tomlinson (2000)

consists of the efforts of teachers to respond to variance amongst learners in the classroom. Whenever a teacher reaches out to an individual or small group to vary his or her teaching in order to create the best learning experience possible, that teacher is differentiating instruction. (p.1)

Differentiated Instruction as found in the Differentiated Instruction Educator's Guide (2016) is any form of teaching and learning with learners differences in mind. Therefore, teachers in the Jirapa

15

Municipality need to be guided by the principles of differentiated instructional theory. Thus, teachers should place premium on students during teaching and learning in the classroom, develop teaching and learning tasks that are appropriate and within the interest of each learner in the classroom.

OECD (2018); Rasheed and Wahid (2018); Saundersora (2014) admonished that external and internal differentiation are the two distinctive components of the theory. External Differentiated Instruction is viewed as the provision of different instruction to learners, grouped together on a long-term basis perhaps in special schools based on their abilities and competencies (Saundersová, 2014). Exemplifying this in Ghana is the Special School for the Deaf, Blind, and Mentally Retarded.

Internal Differentiated Instruction, on the other hand, refers to the provision of different instruction within a group of learners in a class (Narh, 2015; Saundersová, 2014). This takes place when the content of learning materials and resources are modified and broken into teachable tasks or components for easy understanding. Differentiated Instruction mainly focuses on thoroughly adjustment and modification on how to vary the instructional method, learning materials, the level of difficulty of a task, the time given to work on a task, and the learning content (Rasheed & Wahid, 2018; Tomlinson & McTighe, 2006; Tomlinson, 2003). However, the current challenges in schools in the Jirapa Municipality emanating from inadequate adaptive expertise, inadequate pre-service and in-service training, time constraint, high enrolment figures, overloaded curriculum, poor supervision, poor seating

16

arrangement and others appear to put a barrier on teachers and learners from adapting to Differentiated Instructions and approaches effectively.

Tomlinson (2003) noted that the theory of differentiated instruction underscored the learner variability with dissimilar growth even when the learners are of the same age. The variation in intellectual, physical, emotional, and moral development creates varying needs, interests, readiness and modes of learning amongst the learners in the classroom. The differences exist in learning styles, cultural backgrounds, prior experience, and variation of special needs for which learners in a class will not learn the same things at the same time (Tomlinson, 2003).

Tomlinson and McTighe (2006) noted that Differentiated Instruction theory will not permit teachers to ignore the diversity of learners in their classrooms. This implies that whole class teaching without the skill of varying the instructional strategies maybe detrimental to some of the learners in the classroom. The variations amongst learners in the classrooms included cultural heterogeneities, gender, age, experience, prior knowledge, learning preferences, and cognitive variations (Rasheed & Wahid, 2018). As a result, teachers' teaching and the learners' indicators in the classroom ought to mirror the understanding of these differences in the classroom. So, teachers' ways of imparting knowledge must match the variations in learners' knowledge (Tomlinson, 2003).

According to Rasheed and Wahid (2018) this behooves on the teacher to simplify the content, sequence the instruction, assessment of learners and other characteristics of the learners that matter in their learning process. This showed that different learners in the classrooms in selected Junior High

Schools in the Jirapa Municipality may have different learning styles and challenges in the classroom. Teachers need to then use their adaptive expertise to improve the pace of each learner's learning.

Elements of Differentiated Instruction

Tomlinson (2003) viewed five elements of the curriculum that teachers can differentiate, or modify, to increase the potential of each learner's learning in the classroom. These include content, process, product, affect and learning environment.

Content: Hanover Research (2018) and Burkett (2013) said that content is the aspect of knowledge, understanding, and skills that teachers want learners to learn and how the learners will get access to the information. The teacher delivers this content in the classroom in the form of group demonstration, educational games, project work, class exercises, homework and any other methods that learners can use to access key information from the curriculum (Hanover Research, 2018; Saundersová, 2014; Tomlinson, 2010; Tomlinson & Imbeau, 2010). This implies that teachers in the Jirapa Municipality must vary their modes of classroom teachings for many learners to benefit.

Alhassan and Abosi (2014) contended that in adaptive instruction the teacher requires sound reasoning in order to think about what to adjust and modify from the curricula content in textbooks, teaching and learning resources, methods, and learning environment. So this necessitates continuous professional development and research on the adaptive instructional concepts by the teacher. This suggests that there is a reawaken call on policy makers to avail resources for adaptive instructional concepts in the classroom. Teachers

18

also need continue professional development programmes in order to implement adaptive instruction effectively in the classroom.

Mitchell, Pilkington, Daiski and Cross (2017) argued that teaching and learning has become content driven for both teachers and learners. This has pushed most learners to resort to figuring out what is required to pass an examination, so that they can give the content back without necessarily understanding it from their own learning perspectives.

To differentiate the content to suit all learners, teachers need to design classroom teaching activities covering all the various levels of Bloom's Taxonomy (Lian, 2003; Bloom, Engelhart, Furst, Hill & Krathwhol, 1956). Bloom's classification of levels of intellectual behaviour of learners, are ordered from lower-order thinking skills to higher- order thinking skills. The classification starts from knowledge, comprehension, application, analysis, synthesis, and the highest being evaluation (Lian, 2003; Bloom et al.,1956). So in achieving all these six levels of thinking, which the various learners may be at different ranks in the classroom, teachers may be required to use adaptive instruction to adjust and modify each level. Therefore, learners are often required to complete different question tasks ranging from remembering, understanding evaluating and creating (Lian, 2003). Teachers can achieve this through the implementation of diagnostic instructional strategies which aimed at bringing teaching and learning closer and meaningful to each learner (Tomlinson, 2003). Curriculum contains the content that teachers should teach. This content is translated into textbooks, pamphlets, audio tape recordings and many other forms in response to each learner's individuality.

19

Process: Tomlinson (2003) admonished that the distinction between process and content is unclear. However, basically, process deals with how learners come to understand and possess the knowledge, understanding, and skills essential to a topic that is being taught (Gentry, 2013; Olinghouse, 2008).

Furthermore, Jahan, Khan and Asif (2017) and Tomlinson (2003) explained that process begins when the teacher asks the learner to stop listening or reading and to begin constructing personal sense out of information, ideas, and skills they have received. The learner at this point ceases to be a consumer of the content but rather a processor of the content goals. This is where the teacher embraces various approaches in adaptive instruction just to impart knowledge.

Products: This is the outcome of an entire demonstration of what learners have come to know and understand (Jahan, Khan & Asif, 2017); (Olinghouse, 2008).   Thus, this stage provides the learner with real opportunity to demonstrate their knowledge. This means the learner becomes a producer or constructor of content goals.

Affect: Focuses on how learner's link thoughts, values and feeling in the classroom (Jahan, Khan & Asif, 2017; Narh, 2015). So when the teacher uses adaptive instructive effectively, learners get to absorb and comprehend the content with ease. However, anything short of this destabilizes learners and makes them moody. This reduces the potentials and compounds the challenges of learning of the respective learners in the classroom. There appears to exist relationship between the emotional status of the teacher, learners and the general feeling in every classroom.

Learning Environment: According to Jahan, Khan and Asif (2017) this refers to the way the classroom works and feels. That is cultivating a mutually helpful and respectful atmosphere amongst the class members for effective and supportive teaching and learning to take place (Saundersová, 2014).

Francis and Gould (2014) identified three aspects of the teaching environment, thus, the physical, social and learning environment. The physical environment denotes the infrastructure, seating, and the teaching and learning resources. The social environment in the differentiated classroom should include areas in which learners can work quietly as well as provide collaborative supportive learning for the learners (Olinghouse, 2008).

Teachers in the Jirapa Municipality need to recognize the physical and social environment's variations that exist in the classroom in order to teach effectively. This is because a focus on learning alone does not secure a positive learning environment but also the physical and social environment should be conducive for effective teaching and learning (Insane, 2015; Francis & Gould, 2014).

The five classroom elements, the content, process, product, affect and learning environment, which teachers can differentiate can be represented in a diagrammatic form as shown in Figure 1.

21
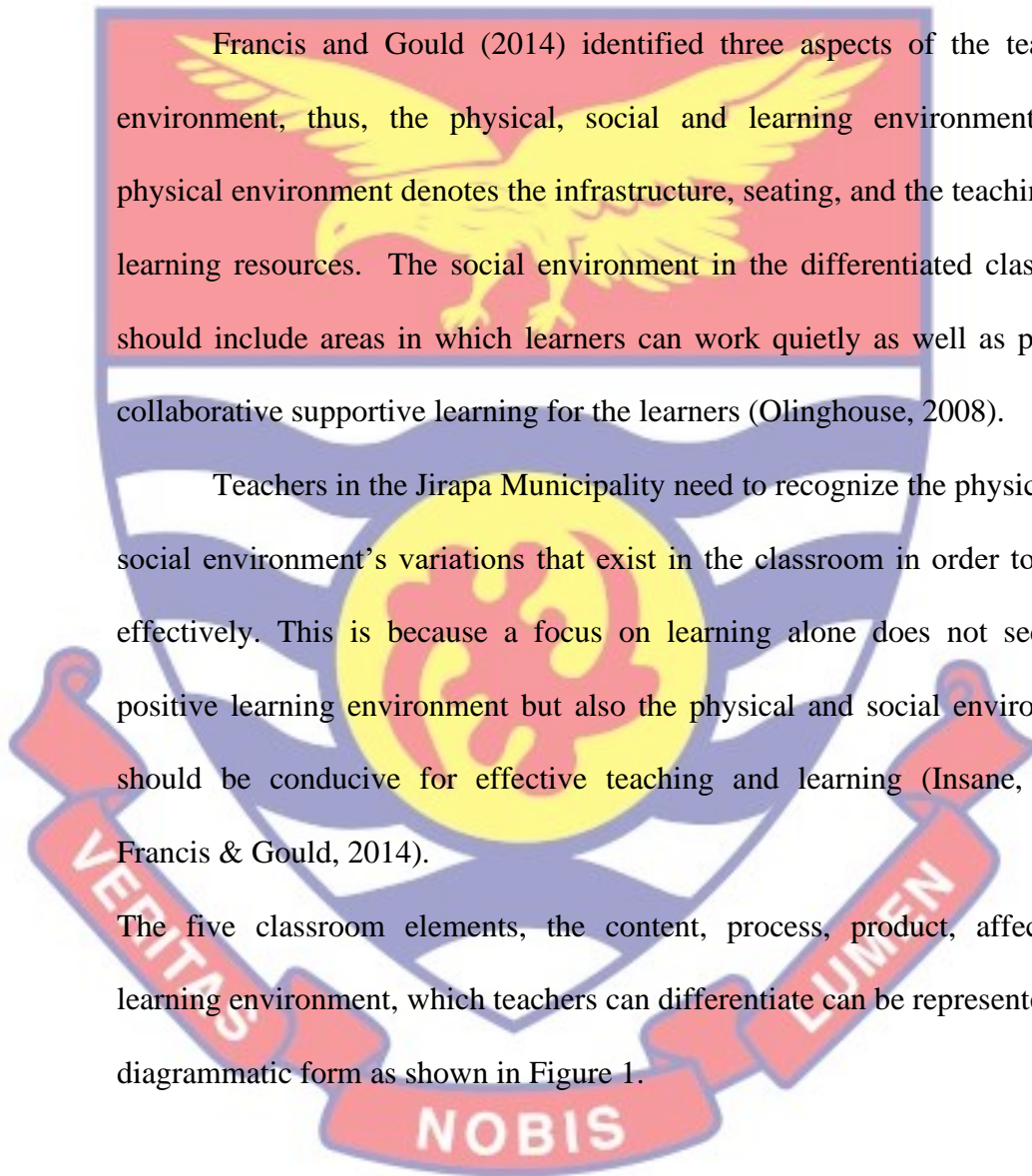
Saundersová, 2014; Tomlinson & Imbeau, 2010; Tomlinson, 2003). Saundersová (2014) believed that teachers must not be constraint to differentiate all in every single lesson in the classroom. Teachers in the Jirapa Municipality need to have sufficient knowledge to differentiate between these elements in order to meet the varied learners needs in their classrooms.

Learner Characteristics for Differentiated Instruction

There are three learner characteristics teachers need to navigate around if teaching and learning in the classroom is to be responsive to the each learner (Differentiated Instruction Educator's Guide, 2016; Saundersová, 2014; Burkett, 2013 & Tomlinson, 2003). These characteristics are readiness, interest and learning profile.

Firstly, readiness is what Seligman cited in Rasheed and Wahid (2018) referred as preparedness. A learner's readiness can vary from lesson to lesson, skill to skill, and concept to concept (Rusdin, 2018). The current knowledge, understanding, and skill level a learner brings to the classroom has relation with how they construct knowledge, understanding and sequence, the learning process.

Teachers can use diagnostic and formative assessment techniques to tap information about learners'readiness (Differentiated Instruction Educator's Guide, 2016). This means that quick pre-test, examining learners work such as previous assignments and observation of learners can be employed to ascertain each learner's understanding about the topic. Rasheed and Wahid (2018) submitted that learners readiness is assessed to set working tasks that are within the range and strenght of each learner in the classroom. Readiness to learning mainly depends on the learner himself (Narh, 2015), it is however,

necessary for the teacher to capitalize on the learner readiness to stimulate effective teaching and learning.

Also, interest is what sustains a learner in the classroom. A teacher is the resource person who links the required content to learners' interests in order to hook each learner along in the teaching and learning process (Hockett, 2018; Saundersová, 2014). So the teacher being aware of the entry behaviour of each learner helps to demystify the misconception that learners bring to the classroom. The differentiated teacher is the one who then gets to link the learners to the content that is of essence to each learner (Maheshwari, 2017).

According to the Differentiated Instruction Educator's Guide (2016) teachers can determine learners' interest by asking questions and also asking learners to connect their interests with topics of study for the term. This suggests that there is a strong linkage between the interest of each learner in the class and the subjects or topics that are taught and learnt in classroom.

According to Koehler (2010) interest differentiation is to help learners relate their Relevant Prior Knowledge (RPK), understanding, and skills with the curriculum content that is to be transmitted to the learners. Koehler's claimed was supported by Saundersová (2014) whose study reported that differentiation by interest helps the learners to relate teaching and learning to their personal experiences and known knowledge.

It however appears that knowing the exact interest level or state of a learner appears to be cumbersome to determine, even when there exists an inseparable relationship between the readiness and interest of learners.

24

From Figure 2 the learner characteristics include learner readiness, learner interest and learner learning profile that teachers can differentiate. These learner characteristics are inter-related (Saundersova, 2014) and Tomlinson, 2003). So, differentiated instruction theory enjoins teachers in the Jirapa Municipality to understand and appreciate each learner with respect to these characteristics. Teachers who are conscious of these learner characteristics will tailor the classroom teaching and learning to profit each learner.

The teacher, learner and the classroom are supposed to be in active interaction for effective teaching and learning to take place. Hayford (2019) in his book helpful hints for teachers' professional development and management competency. The author compared learners, teachers and the classroom to that of a candle and it stand shining. Hayford observed that every learner is like a candle who has God-endowed potentials to excel (shine) in class if the appropriate teaching strategies are employed in a conducive learning environment. Hayford further maintained that every teacher is like a candle stand who should be very supportive to learners (candle). Thus, the teacher facilitates each learner to unfold his or her potentials. Hayford finally viewed every class as a collection of candles on a candle stand with each candle already fully endowed to shine, but only shines when it is lighted and lighted well.

Similarly, every classroom is comprised of varied learners. Each has his or her own unique learning potentials and abilities. So teachers in the Jirapa Municipality who employ differentiated instructional strategies will be moving classroom teachings closer to each varied learner in the Municipality.

26

Taylor (2017) contradicted that Differentiated Instruction theory seems to be an effective concept on the surface look, with deeper analysis, it is rather demanding to determine the real outcomes. As factors such as cultural heterogeneity, varied prior knowledge, gender differences, age differences, varied learning styles, cognitive ability differences, varied emotional status, varied receptive span and memory retention and varied form of punishments in class, all exist in single classroom. Taylor further opined that these varied learners differenceshave an effect on the outcome of learner' educational achievement.

Varied Learners Differences that Call for the Deployment of Adaptive Instruction in Classrooms

Saundersová (2014) maintained that adaptive instruction can be effective when the teacher begins with knowing the learners and their existing learning variations. This implies that the pace and style each learner absorbs the learning essentials in the classroom is unique and not similar. Teachers are expected to identify the differences in term of learners that prevail in their classrooms before modifying, adjusting and creating teaching and learning that will fit each individual. Some perceived varied learners differences in the classroom that might call for the deployment of adaptive instruction are reviewed below:

Cultural Heterogeneities

Tomlinson (2015) and OECD (2010) noted that cultural heterogeneity is one of the learners' differences observed in the classroom. Diverse cultures are even brought to bear in the curricula let alone in the classroom (Taylor, 2017; OECD, 2010). This means as part of adaptive strategies, classroom

27

teachers must include methods and topics that interest learners from their varied cultural perspectives.

Therefore, maintaining a complete cultural homogeneous classroom in the Jirapa Municipality may be extremely difficult to realize. So, public schools, will often have learners from different cultural orientation which OECD (2010) admonished that a class without cultural heterogneities would have been considered a barren learning environment.

Krasnoff (2016) admitted that cultural heterogeinities influences the behaviour, attitude, and values that learners and teachers bring to the classroom teaching and learning process. This implied that every teacher has his or her preferred style of imparting knowledge, and so, will every learnerhas his or her style of receiving or constructing what is being taught.

Inferring from this, Corno (2008) and Santamaria (2009) noted that cultural heterogeneity exist in classrooms for which the classroom teacher has to cater for subgroups of learners for learning. Each subgroup can mimic different level of cultural diversities (Corno, 2008). So each varied cultural subgroup demonstrates their cultural orientation, values, attitudes and norms which could either be a facilitating or limiting factor in the learning process to acquire the desired knowledge. The pictures, names, examples, text, and exercises used in the learners' syllabi, textbooks, teaching learning resources and other illustrations may tends to be skewed to certain cultural backgrounds. This is more problematic in a multi-cultural and ethnic environment like Ghana. So, which of these varied background examples, stories, pictures and illustrations will the teacher use without disadvantaging learners who do not come from one setting?

It is cumbersome for the teacher to achieve social cohesion in the classroom as a result of the varied cultural orientations each learner brings to the classroom. In an ideal classroom there is the need for the teacher to celebrate diversity, collaboration, and belief that facilitates learning opportunities for all children from all backgrounds to learn (OECD, 2010). To achieve this, teacher trainees need to pre-acquire skills that will enable them to teach learners with all form of variations existing in the classroom (Taylor, 2017; OECD, 2010).

Cultural heterogeneity issues can be managed substantially in the classroom context when Teacher Training Institutions (TTIs) run courses that will enable the trainees to have opportunity to investigate basic philosophical concepts such as diversity, identity, pluralism, democracy, controversy and deliberation (OECD, 2010).

Varied Relevant Prior Knowledge

OECD (2010) argued that learners have different prior knowledge to the content the teacher delivers in the classroom. These variations may be obtained from their respective geographical locality. This may put some learnerswith privileges ahead of others in the classroom. Elmohamady (2017) argued that learners with rich prior knowledge level may require less supportive adaptive instructional designs to accomplish each learning task in the classroom than learners with limited prior knowledge level.

This means that teachers in the classroom have to unify their teaching strategies such that learners who are not so familiar with some learning content are not too much affected in absorbing what the teacher is imparting.

29

Teachers need to constantly adjust their teaching and learning strategies based on the student previous knowledge (Corno, 2008).

The concept of adaptive instruction acknowledges that learner' diversities exist in the classroom. Therefore, teachers need to be adaptive taking all these classroom teaching variations into account, viewing each learner as a complex individual. To that end OECD (2018) noted that these learner' variations that exist maybe an opportunity for teachers to investigate each learner and know their unique learning needs.

Gender Differences

Taylor (2017) argued that it would be a misrepresentation of information to state that effective adaptation in classrooms can take place without considering factors such as gender differences. This means that gender differences can influence teachers attempt to use adaptive instruction in the Jirapa Municipality.

Elmohamady, Nabil, Mobarez and Fakhry (2016) stated that in the classroom gender difference is an essential issue that affects teaching and learning outcomes. Differences in roles assigned to males and females either at home or in school tend to have implication on the learning outcomes in the classroom. Burkett (2013) believed that gender differences can influence the pattern of learning by learners. The case where the female learner is the one who wakes up early, sleeps late and wakes up early again to attend to domestic errands makes her tired and sleepy during lessons.

Also, a research conducted in Pakistan on the impact of gender inequality in education on rural poverty by Chaudhry and Rahman (2009) concluded that gender inequality in education has adverse impact on rural

30

poverty. According to the researchers, male members of the family are given better education and are equipped with skills to compete for resources in public arena, whilst female members are imparted domestic skills to be good mothers and wives. They are given limited opportunities to create choices for themselves in order to change the realities of their lives.

Similarly, in the Ghanaian context female learners appear to be relegated when it comes to exposure to educational opportunities than male learners. The male learners are given all the available chances to explore and soar academically. So the use of adaptive instruction can demystify these stereotype work roles that are counter-productive to the work choices of the various genders (Elmohamady et al., 2016).

Moreover, Wehrwein, Lujan and DiCarlo (2006) conducted a study on gender differences in learning style preferences amongst undergraduate physiology learners in Michigan State University, East Lansing and Wayne State University. The study concluded that a majority of male learners preferred multimodal instruction whereas a majority of female learners preferred single-mode instruction. Thus, male and female learners have significantly different learning styles. The study indicated that it is the responsibility of the teacher to address this diversity of learning styles and develop appropriate teaching and learning approaches to suit each gender in the classroom. So single and mixed sex classroom, have different learning styles in which teachers have to investigate as an adaptive strategy to effectively impart knowledge for the different sexes.

31

Age Differences

The relevance of adapting instruction to meet the learning needs of different age levels in the classroom has long been acknowledged in the educational spectrum (Rodriguez, 2016). This shows that age differential exist in all classrooms. Tomlinson (2000) observed that in most classrooms there are some learners who perform extremely well above their age level and some who also perform far below their age level. This is because of the differences in terms of age and individual learner characteristics. Tomlinson therefore maintained that classroom teachers need to modify their curriculum content as well as instructional strategies that will carry along each age group of learners in the teaching and learning process.

Rodriguez (2016) undertook a study on the impact of chronological age differences on the academic performance of learners in a first grade classroom, and the findings revealed that being younger in age in the midst of older ages in class could create learning difficulties for children, especially in mathematics. Whilst older learners in the midst of younger ages seem to struggle more with reading if they struggle with anything. Rodriguez (2016) therefore agreed that varied ages in single classroom settings is common, where classrooms are congested with younger and older learners. This means that age differences in the classroom could have an influence in the achievement level of learners.

Corbin (2017) argued that age is considered an important factor in the teaching and learning preferences and outcome. This means that age categorization and being aware of age variations in the classroom may influence teachers' choice of teaching strategies and the learning styles.

Bowers, Merritt and Rimm-Kaufman (2019) explained that notwithstanding the varied age levels existing in the classroom, it is time consuming for teachers to practically and fully use adaptive instruction in the classroom to resolve the age variations in learning. Teachers need to constantly be mindful of learners age differences when faciliting teaching and learning in each Junior High classroom in the Jirapa Municipality.

The findings of Rodriguez (2016) were disputed by Murray, Smith and Nelson (2010, as cited in Corbin, 2017), who submitted that age difference was not influential in the teaching and learning outcomes in the classroom. Moreover, Shak and Udgaonkar (2018) study in the BharatiVidyapeeth University on the influence of gender and age found that learners did not feel age is a barrier in teaching and learning, rather, the teacher's interest and experience has a positive influence on teaching and learning. So the academic debate on the relationship between age and learning preferences and outcome in teaching and learning in the classroom is still an unsettled puzzle in academic discourse (Corbin, 2017).

Varied Learning Styles

The classrooms in selected Junior High Schools in the Jirapa Municipality continue to witness varied learning styles. Singh (2014); Kaliska (2013) and Hammond (2001) therefore submitted that the most possibly effective learning styles depend on what type of learning is desired and what kind of learning outcome is expected. This shows that not all learners learn in the same way or premise.

Corbin (2017, p.68) defined learning style as "a personal quality that influences a learner's ability to acquire information, to interact with peers and

33

teachers and otherwise participate in learning" Wehrwein, Lujan and Dicarlo (2006) also explained that, learning style preferences are the manner in which, and the conditions under which, learners most efficiently and effectively perceive, process, store, and recall what they are attempting to learn. This implies learning styles are the modes and various ways individual learners acquire teaching and learning in the classroom.

Furthermore, Kaliska (2013) and Graf, Viola and Leo (2007) also identified several different learning style models including Kolb (1984), Honey and Mumford (1982), and Felder and Silverman (1988). Each model proposes different characteristics and classifications of learning styles. Whereas some learners grasp the teaching and learning content fast, some may be slow and need more examples of the teaching content (Elmohamady, 2017).

Kaliska (2013) and Felder and Silverman (1988, as cited in Graf, Viola and Leo, 2007) identified four dimensions of learning styles. The first dimension distinguishes between an active and a reflective way of processing information. An active learner likes to manipulate the learning materials and prefer group work whereas the reflective learner prefers to think and reflect independently on the learning material, and thereby dislike large group work (Kaliska, 2013; Graf, Viola & Leo, 2007).

According to Kaliska (2013) the second dimension is sensing and intuitive learners. The sensing learner prefers to learn facts, with concrete materials. They are more practically oriented, who likes to connect what is learnt to the world of work, whereas, the intuitive learner is abstract thinkers.

So the intuitive are discovery, creative, and innovative learners (Graf, Viola & Leo, 2007).

Thirdly, visual-verbal dimension classification of learners are those who learn best by seeing. They prefer pictorial, diagrams, and flow charts representations of teaching and learning. In contrast, are the learners who get more out of textual representations, regardless of whether they are written or spoken.

The fourth dimension is the sequential and global learning style. The sequential learners prefer linear thinking, orderly and incremental steps where they learn in bits. These learners prefer to organize and progress gradually for easy understanding of the content.

Teachers therefore need to incorporate the individual learning styles of each learner in the classroom when preparing lesson notes, exercises, teacher made tests, and other teaching and learning resource materials.

Different Cognitive Abilities

Gardner defines intelligence as an ability or set of abilities that allow a person to solve a problem (Gardner, 1993). This indicates that every learner requires a certain degree of intelligent to be able to solve classroom task. All learners in a class possess intelligence but in varying degrees of strength and skill. Classroom tasks must also vary in order to meet each individual intelligence level. Learners possess different kinds of cognitive abilities as in thinking, problem solving, decision making, perceiving and remembering (Elmohamady, 2017). So, each learner has a unique cognitive strength that teachers need to unearth in the classroom.

35

Varied Emotional Status

The foundation of a good learning classroom for learners is a feeling of safety and acceptance by the class teacher (Stepanek, 1999). This means the teacher in the classroom has a huge task in creating emotional stable learning atmosphere for each learner. All learners need to feel and recognize the value of their abilities and others in the classroom.

Tomlinson (2003) asserted that in a differentiated classroom, the teacher continually ponders over what to do to ensure that learners of all levels feel safe, incorporated, affirmed, valued, challenged, and supported in the class. Tomlinson (2003) further admitted that teachers differentiate in the classroom through planned and unplanned ways. This is done based on the understanding of the affective needs of each learner and a reflection on how each learner's readiness levels, interests, learning style, intelligence preference, culture, gender, economic status, and general development shape his or her affective needs. According Manasia, Ianos and Chicioreanu (2019) and Hannah (2013) when teachers are making adaptations to the classroom teaching and learning there is the need to appreciate the learner's emotional status environment. This is the atmosphere created by the teacher which can either encourage or discourage learners from attaining desirable teaching and learning outcomes. According to Hannah teachers should be able to create lesson plans that the learners will find more engaging, motivating learners to use their skills, or providing positive feedback to all in the classroom effectively. A study conducted by Manasia, Ianos and Chicioreanu (2019) in the University of Politenhnica of Bucharest- Romania on pre-service teacher preparedness for fostering education for sustainable development: an empirical

analysis of central dimensions of teaching readiness, revealed weak areas of teacher training: these include inability to manage learners' disruptive behaviours, to customize learning and to self-regulate teaching emotions. This means teachers cannot marry learners' varied emotional status with their teaching and learning in the classroom.

Varied Receptive Span and Memory Retention

According to Gaines (2001) receptive span and memory retention of learners play a major role in classroom teaching and learning process. Without good receptive span and retention memory there cannot be a successful transmission of knowledge from teacher to learners. Therefore, teachers with adaptive expertise will encourage learners to be attentive and observant during lesson delivery (Gaines, 2001).

Inferring from the above assertion shows that there is a link between the teaching and learning content learners receive and retain in classrooms. Ministry of Education (MoE) (2018) maintained that the length of instructional time in the classrooms needs to reflect the demands and interest of the learners and curriculum at large. So, a duration of 40 minutes lesson period for a single lesson and 1hour: 20minutes for double lesson is supposed to be on the time table for each subject that is taught at the Junior High School (MoE, 2019). The mind boggling questions are whether this standardized time duration is enough or too long for the attention span of each learner? What happen when teachers under utilize or over utilize this standardized time in their delivery process? Gaines (2001) explained that if effective reception and retention is prioritized in the classroom, then, teachers were likely to be extending or reducing the duration of their lessons in the classroom. That is,

teachers need more time to be able to meet the attention and memory retention of learners.

Varied Form of Punishments in Class

Cathcart, Peterson and Palmon (2015) explained Punishment as any form of mechanism put in place to make good or compensate for loss, damage or harm. Therefore, learners might be punished if they are not able to reproduce what teachers have taught them in the classroom. According to UNICEF (2018) around the world, the use of punishment especially corporal punishment in schools is increasingly prohibited. Most often, teachers attempt to deal with disruptions and misbehaviour from learners in classroom resort to the use of various forms of punishment including insults, caning, sacking, and suspension (Kelly & Pohl, 2018). However, Policy makers over the years have passed laws and/or formulated policies that prohibit some forms of punishments in Ghanaian classrooms.

Frimpong, Appiah and Kumedzro (2018) affirmed that Comenius says that poor work should not deserve punishment. I think the authorities of education inherited this point from Comenius because in Ghana now the rule is that there should scarcely be any punishment unless under the supervision of the headteacher of the school.

It is however possible that some teachers still use all forms of punishments in class including corporal punishment. Even with that, each learner has his or her preferred punishment and any form of punishment either than the individual preferred punishment has the tendency of affecting teaching and learning in the classroom.

Makewa, Myriam and Benson (2017) agreed that teachers' ability to control and be in charge of their classrooms largely depends on their powers and authorities. So, good teachers actually don't need punishment mechanisms such as caning, and sacking, to keep their classroom in discipline. Their discipline should emerge from positive ethics of school, and their personality.

Global Initiative to End All Corporal Punishment of Children (2009), submitted that non-violent, positive discipline delivers better results in the classroom, whilst corporal punishment is associated with many negative outcomes including school dropout, poorer cognitive abilities, slower cognitive development, and poorer school marks. This shows that, classroom teachers in should not use the varied forms of punishments especially corporal punishment in the class.

As a result of the above learner-factor impact in teaching and learning environment, learner variations may exist in the classroom of Junior Schools in the Jirapa Municipality. This will call for teachers in classrooms to fine ways of navigating to improve the learning outcome of each learner.

Strategies in Responding to the Varied Learners Differences in Classrooms

To investigate adaptive instructional practices that teachers can employ in the classroom, teachers need to examine the instructional methodologies upon which adaptations are based (Scott, 2002).

Tools for Schools (1998) and Wang (2010) agreed that a universal framework for all forms of educational programmes designed to meet the diverse social and academic needs of learners in classrooms is the Adaptive Learning

39

Environment Model (ALEM). This is what Narh (2015) termed as Universal Design for Learning (UDL).

ALEM is based on the premise that learners learn in different ways and at varying rates and each will need different varied instructional support through adaptive instruction (Narh, 2015; Tools for Schools, 1998). The ALEM allows teachers to build their capacities and use adaptive strategies in responding to the individual differences amongst learners in the classroom. Strategies advocated by ALEM that teachers can use in an adaptive instructional classroom are reviewed below:

Group Work

The Adaptive Learning Environment Model (ALEM) incorporates group work as an approach to accommodating and reaching out to individual learning needs in regular classroom teaching (Alhassan & Abosi, 2014; Wang & Walberg, 1983). Group work is an instructional adjustment where learners can be put in differentiated groups and task assigned them differently.Which means varied tasks can be assigned to various groups depending on the knowledge or familiarity (Francis & Gould, 2014). This suggests that in grouping learners their strengths and weaknesses are considered significantly.

OECD (2018) and Tomlinson (2015) observed that grouping learners can be based on ability grouping and mixed grouping. This ensures that learners whether in ability grouping or mixed ability groupings get to fully participate and profit from the classroom teaching and learning opportunities (OECD, 2018; Hannah, 2013).

40

Ability Grouping

This is grouping learners into group(s) with similar learning abilities. This type of grouping places learners in groups based on their academic achievements (Bolick & Rogowsky, 2016). The common purpose of ability grouping is to allow teachers to provide instruction that is appropriate for learners and their individual needs. However, OECD (2018) argued that grouping learners with similar learning abilities seem to disadvantage the low achievers in terms of group exercise within the class. These learners are often not being sure of the contributions to offer the group, for the fear of uttering wrong statements. As such, they prefer to work independently on their books, even when they are providing the wrong answers (OECD, 2018). This means that high achievers get to like group exercise as each particularly the outspoken is often confident and sure of dominating with right answers. So in this case, setting learning indicators for a whole group may disadvantage some of the learners. Westwood (1997 as cited in Tomlinson, 2015) and Alhassan and Abosi (2014) then confirmed that group working is a valuable strategy in a single classroom teaching and learning process. This means teachers who employ group working in their classroom teaching and learning in the Jirapa Municipality will be responding to adaptive challenges in such classrooms.

The question is why are teachers required to state the learning indicators in lesson plan that teachers are expected to prepare? With differentiated groupings approach in mind? It is not possible that some groups or individuals within the groups may not meet their learning needs in the entire teaching and learning process?

Mixed Ability Grouping

This is grouping learners into group(s) with different learning abilities. Mixed ability grouping allows the teacher to create an enabling environment and respect for differences in learners (Iloanya, 2014). A teacher can deliberately group learners with different learning abilities together. This will allow learners that need help, more individual attention, as well as provide an opportunity for learners with higher academic performance to relearn the material by teaching it (Hannah, 2013). So in this grouping, the learners capitalize on the strengths and weaknesses of their colleagues or get to know of the differences in each group member. Therefore the teacher may regulate or the respective group members may enforce self-regulation to aid the pace of independent learning competencies. Mixed ability groupings advantage lower achieving learners and has no harmful effect on the achievements of more able learners (Row, 2016). This means that gifted learners lose nothing in this type of grouping.

A study conducted by Row (2016) on an investigation into the experiences of learners in ability and mixed ability grouping in an independent secondary girls' school at the College of Business, Arts and Social Sciences Department of Education Brunel University, London, indicated that mixed grouping allowed learners to feel more relaxed and confident. However, the study stated that there were instances where learners reported that they felt anxious about trying to keep up with others or feeling frustrated about having to wait for others to catch up. This means that mixed grouping permits the learners to learn within their own pace though some regulations may set in either from teachers or their own colleagues within the grouping.

42

Collaborative Learning (CL)

According to Le, Janssen and Wubbels (2017) and Gokhale (1995) the term collaborative learning refers to the form of teaching and learning approach in which learners work together in small groups towards achieving a common goal. The learners are directly responsible for their own learning and it does promote critical thinking and sustainability of learner's interest in the teaching and learning process (Le, Janssen & Wubbels, 2017). Inferring from this, it means collaborative learning is a supportive learning amongst small groups within a whole class.

Collaborative learning behaviours or elements that can be observed in an adaptive classroom include: positive interdependence, individual and group accountability, interpersonal and small group skills, face-to-face promotive interaction, and group processing (ElMohamad, 2017; Laal & Laal, 2011). These collaborative learner characteristics when exhibited and demonstrated effectively may lead to learner success in the classroom.

Gokhale (1995) maintained that collaborative learning allows teachers to throw classroom teaching that traditionally would have been the responsibility of the teacher back to the learners to construct and discuss the learning process actively within their own understanding and ability level. The potency of collaborative learning is affirmed by a research conducted by Corbin (2017) on assessing differences in learning styles: age, gender and academic performance at the tertiary level in the Caribbean. The findings suggested that collaborative learning was the most preferred learning style based on the mean scores of Grasha-Riechman rating norms. To whether

43

teachers in the selected Junior High Schools in the Jirapa Municipality are able to decipher and apply this as an adaptive strategy is yet to be ascertained.

Wang and Zollers (2016) argued that the school curriculum should make provision for learners to exercise collaborative learning. This offers assistance in pursuing individual and group goals. So teachers in the classroom should endeavour to inculcate in learners the attitude to work in small groups.

Co-operative Learning

Hanover Research (2018) and OECD (2010) state that all forms of co-operative learning involve having learners to work in small groups or teams to help one another learn academic content and material. The learning complements and lessens the burden of teachers in the classroom since that provides an opportunity for the learners to discuss information or practice what is taught them (OECD, 2010). Ikwumelu, Oyibe and Oketa (2015) further argued that this adaptive strategy creates an interactive platform for learners. Through this, the learners acquire co-operative values and attitudes.

Attah-Asamoah, Doe, Tekpetey and Boham (2014) argued that in co-operative learning classroom, learners are required to work on tasks in small groups. Through this rewards, recognition and any form of outcomes are based on the group performance. This consciously internalizes in members, and they tend to then let the work reflect in the contribution and competencies of the entire membership. This is the implicit group coercion which ensures that if the whole group is succeeding, all members succeed, but, if the entire group is failing, all members fail.

Attah-Asamoah et al. (2014) further opined that co-operative learning in classrooms work best when learners possess the following characteristics;

heterogeneous groups consisting of two to six members, when there is a genuine feeling of positive interdependence amongst group members and since each individual is accountable for the learning outcome of the group, learners teach one another to succeed. This is what Ikwumelu, Oyibe and Oketa (2015) confirmed that when there is a genuine feeling of positive interdependence amongst group members, each individual is accountable for the learning outcome of the group where learners teach one another to succeed.

Though co-operative learning and collaborative learning are sometimes used interchangeably by non-educationist, in the professional realm, there are distinctions between the two approaches. Ismail and Allaq (2019) outlined that participation in co-operative learning is usually structured and led by the instructor with a clear learning outcome, whereas, collaborative learning is more flexible in respect with the emphasis being more on group abilities and contributions.

So, co-operative learning strategy in the classroom in Jirapa Municipality may require teachers to facilitate the learning task by moving between workgroups to observe and intervene when necessary. However, in collaborative learning teachers need not actively monitor the groups, but rather, provide encouragement when the need be. So teachers in an adaptive classroom environment in the Jirapa Municipality need to utilize these approaches effectively as far as they suit individual learning needs and preferences in the Municipality.

Inquiry Based Learning (IBL)

Ikwumelu, Oyibe and Oketa (2015) asserted that inquiry learning as an adaptive instructional strategy involves the learner as an active agent in discovering concepts, principles, ideas and generalizations. Thus, each learner critically customized the learning problems or tasks and find answers, draw appropriate conclusion.

Ismail and Elias (2006) opined that in inquiry learning, learners are shown how knowledge is constructed and transmitted and how they can acquire the knowledge and skills necessary to become life-long learners. This means that fundamentally, learners embark on personal discovery to grasping concepts and principles of teaching and learning.

Exline (2004) asserted that inquiry learning allows the learner who is seeking for truth, information, or knowledge the opportunity to ask questions. This means learners can interrogate the teacher to clear the misconceptions in the classroom. This process begins in gathering information and data through applying the human senses including seeing, hearing, touching, tasting, and smelling (Exline, 2004). It can therefore be maintained that inquiring based learning is a participatory teaching and learning strategy in the classroom.

Teachers need to play that motivational role in this strategy in order to unearth every learners' talent. The various disciplines taught in schools are constantly expanding and changing, and so teachers need to develop their skills and nurture the inquiring attitudes necessary for the generation and examination of knowledge of learners in the classroom (Exline, 2004). The challenge of learners' in inquiry learning as an adaptive strategy in the classrooms of selected Junior High Schools within the Jirapa Municipality will

46

not be on the availability and accessibility of information but rather the relevance and credibility of the information in this 21st century.

Also, the inquiring abilities of learners may be undermined in the classrooms where the teacher is often right in using the cane and threats to intimidate learners. This may not easily allow the learners to ask questions and/or investigate the content taught them to aid lifelong learning (Adedeji & Olaniyan, 2011).

Microteaching

Another adaptive strategy is microteaching. This lexicon was first introduced in the 1960s at the Stanford Teacher Education Programme as a way to prepare learners and get them ready for their clinical experiences (Saban & Coklar, 2013). It is popularized and a requirement in most initial teacher training institutions, known as *On Campus Teaching Practice (OCTP)* (Francis & Gould, 2014) in Ghana.

Saban and Coklar (2013) stated that microteaching model is cyclical in nature since it involves planning, practicing, observation, critiquing followed by the repetition of the same steps, after the whole process is reviewed. Microteaching exposes the teaching and learning content bit by bit, in a more intense form by learners own colleagues (Giurgiu, 2017; Francis & Gould, 2014). As a result, in microteaching, mini lessons are presented within short duration (5-20 minutes) and the number of the learners are few, not more than 20 (Francis & Gould, 2014; Saban & Coklar, 2013). So learners tend to teach their peers based on one's own understanding of what has been taught and learnt. The one delivering the teaching is also observed by the peers. Francis and Gould (2014); Saban and Coklar (2013) affirmed that microteaching

provides a platform for the learner teacher to transfer the theoretical knowledge and skills acquired into action, and thus, bridging the gap between the theory and practice.

A study carried out by Saban and Coklar (2013) to examine microteaching practices on teacher qualifications and teaching experiences indicated that pre-service teachers believed that microteaching allows them to evaluate their strengths and weaknesses in teaching. The study concluded that microteaching made pre-service teachers to manage timing, planning, questioning, and classroom management, using different materials and examples, and improvement of physical appearance during the teaching process. Also, Saban and Coklar (2013) affirmed that microteaching imbibes self-confidence, ability to contain shortcomings and learning differences in teaching and learning process. Gokhale (1995) agreed that this approach retains content longer in learners even including the quiet individuals in the classroom. Learners share their learning experiences by engaging in discussion and other explorative learning.

The challenge is that the novice peer-teacher may not deliver the desired content within the specified time or may tend to rush to finishing the content.This assertion is supported by Valiandes and Neophytou (2017) who stated that even though teachers recognize the need to teach for individual to benefit in the classroom, it is difficult and time consuming. Valiandes and Neophytou (2017) further contradicted Gould (2014) and Saban and Coklar (2013) when they stated that teachers often admit that they really don't know how to translate the theory of differentiated instruction into practice in the

48

classroom.This, when not managed well, may affect the learning outcome of those being taught (Giurgiu, 2017).

According to Matei and Gogu (2017) the teacher as the pivot of teaching and learning employs various forms of teaching in an adaptive classroom. This is to avert the diversities existing amongst learners in the classroom from not performing. This is to enable many learners benefit from the instruction in an individualistic pace in the entire class.

Self-Directed Learning (SDL)

Ikwumelu, Oyibe and Oketa (2015) explained self-directed learning approach as the teaching and learning approach where learners are actively engaged in the learning process. This leads to the acquisition of higher-order thinking skills (Adedeji & Olaniyan, 2011) where learners construct their own understanding, meaning, reasoning critically about the content delivered (Ikwumelu, Oyibe & Oketa, 2015). This makes learners in the selected Junior High Schools within the Jirapa Municipality to go the extra mile to reorganize teaching and learning from their own perspective: based on their way of thinking and own prior knowledge.

Adedeji and Olaniyan (2011) observed that this teaching strategy can be employed by teachers in rural schools on learners who demonstrate a high level of independence, enjoy working on their own, and have the ability to initiate plans for their own learning. Teachers often use classroom activities such as project exercises, questions and answers, discussion techniques to shift the responsibility of learning to the learners (Mentz & Oosthuizem, 2016).

Sumuer (2018) also explained that in self-directed learning as an adaptive strategy, learners are initiators and responsible for their learning.

49

Thus, learners tend to appreciate their needs, set their learning goal, determine appropriate resources, decide on their learning strategies, and evaluate their learning outcome. The learners have the opportunity to take charge of their own learning. As a result, Malison (2018) explained that in this millennium, learners search for knowledge on internet and the social media at their own pace and comfort for their learning purposes.

Al Ju'beh (2017) argued that there is an increase in access to information in this century making self-directed learning easier than before. This means that Junior High School learners in the Jirapa Municipality especially those who have access to internet services can have access to all forms of learning materials. Sumuer (2018) upheld that self-directed learning offers the opportunities for learners to be creative and self-independent. This will demystify learners seeing their teachers as reservoir of knowledge instead of facilitators in the classroom.

Dumont (2017) explained that in an adaptive classroom, the teacher transmits different content to each learner, with different tasks given to each learner at the same time. Thus some working independently, others engaged in learning with peers, and others are being introduced to new subject matter by the teacher. This illustrates that different learners are given tasks that are significance and thoughtful of their learning standards. The adaptive instruction accords the teacher with the opportunity to distinguish and separate the learners for the required guidance and structured support where necessary particularly to low-achieving learners than high-achieving learners (Tomlinson, 2014). Self-directed learning does not mean that learners study in isolation (Ohashi, 2018) rather learners make decisions based on self-

50

knowledge, assume responsibility for completing their work at an acceptable level and in a timely manner, seek and articulate problems and determine a method for solving them, and evaluate their own teaching and learning in the classroom.

Task Analysis Approach

According to Sherman and Wildman (1980) the emphasis on task analysis has shifted from behavioral outcomes to the analysis of cognitive processes. This means that task analysis approach can be employed to breakdown curriculum content into smaller units and presented in bits for learners to understand.

Bloom (1971, as cited in Murray and Pérez, 2015) theorized that achievement gaps between learners could best be addressed by differentiating instruction. To this end, Bloom propounded the instructional strategy theory known as Mastery Learning. The theory professed that content and skills to be learned are organized into individual units from the known to unknown and concrete to abstract (Corbin, 2017). Thus, the learning task is structured from narrow or surface content to broader or deeper content. This makes the content easier for the learner to absorb rather than the vice versa.

Therefore, Sherman and Wildman (1980) were of the view that task analysis approach assists the classroom teacher and the learner to understand the content to be taught and how to present it in a simplify form. Corbin (2017) concluded in his paper that more consideration needs to be given to teaching styles that match learners' learning styles. Teachers bid to adapt teaching and learning supposed to integrate these strategies in delivering lessons. The classroom is a composite environment with varied learner,

51

therefore attaining the desired teaching and learning outcomes require an adaptive expertise from the classroom teacher.

Outcomes of Adaptive Instruction in the Classroom

Murray and Pérez (2015) stated that adaptive instruction is touted as a potential game-changer in classroom teaching and learning, a panacea to solving challenges that teachers are likely to encounter in their teaching and learning.Sloan and Anderson (2018) supported the proponents of adaptive instruction, the authors submitted that the greatest benefit of the concept is its ability to create learner-centred classroom. This is done by customizing the teaching and learning based on the variation of learners' in the classroom. These varied learners differences when identified and teaching and learning presented appropriately, the teaching outcomes will be desirable.

This research anticipates that, if adaptive instruction is used fully in the classroom, the outcomes below might be achieved.

Lifelong Learning

This is the form of learning that starts from cradle to grave (Demirel, 2009), where the learning focus mainly on reinforcing and improving the life quality of learners by enabling them to bring their own potential to bare aspect of the learning.

Sustainable Development Goal 4 (SDG4) is to ensure inclusive and equitable quality education and promote life-long learning opportunities for all (German Development Institute, 2015) so, teaching and learning must be made available in all forms for all learners who are of school going age to benefit. World Bank (2019) and Ntim (2018) admitted that teaching and learning in the 21st century should focus on enhancing the skill to transfer knowledge and

52

skills acquired in the classroom in different situations in the world of work. Therefore, teaching and learning in the selected Junior High Schools in the Jirapa Municipality should be a holistic approach aimed at benefiting every learner in the class. Demirel (2009) affirmed that teaching and learning should not be limited to the classroom but it should continue throughout one's life.

International Labour Organization (2019) opined that the concept of lifelong learning connects individual learning experiences with formal, non-formal and informal learning undertaken throughout life, resulting in an improvement in knowledge, skills and competences of the learners. Thus, adaptive teachers create a learning environment where teaching and learning becomes flexible and changeable based on the learner's needs throughout their lives. Damirel (2009) therefore admitted that learning is personal, like one's fingerprint. This means that, individual learners entered the classroom with different unique learning pace. Adaptive teachers should then be able to guide each learner to places that are most appropriate for their learning profiles (Jahan, Khan & Asif, 2017; Damirel, 2009).

OECD (2010) asserted that in adaptive instruction, learners do not perceive their differences as an impediment to their learning. This is because adaptive instruction gets to address each and every learners' difference in the classroom. Learners benefit and practice in a continuing teaching and learning process. Thus, lifelong learning can supportlearners in the selected Junior High Schools in the Jirapa Municipality to sharpen their skills. As these learners in the Municipality will have the push for and the desire to obtain up-to-date knowledge.

Enhanced Learning Preferences

Elmohamady et al. (2016) explained that an enhanced learning preference in an adaptive instruction classroom occurs when learners get to be aware of their learning opportunities. As such, the teacher embracesappropriate learning materials to facilitate the learning process. So, teachers get to know the learner's learning preferences. This enables the teachers to adjust, review or create the teaching styles that accommodate suitable materials in harmony with the learners' learning preferences (Elmohamady et al., 2016). This is critical since any mismatch between learners' learning style with the teacher's presentation of the learning materials or content will limit the learning interest of learners. It is therefore imperative for teachers with the adaptive expertise to have some understanding of their class learners with regard to how each prefers to learn the content being delivered. In this regard, therefore, teachers need to use multiple teaching and learning strategies in the classroom.

Bachari, Abelwahed and Adnani (2012) asserted that through adaptive instruction teachers make identification of learner's individual learning style, and then tailor the instruction to suit the learning preference of each individual learner in the classroom. This strengthens the learning pace, stimulates and sustains the interest in learning, and increase the achievement of learning (Wehrwein, Lujan & DiCarlo, 2006). Teachers knowing the learning preference of learners, allows teachers to offer support differently that suit each individual needs.

54

Sound Receptive and Retentive Memory

Alhassan and Abosi (2014) noted that adaptive instruction allows the teacher to increase learners' attention during instruction in the classroom. Adaptive instruction is reactive to the interest of learners and as such learners tend to be excited about the instruction and participate actively. This keeps the learner attentive in class since the instructions are bound to meet his or her interest (Rotter, 2009). Thus, adaptive instruction does not only allow the teacher to gain the maximum attention of learners in the classroom, but also facilitates learning and understanding amongst the learners. As such, teachers build on what learners already know to make it easy for learners on what is to be learnt. When this occurs, learners get to enhance their receptive and retentive abilities. However, there could be an imbalance gap between prior knowledge of each learner and the content to be learnt.

Formative Assessment

MoE (2018) explained that formative assessment is done continually to inform teacher's choice of instructional strategies and learning aids. Formative assessment can be used to construct learner groups, adjust the pace of instruction, or alter the way in which content and materials are presented to learners (MoE, 2018; Burkett, 2013). This implies that the assessment modes teacher's employs can help the teacher to appreciate the learners. Therefore, the assessment modes of teachers should be varied to meet each learner needs. MoE (2018) maintained that formative assessment in Ghana's classrooms should include:

o   observations during in-class activities

o   homework exercises as review of class discussions and signal for future teaching and learning activities.

o   reflections journals that are reviewed periodically during the term

o   question and answer sessions, both formal (planned) and informal (spontaneous)

o   progress review meetings between the teacher and learner at various points in the term

o   in-class activities where learners informally present their results.

Therefore, teachers must gather vital learning information from each learner in order to be able to adapt effectively in the classroom. To that end, Smale-Jacobse, Meijer, Helms-Lorenz and Maulana (2019) andSmit and Humpert (2012) posits that differentiated instruction is intertwined with formative assessment. The linkage between differentiated instruction and formative assessment allows the teacher to make inform decision on each learner in the class.

Teaching with formative assessment for adaptive and differentiated instruction has been identified as a powerful strategy for closing the achievement gap between slow and fast learners in classrooms. This means the three concepts when employed effectively facilitates learners understanding in classroom teaching and learning.

Adaptive instruction permits the teacher to assess his own learners at every point of the learning and better prepare to respond to specific needs identified in the assessment (Burkett, 2013; Scott, 2002). Through this, the teacher psyches up intelligent and less intelligent learners to profit from their strengths and weaknesses in the classroom. This facilitates learners to share

learning interest, experiences and learning preferences. This further allows the teacher to equally make enquiries from learners in order to assist individual learners on what works best for each of them (Tomlinson, Brimijoin & Narvaez, 2008). Formative assessment in adaptive instruction will allow teachers in the selected Junior High Schools in the Jirapa Municipality to ascertain individual learner's information that may necessitate re-teaching of certain topics.

OECD (2010) states that formative assessment can satisfy learner's needs most especially when the teacher is conscious of the learners' learning environment, knowledge and pace of learning. This assessment allows the teacher to know the focus, aim and learning goals of the respective learners in the classroom. This makes the teacher able to assist each of the learners to steer and address his or her respective learning needs independently.

Committee on the Foundations of Assessment (2010) noted that timely feedback on learners' learning allows the teacher to measure strengths and weaknesses of learners as the teaching and learning progresses in the classroom. Formative assessment scores will guide teachers to make responsive and accurate decisions about each learner advancement (National Council for Curriculum Assessment[NaCCA], 2019). This will make parents come to terms with the work of teachers in the classrooms in the Jirapa Municipality. This is because parents will equally be privy to the scores of their wards, and thereby, assist the wards where necessary. This can be done either by collaborating with the subject teacher to find solution or finding extra class for the ward at home. Subsequently, teachers do not receive undue pressure or blame from parents for the non-performance of learners. This

assessment is a diagnostic insight that yields desirable teaching outcomes (Amoako, Asamoah & Bortey, 2019; Ackerman, Mette & Biddle, 2018) and not merely monitors learners' cognitive achievement on content but rather being holistic to focus on practical and content knowledge of the learner.

However, Awinyam (2018) lamented of the fact that teachers' attention, value and quest is placed on summative assessment rather than formative assessment. This mindset has the tendency of undermining the potent benefits that learners stand to benefit from formative assessment in Junior High School classrooms in the Jirapa Municipality.

Sustainability of Learners' Interest

According to United Nations Educational and Scientific Cultural Organisation [UNESCO] cited in Brito, Rodríguez and Aparicio (2018) education for sustainable development enhances learning to make decisions that secure the economic, environmental and social future of the learner. This implies that when adaptive instruction is utilized effectively each learner will be meeting his or her educational needs.

Brito, Rodríguez and Aparicio (2018) further maintained that to strengthen learners interest, schools curricula must be updated and integrated into the context of education for sustainability in its environmental, social and economic perspectives. Thus, the curricula in itself should contain activities that gear towards surviving each learner's interest in the classroom. Teachers should therefore create good teaching enabling classrooms for each learner to thrive on their interest.

This is affirmed by a research project on how learner interest and instructor effectiveness impacted learner performance which was conducted

by Sauer (2012) with two middle school learners. The findings revealed that learner's interest and their relationship with the instructor were contributing factors in teaching and learning outcomes. Therefore, teachers need to consider learners interest in order to promote their learning needs in the classroom. When the learner's interest is sustained, it may retain their stay in class and the opposite is possible.

The researcher envisages challenges teachers might encounter in using adaptive instruction in the classrooms. These perceived challenges are reviewed and discussed below.

The Challenges of Adaptive Instruction to the Teacher

Ackerman, Mette and Biddle (2018) stated that adaptive challenges are unpredictable, complex, and ambiguous in nature. The authors maintained that solution to this type of challenge usually require people to learn new ways of doing things, as well as to have the ability to change their attitudes, values, and norms to fit the situation in the classroom. This implies that in an adaptive instructional classroom certain setbacks and hindrances that emanate during teaching and learning might be temporal and not permanent since the teacher is flexible in shifting teaching and learning activities to suit the existing challenge as early as the challenge is detected.

In order for the classroom teacher to respond effectively to learners learning challenges, some kind of agreement must be established by the teacher including the capacity to adapt instruction (Athanases, Bennett &Wahleithner, 2015). This implies that when classroom instructions are not adapted effectively by the teacher, teaching and learning may not produce desirable products. Tomlinson (2015) and Alhassan and Abosi (2014)

59

indicated that learning differences in the classroom creates shortages, shortfalls, and discrepancies amongst learners. Implying that there are learners, who perform exceptionally well in the class, others perform as anticipated, whereas some learners perform far below their age. As a result, teachers solely blame certain learners and at times subject them to strict corporal punishment for failing to comprehend what is taught in classroom (Alhassan & Abosi, 2014). With this in mind, Tomlinson (2015; 2000) argued that teachers who do not adapt instruction automatically exclude certain learners from active participation in the classroom. Mean whilst, classroom participation is critical as it leads to inclusion of all the learners in an adaptive instructional classroom.

Inadequate Pre-service and In-service Training

Education for All Global Monitoring Report (2015) is of the view that curriculum reform requires teachers to obtain adaptive expertise to be able to adequately meet the changes in the classroom teaching and learning. This indicates that teachers coming out from the Teacher Training Colleges and teachers who are already in the profession need to receive some amount of training to enable the teachers meet classroom demands.

INSET Sourcebook (2012) affirmed that pre-service training at the Colleges of Education alone cannot provide teachers with the knowledge and skills necessary for a lifetime teaching at schools.It is necessary to have both quality pre-service training and a coherent process of continuous professional development (CPD) to keep teachers' knowledge and skills required in classrooms up-to-date. This means that there should be regular training for teachers to enable them teach to meet the varied learners differences in the

classroom. Scott (2002) suggested that pre-service and in-service training need to address not only the issue of providing teachers with a broad knowledge based in the area of reading but also need to address teaching style, teacher belief and teachers' ways of knowing.

Institutionalization of in-service training for teachers on the academic time table in schools (Safi, 2014) has not been followed through by many school headteachers and the Jirapa Municipality is not an exception. On this note, in-service training need to be organised regularly in junior high schools in the Jirapa Municipality.

Inadequate Adaptive Expertise

Alhassan and Abosi (2014) observed that teachers possess limited adaptive or no adaptive expertise at all in the classroom. This may be as a result of little or no appreciation of adaptive knowledge as a teacher. The adaptive classroom teacher may be handicapped with adaptive skills especially amongst the untrained and newly trained teachers. It will therefore be difficult blending the needs of all sorts of learners' in the classroom within every single lesson (Bachari, Abelwahed & Adnani, 2012). This implies that each adaptive teacher is to be flexible when addressing learners' needs in the classroom teaching and learning.

Bachari, Abelwahed and Adnani (2012) submitted that it is extremely cumbersome for a teacher to determine the best learning style for each learner in the same classroom. Even if the teacher is able to identify each learner learning style, it will still be extremely difficult to apply multiple teaching strategies in a real teaching environment. This assertion if maintained implies

61

that it might be impossible meeting the learning needs of each learner in a single classroom instruction.

Time Constraint

Valiandes and Neophytou (2017) and Haddad and Kalaani (2014) found that lesson delivery in the classroom is really confronted with insufficient time when the teacher must help each learner to achieve. Taylor (2017) affirmed that time affect teachers delivery in classroom because they require extra time and effort, to break instructional tasks and assessments since such are very complex. Wang and Walberg (1983) also submitted that there is the need to increase the amount of time spent by individual learners on suitable tasks. However, teachers inability to get maximum time to teach to learners' suitability on task may serve as a serious constrain to adaptive teachers in the classroom (Wang & Walberg, 1983); Geel, Keuning, Frèrejean, Dolmans, Merriënboer and Vissch (2019) and Valiandes and Neophytou (2017) affirmed that teachers are aware of the need to differentiate in class though it is difficult and time consuming.

This is against the background that the curricula content in Ghana is an examination driven nature which put teachers on a rush to complete it. Teachers' scheme of work and teaching syllabus in the term are hastily completed. This may leave little room for classroom adaptation even when that is the desirable approach to the different learning needs of the learners.

Multi-Grade Teaching

Adedeji and Olaniyan (2011) noted that inadequate teachers to teach available classes is a widespread challenge in most schools. As a result, one teacher combines two or more classrooms and teach at the same time in one

classroom (Hyry-Beihammer & Hascher, 2015; Adedeji & Olaniyan, 2011) This is termed as multi-grade teaching. In this scenario class teachers are required to teach more than one curriculum concurrently in the same class. Teaching combined classes in one classroom becomes difficult for most teachers when it comes to utelising the curricula effectively.

Mathot (2001) submitted that learners bring a lot of great diversities to their classes. Teachers need to appreciate and recognize these variances regardless of the number of classes combined for the teaching and learning process. It might therefore be difficult for an adaptive teacher to be able to modify instructions appropriately to meet each class in this approach.

It is evidently clear according to Adedeji and Olaniyan (2011) that, not many teachers are competent in this teaching multi-grade classsess, therefore, in such classes the performance of the learners can be negatively affected. There is thus the need to organize short courses for teachers to be able to apply adequate teaching strategies as the case applies. This is because multi-grade teaching may require more work than single-grade instruction.

Large Class Size

Class size refers to the number of learners in a given course or single classroom being taught by individual teachers (MoE, 2019). Class size has the tendency of influencing teaching and learning in the classroom. According to Ministry of Education, 2019 any class size at the Junior High School that exceeds 30 learners is considered a large class size.

Alshammari (2016) argued that in a traditional classroom setting, adaptive instruction may be limited because of the large class sizes. To this effect, teachers seldom get enough time, resources and ability to assess the

knowledge level, application ability and content understanding levels of each learner for the teacher to adjust his or her teaching approaches accordingly. This assertion is affirmed by Alhassan and Abosi (2014) who were of the view that teaching a class with large size in the urban and semi urban schools is often characterized with difficulties including instilling effective classroom management. Sustaining learners' attention, effective monitoring and assessment of progress during teaching becomes challenging (Alhassan & Abosi, 2014). Therefore, teachers within the Jirapa Municipality are likely to aslo face similar difficulties because large classrooms are common in the Municipality. There is the need for teachers in the Jirapa Municipality to employ adaptive teaching and learning strategies in the classrooms to be able to meet the varied learners differences.

Overloaded Curriculum

The school curriculum epitomizes the kind of knowledge, skills and values that teaching and learning should archor on. The curriculum ought to address questions such as what, why, when and how learners should learn (UNESCO, 2016).

Education for All Global Monitoring Report (2015) further maintained that the curriculum is at the heart of all teaching and learning in the classroom and need to be managed well. It influences the learning outcomes of all teachings and learning in the classroom. Ikwumelu, Oyibe and Oketa (2015) noted that current global trending issues such as HIV/AIDS, gender disparity, substance abuse, human trafficking, child labour, child abuse, hunger, and prostitution have propelled curriculum designers to include these elements in school curriculum so as to educate the

64

learners on the unbearable effects. The inclusion of these societal problems though relevant seems to have overloaded the curriculum content. Therefore, classroom teachers are often uneasy adjusting to these new issues into the already crowded school time-table. Schools and teachers rush through subjects just to complete their syllabuses and drill learners to possibly pass examination not mindful of whether or not real learning has taken place.

Education for All Global Monitoring Report (2015) argued that the curriculum can turn out to be a barrier to teaching and learning when it is a must document for teachers to cover certain amount of the syllabus within a particular period, regardless of comprehension. If the school curriculum covers too much, and fails to consider teachers' ability to deliver, then learners will fall behind (Beatty & Pritchett, 2012). The overriding issue here is that the pace at which the curriculum is taught should be within the range of most learners (Ikwumelu, Oyibe & Oketa, 2015).

Ackerman, Mette and Biddle (2018) however argued that resolving adaptive instructional challenges in the classroom teaching and learning spectrum is a '*wicked problem'*. This means that there is no easy way to identify a cause or profess exact solutions to the perceived adaptive challenges in the classroom.

Poor Supervision

Supervision is a complex process that must play a prominent function in the classroom teaching and learning (Adedeji & Olaniyan, 2011). Poor supervision means the implementation of adaptive instruction in classroom fails to deliver the desired outcome to the learners (Taylor, 2017). To this effect, any form of behaviour and attitude from teachers, headteachers and

circuit supervisors that may lead to poor supervision in the school system can have a trickling down effects on some learners with varied learning needs in the classroom. Adedeji and Olaniyan (2011) agreed that supervision is a forward looking process that enable teachers to select the most appropriate strategies in his or her classroom in order to meet most of the learners learning needs in the classroom. Teachers who lack the essential principles for supervision may encounter classroom management challenges.

Scott (2002) affirmed that the level of administrative support in a school system can affect the effective implementation of an adaptive instruction in the classroom. Steele (2017) also maintained that the teacher adaptive abilities have been recognized as a component for effective teaching and learning, empowering teachers to modify information for learners.

Conceptual Framework

Conceptual Framework for Adaptive instruction in JHSs Classrooms in the Jirapa Municipality
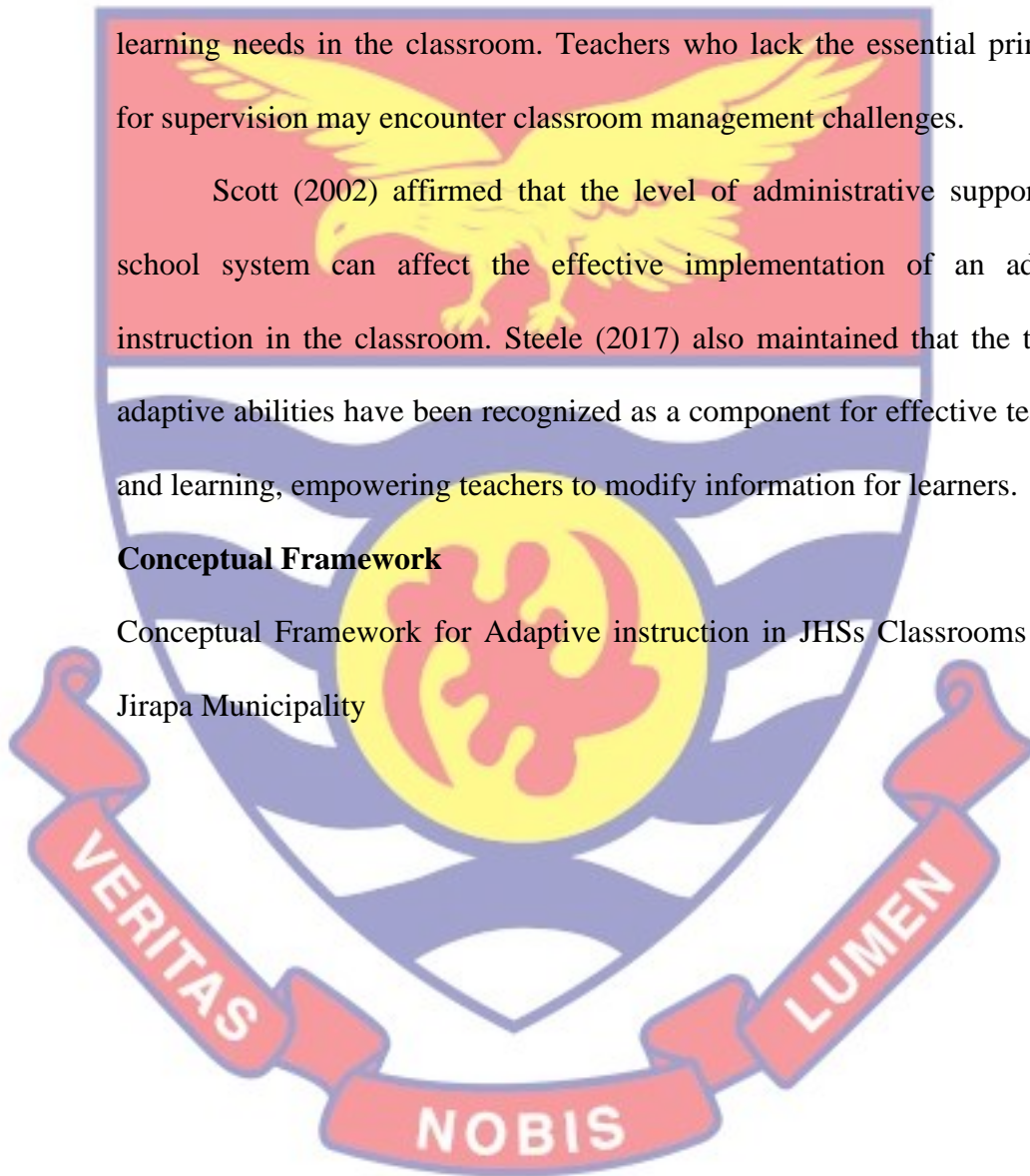
variations may be common in most public schools within the Jirapa Municipality. Adaptive instructional strategies that are perhaps applicable in the classroom include group work, task analyses, co-operative teaching, microteaching, self-directed learning, collaborative learning and Inquiring based learning. This explained that when these multiple instructional strategies are applied effectively by an adaptive teacher, the teacher will be moving teaching and learning closer to each learner despite their varieties in the class. Jahan, Khan and Asif (2017) agreed that adaptive instruction is the form of teaching individuals within a group. The use of adaptive instructional strategies in teaching and learning could lead to desirable outcomes in the class such as lifelong learning, enhanced learning preferences by learners, sound receptive and retentive memory and formative assessment. Similarly, as varied learners differencesare common across most classrooms, teachers who pay little or no attention to these may not be responding to many learners needs in the class.

Therefore, all teaching and learning in the classroom should be geared towards adaptive instruction, since it is an approach capable of responding to the varied learners differences that exist in every Junior High School classrooms within the Jirapa Municipality.

Chapter Summary

Differentiated Instructional theory forms the major theoretical framework underpinning the study. The review pointed out the learner characteristics that teachers can differentiate in the class. They are the learner readiness, interest and profile.

Classrooms are engulfed with varied learners differences such as cultural heterogeneity, varied prior knowledge, gender differences, age differences, varied learning styles, difference cognitive abilities, difference emotional status and varied form of punishments.

The literature available maintained that there are many ways in which learners learn and also very different in their aptitude and preferences. What suits some is exclusive for others, what is usual practice in one culture may be exceptional or unacceptable in another. Learners of different ages, with different needs, from different occupations and cultures will have been exposed to very different learning and teaching styles and this may significantly affect their preferences and expectations inthe teaching and learning environment.

Therefore, it has been found that teachers should not go to the classroom with 'one size fits all' approach of teaching and learning, rather, multiple strategies should be employed in order to reach out to majority if not every learner in the lesson. It is established that adaptive instruction is necessary if teachers are to meet the varied learners differences in the classroom despite the challenges that may impede teachers from effectively and efficiently implementing adaptive instruction in the selected Junior High Schools in the Jirapa Municipality.

69
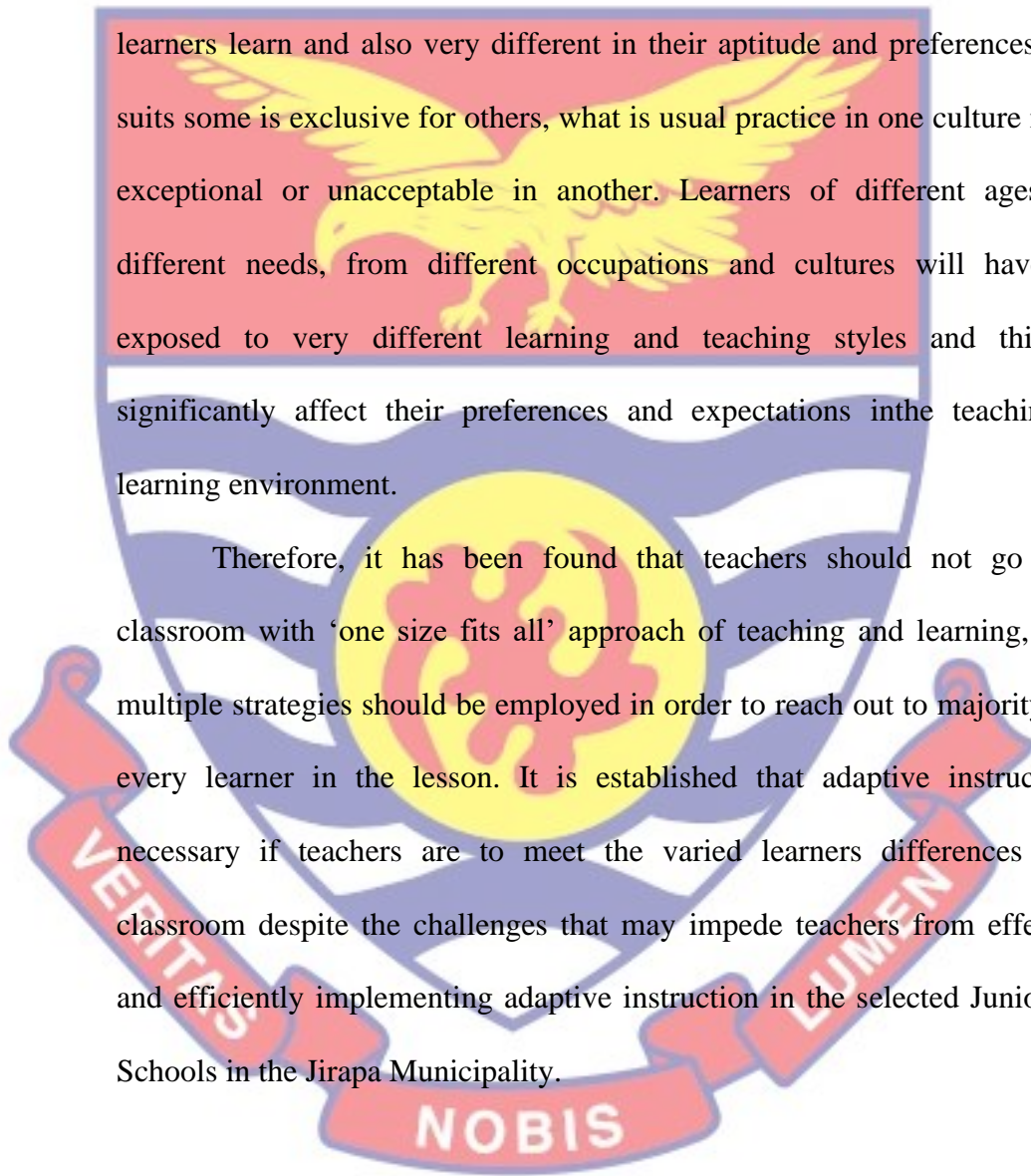
CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter presents discussions on the educational profile of the study area, the philosophy that underpins the study, the research approach, and the research design. The rest are: population, sample and sampling procedure, instruments, data collection procedure, ethical issues, data processing and analysis, hypotheses and finally the chapter summary.

Study Area

The research area is Jirapa Municipality with Jirapa as the capital town. Jirapa Municipality is one of the eleven districts in the Upper West Region of Ghana. The Municipality is located in the northwest part of Upper West Region. The Jirapa Municipality has 46 public basic Junior High Schools with a total enrolment of 5162 learners. This is made up of 2,544 male learners and 2618 female learners respectively. The schools are clustered into 10 circuits with a total of 240 teachers.

The table below shows the name of the circuit and the number of teachers in each circuit.

70

Research Philosophy

This study is guided by the pragmatic point of view. According to Kaushik and Walsh (2019); Creswell and Creswell (2018) pragmatism derives from the work of Peirce, James, Mead, and Dewey as well as from the work of Murphy, Patton, and Rorty. These authors believed that pragmatism as a philosophical worldview arises out of actions, situations, and consequences rather than antecedent conditions (as in postpositivism). The pragmatic paradigm is in tandem with the mixed methods research because of the multiplicity of models and methods they both accommodate (Brierley, 2017). Nartey (2018) maintained that pragmatists study focus mainly on the research problem in social science research and then using pluralistic approaches to derive knowledge about the problem. Creswell and Creswell (2018) is of the view that the philosophical underpinnings for pragmatist researchers include:

1. the researcher is not bound to any one system of philosophy and reality.

2. the researcher has freedom of choice.

3. the researcher does not see the world as an absolute unity.

4. thus, for the mixed methods researcher, pragmatism opens the door to multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis.

Therefore, the philosophical underpinnings of this study is anchored on the pragmatist point of view since the researcher was free to choose the methods, techniques, and procedures of research that best meet the needs and purposes of the study, the study also employed many approaches for collecting and

analyzing data rather than subscribing to only one way (e.g quantitative or qualitative).

Research Approach

Mixed methods approach was used for the study. This type of approach rides on the assumptions that collecting different types of data will best provides a more complete understanding of a research problem than either quantitative or qualitative data alone. This approach also ensures a complete detail of the purpose of the study and also help to complement and strengthen the weaknesses of one instrument with the other (Creswell & Creswell, 2018). From the forgoing, the mixed method approach situated well for this study.

Research Design

This study used cross-sectional survey as a design. Research design is a blueprint that articulates what data is required, what methods are going to be used to collect and analyze the data, and how all of this is going to answer the research questions posed in a study (Amedahe & Gyimah, 2018).

The choice of a research design for a particular study is based on the purpose of the study (Cohen, Manion & Morrison, 2017). This design provided a clear snapshots of practices, beliefs, or situations from a random sample of subjects in field settings through a survey questionnaire or less frequently, through a semi structured interview (Bhattacherjee, 2012).

In this design, one-off data was collected, thereby, making the design quick and cheap to undertake (de Vaus, 2001). According to deVaus (2001) the cross sectional design allows one-off collection of data devoid of repetition. As such, this design is economical, and therefore, saves the researcher's time, effort and cost.

73

However, steps were taken by the researcher to correct the weaknesses associated with the cross-sectional design, the questionnaire was pre tested and this enabled the researcher to review ambiguous statements for clarity. Respondents were assured that their responses will be treated as confidential and will exclusively be used for academic purpose.

Therefore, this design was used to investigate classroom teaching and learning through adaptive instruction in some selected Junior High Schools in the Jirapa Municipality of the Upper West Region.

Population

The population of the study covered all teachers who are teaching in basic schools and all learners in the Jirapa Municipality. According to Amedahe and Gyimah (2018), population represents the larger group to which the researcher hopes to generalize the results and findings. That is the larger group that interests the researcher upon which conclusions can be drawn.

The target population comprised of 240 teachers and 5,162 learners. The accessible population was trained teachers at the Junior High Schools who are willing to participate and are available. Learners at the Junior High Schools, headteachers and the Municipal Education Training Officer who were available at the period of the study were part of the study.

Sample and Sampling Procedure

The study used both probability and non-probability sampling procedures. The selection of probability sampling was based on the premised that every element of the survey population (sampling frame) has a chance of being included in the sample (Cohen, Manion & M orrison, 2017). The probability sampling procedures used are cluster sampling and simple random

74

sampling and the non-probability sampling was purposive sampling and census method.

Krejcie and Morgan (1970) sample size determination table was used to arrive at the sample size of 148 teachers for the study. Krejcie and Morgan table shows a predetermined population and its corresponding required sample size. Thus, a teacher population of 240 in the Jirapa Municipality gives a sample size of 148 which was used for this study. See appendix A for Krejcie and Morgan (1970) sample size determination table.

Cluster sampling method was used in selecting the 148 teachers for the study. The various circuits in the Jirapa Municipality were considered as clusters. Also, each of the Junior High School in the respective circuits were further considered as clusters. The researcher then used the census method in selecting all 10 circuits in the Jirapa Municipality. Four (4) Junior High Schools in each of the circuits were then chosen for the study using simple random sampling.

In all, 40 Junior High Schools were considered. In each school, 4 teachers were selected using simple random sampling. The researcher used the lottery method is selecting the teachers. Any school that has more than four teachers, 4 'Yes' and 'No' were written and put in a box. Then each teacher would select, teachers who selected 'Yes' were given the questionnaires. Those teachers who selected 'No' did not take part in the study. Notwithstanding, it is emphatic to state that census method was used to select 12 Junior High Schools in the Jirapa Municipality which had exactly 3 trained teachers each. Therefore, all the 3 trained teachers were selected in such schools for the study. Using simple random sampling and the cluster sampling

allowed for representativeness of the sample units in the sample, reduced biases and minimizing cost particularly when not all the sample units were included in the study (Amedahe & Gyimah, 2018; Seidu, 2015).

Purposive sampling method was used to select 80 learners. The four (4) Junior High Schools in each circuit that the researcher visited, two (2) form two (2) learners were chosen to respond to the questionnaire, that is the class prefect and assistant class prefect. In all eighty (80) Junior High two (2) class prefects and assistants responded to the questionnaires.

The class prefect and assistant class prefects were purposefully selected for this study because they might be regular in class since they are the class leaders and maybe able to provide the researcher the most information needed for the study. A headteacher each from the 10 circuits were purposively chosen to be part of the study. The headteachers were chosen because of their in-depth knowledge and supervisory role each plays in their schools towards effective and effecient teaching and learning. The Municipal Education Training Officer who is responsible for organizing professional development programmes for teachers in the Municipality was purposively selected to be part of the study. This was because it is only one officer who occupies that portfolio in the education offices.

Data Collection Instruments

Data for this study was gathered using three instruments: questionnaires, interview guide and observation protocol.

Questionnaires

Questionnaire is a data collection instrument which is mostly employed in generating quantitative data. This is popular in quantitative

studies though it can also be used in qualitative studies (Kusi, 2012). Questionnaire was appropriate for gathering data for this study. According to Amedahe and Gyimah (2018) questionnaires are series of questions, statements or items which are given out to the respondents to respond by writing or selecting from given options. Questionnaires allow the respondent to offer any information, express any opinion they wish, although the amount of space provided for an answer will generally limit the responses. Additionally, it permits the researcher to unearth relevant information on the area of study. To achieve the research objectives, the researcher administered set of questionnaires to teachers and learners.

Questionnaire for Teachers

The set of questions were divided into Sections A, B, C, D and E under the following headings.

Section A: This dealt with the demographic information of the teacher.

Section B: Focused on using a three-point Likert scale to measure the varied learners 'differences in adaptive instruction amongst teachers in the classroom. Respondents were required to choose only one option by ticking either exist (1),does not exist (2) or, not sure (3) in the boxes provided to indicate the existence or otherwise of varied learners differences in the classroom. The respondents further explained in the space provided the nature of existence of each variation in the classrooms.

Section C: Likert scale was used in finding out from agree (1), disagree (2) or, undecided (3) to solicit data on the strategies in responding to varied learners' 'differences in the classroom. In this, each respondent was required to tick in the box on the strategies used in the classroom teaching and learning. The

77

respondents explained on the dotted lines how each strategy is demonstrated in classroom.

Section D: dealt with the outcomes of adaptive instruction in the classroom. A 3-point Likert scale was used to measure the level of agreement of respondents on the outcomes of adaptive instruction in the classroom. The teachers were required to tick either disagreed representing (1), agreed (2), or undecided (3) in the boxes provided to indicate their level of agreement or otherwise of the outcomes of adaptive instruction in the classroom. The respondents further explained in the space provided the nature of each outcomes in the classroom.

Section E: solicited responses on the challenges of adaptive instruction to the teacher. Each respondent was to tick either disagreed represented by (1), agreed (2), undecided (3) respectively, in the boxes provided to indicate the challenges of adaptive instruction to the teacher. The respondents also explained on the dotted lines the nature of each of the challenges.

Questionnaire for Learners

This set of questions were administered to learners. The responses were used to validate the responses from teachers and headteachers. Item 1-8 required learners to rank selected teaching and learning strategies.

Neuman (2014) was of the view that questionnaire permits researchers to merge responses of the respondents, and thereby, making comparison of responses easier. Questionnaires allowed the respondents to easily and quickly answer, and through this, the researcher had wide coverage of the respondents (Neuman, 2014) across the study area. Therefore, the researcher chose questionnaire over other instruments for the teachers and learners because both respondents can read and respond appropriately to the questions contained in

it. It also provided the researcher the opportunity to generate numerical values needed for the study. One limitation of it is that respondents may misconstrue some of the questions thereby affecting the response given. Also, some of the respondents may skip some of the questions or may refuse to return the questionnaires.

To overcome these weaknesses, the researcher explained items to respondents and encouraged their frank responses. Also, the researcher sought the informed consent of the respondents and assured them that they could decline at any point.

Interviews

The researcher interviewed headteahers and the Municipal Education Training Officer. As part of selecting interviewees, the professional ranking to be considered included those on the rank of principal superintendent, Assistant Director II and Assistant Director I.

These category of teachers are most suitable to occupy managerial positions such as headteachers and the Municipal Education Training Officer.

Table 1-*Key Informants*

Key Informant	Principal Superintendent	Assistant Director II	Assistant Director I	Number of informants
Headteachers	8	2	0	10
Municipal Training Officer	-	-	1	1
Total	**8**	**2**	**1**	**11**

79

In conducting the interview the researcher employed semi-structured interview method of data collection to help investigate the views, experiences, beliefs and, practices of respondents in the study area (Creswell, 2014). Semi-structured interview is usually conducted in a face-to-face setting which permits the researcher to seek new insights, ask questions, and assess phenomena in different perspectives (Sileyew, 2019).

Semi-structured interview guide was used to gather information from the headteachers to establish their role in ensuring and empowering teachers to adhere or develop adaptive instructional strategies when teaching and learning in the classrooms in the Jirapa Municipality. The questions are basically on the four main research objectives of the study. The headteachers' consent were sought and the interviews were conducted at a serene and convenient setting. The questions on the interview guide include:

1. Do teachers consider the differences in term of learners when they are preparing lesson notes?

2. If yes/no what are your reasons?

3. Do you have learner variations in your school? How do such variations exist or not existed?

4. What strategies have you observed your teachers used either on the lesson note books or in classroom to teach learners with varied learning differences?

5. What are some of the learning outcomes you anticipate if teachers implement adaptive instruction in teaching and learning?

6. As the headteacher of the school, what are some of the challenges you think will impede teachers from teaching to meet all the varied learners differences in the classroom?

There was opportunity to probe from the interviewee for more explanation when the need arose. The researcher also simplified items for the interviewees especially those required for such clarifications. However, these questions were asked in any order and the wording were varied by the interviewer if it is deemed necessary (Amedahe & Gyimah, 2018).

Similarly, the Municipal Education Training Officer was also interviewed to investigate is role in training and developing teachers' capacity on the use of adaptive instruction in the classrooms of Junior High Schools in the Jirapa Municipality. The questions on the interview guide focused mainly on the main objectives of the study. Permission was solicited from the interviewee for the interview to be recorded and notes taken.

However, the openness of some of the questions in this instrument led to the gathering of large quantity of qualitative data. This consumed a lot of time during the data gathering and data analysis sessions. It was also extremely difficult for the researcher to deal with his or her personal biases due to the flexibility of the instrument.

To overcome these perceived challenges in the field, the interviewer tried as much as possible to ask relevant questions that are of interest to the study area. The advantage of using semi-structured interview as a method is that it allows respondents to raise issues that the interviewer may not have expected (Creswell, 2014; Sileyew, 2019). Also, this instrument allowed the

81

researcher the opportunity to seek classification through probing questions (Kusi, 2012).

Observation

Observational protocol form was used to gather information on teachers' mode of delivering lessons in the classroom. According to Creswell (2014) observational protocol allows the researcher to use a single page with dividing lines down the middle to separate descriptive notes from reflective notes.

Purposive sampling method was used to select and observeonce a double period lesson, one each in all 10 circuits because double period lessons have 70 minutes. The schools' characteristics such as the teachers and learners are similar, therefore for convenient seek the first school in each circuit, a class was observed. Purposive sampling was employed to allow the researcher to evenly observe some particular subjects especially the core subjects.

The observational protocol form was divided into section A, B, C, D, and E.

Section A: This contained demographic information about the date, time, form, teacher's gender, number of learners, subject, and the topic to be observed. The demographic information allowed the researcher to have knowledge on the representation sample of the participants.

Section B: Observation on this section was based on teacher ability to recognize or identify varied learners differences for adaptive instruction in the classroom. The researcher was interested in whether the teacher recognizes or not the following statements: respect for cultural heterogeneity in the class, lesson delivered on learners prior knowledge, gender awareness notice in class, age differences is considered during task performance, opportunity for

82

learners to learn on their preferences, learners cognitive abilities, teachers' respect learners emotions, and duration of lesson adhered to by the teacher. If any of the statements was observed, the researcher ticked 'yes', if not observed 'no' was ticked and if he/she ticked 'yes or no' but with issues, the specific issue was written on the remarks column. The variables observed constituted the basis for learner variations in the most classrooms. Therefore, teachers who recognize these learner variations will also implement them in the classroom.

Section C: The observation on this section focused on teacher's ability to use multiple teaching and learning strategies in responding to varied learners differences in the class. The statements to check include whether the teacher employs or facilitates the following strategies during teaching: (a) group work (b) collaborative learning (c) co-operative learning (d) inquiring based learning (e) microteaching (f) self-directed learning, and (g) task analysis approach. Statements that are observed was also ticked yes and those not observed ticked no. Any other relevant issue was written on the remarks column. Classrooms that these variables would be observed to to in usage means such teachers are employing adaptive instruction in teaching to meet the varied learners differences existing in the class.

Section D: In this section, the researcher observed the expected outcomes of adaptive instruction in the classroom. The statements to check were whether the teacher or learners exhibit the following: learners demonstrate practical understanding of the lesson, teacher encourages learning based on learners preferences, learners actively participated in the lesson, teacher assess learners as teaching and learning is in progress and the teacher is supportive to learners

in class. When these variables are observed to be in usage in the classroom, it means teachers have accepted and understood the desireable benefits of adaptive instruction.

Section E: Observation from this section was based on the challenges of adaptive instruction to the teacher. This was observed on three statements, thus, whether the teacher demonstrated adaptive competencies, effective utilization of instructional time, and effective classroom management. In classrooms where these variables would not be observed means such teachers face challenges in trying to practice adaptive teaching.

The choice of observational protocol allows the researcher to generate conflicting or confirming data gathered from the teachers and learners during the administration of their questionnaires.

Observational protocol also provides an opportunity to record information as it occurs in a classroom, to study actual behaviour, and to study teachers and learners on the concepts un der study (Amedahe & Gyimah, 2018).

However, according to Amedahe and Gyimah (2018) and Neuman (2014) researchers may face the following difficulties when collecting an observational data: the observer may over-identify with the class being observed, observer personal biases and perception may set in, and data analysis can be time consuming. To minimize the effect of the shortcomings of this observation, the observer sticked to the observational protocol form and tried as much as possible not to tick any statement based on personal biases. The remarks column also helped the observer to comment on observations that were not on the protocol.

Pre-testing of Instrument

The questionnaire for teachers and the learners were pre-tested in the Wa Municipality of the Upper West Region. Five trained teachers in St. Cecilia Junior High School and five from St. Andrews Junior High School were given the questionnaires.

Also, two (2) learners from St. Cecilia Junior High School and St. Andrews Junior High School were given learners questionnaire each to respond. The researcher also observed a lesson each in St. Cecilia Junior High School and St. Andrews Junior High School. The headteachers of these two schools were interviewed as well.   A pre-test was conducted in the Wa Municipality to ensure that the instruments were valid and reliable. Wa Municipality was considered because the respondents, that is the teachers received similar training and qualifications from their professional training institutions. The learners are also within the same age brackets and similar teaching and learning materials as well as content is taught in all schools just like in the study area.

The pre-testing allowed the researcher to make corrections, modifications and also ascertain the workability of the research instrument for the study. The data from the pretesting was analysed and this helped the researcher to determine whether the methods of data analysis proposed for the main study were workable. It also suggested additional areas that needed to be investigated in the study or better ways of analyzing the eventual data from the study.

85

Validity and Reliability

To ensure the validity and reliability of the instruments, the quantitative data was pretested in the Wa Municipality. The pretest afforded the researcher an opportunity to fine-tune the instruments for the final data collection. In all, 10 Junior High School trained teachers participated in the pretesting of the teachers questionnaire. The result of the pretest shows a Cronbach's alpha reliability coefficient of 0.725, indicating that the instruments were very good and reliable for data collection (Cronbach, 1975). (See Appendix E). The pretest study provided an opportunity for further refinement of the instrument. For instance, the items in section C and D were not understood by most of the teachers. Therefore, short explanations were provided under items such as ability grouping, mixed ability grouping, collaborative learning, co-operative learning, inquiring based learning, microteaching, self-directed, and task analysis approach.

Again, the observational protocol was rearranged to include section A, which offers the opportunity for the researcher to know the date, name of school, time the observation starts and ends, class gender, number of learners, subject and topic observed in each classroom.

Unlike the quantitative data, where statistical method was used for establishing the validity and reliability of the research instruments, the researcher used peer debriefing method to establish the trustworthiness and regour of the interview guide (Guba & Lincoln, 1985). The interview guide for the study was given to my supervisor and peers who are experts in qualitative data analysis to critically review the themes generated. Corrections were made, particularly question two of the Municipal Education Training Officer's

interview guide. The interviewees also validated their respective quotes and the themes that the researcher generated from their quotes. To ensure the trustworthiness and regour of the data, the researcher played back the recorded voices and compared with the notes that were taking during the interview processes. The audio voices are used in filling gaps during the notes taking in the interview process.

Data Collection Procedures

The researcher collected introductory letter from the Department of Basic Education of the University of Cape Coast. This introductory letter was attached to an application the researcher wrote to the Jirapa Municipal Education Office, seeking for data on teachers profile and also permission to visit schools within the Municipality for data collection.

Upon arriving in each school, the researcher sought permission from the Headteacher and then interacted with the teachers. The questionnaires for teachers were administered first. Respondents answered at their convenient time. The researcher did this to minimize the non-response rate amongst the respondents. These respondents were given four days to fill the questionnaires. The researcher went back to the respective respondents for the completed questionnaires after four days. Even with this, others were still not able to complete the questionnaires. So, an additional four days was allowed. After this second deadline, the researcher relied on known staff members to pick up those completed questionnaires. Even with this, the researcher still observed some questionnaires were not answered. These unanswered questionnaires were collected but not used in the data analyzing process. Out of 160 teacher

questionnaire that was distributed, the researcher was able to collect 148 of them back. The return rate was 92.5% which means it was very encouraging.

The learners questionnaires were administered by the researcher, the researcher visited each selected school that was sampled for the administration of the teachers questionnaires. Exactly 40 schools were visited and 80 Junior High two (2) class prefects and assistants were given the questionnaires. They were guided to complete the questionnaires. The questionaires were collected immediately after finishing.

Phone call discussions were held with each of the headteachers of the selected schools to agree on a convenient time for administering of the questionnaires, interviews and observation. However, all the instruments were not administered on the same dates and days.

There were 4 main items on each of the interview guide. Each interview session lasted 25 to 30minutes. It is important to note that one of the interviewees declined the interview due to busy schedule. All efforts by the researcher to arrange for an interview with him proved futile.

After administering the questionnaire to the 4 teachers in each school, the researcher observed one lesson from a teacher per circuit. The first school visited in each circuit, a class was observed. Form 1, 2 and 3 were observed in turns from the first school in each circuit. The observation always took 80minutes. Each observation focused on the following: Section A: information on date, time of the observation, form, teachers' gender, number of learners, subject and topic to be observed. Section B: teachers' ability to recognize or identify varied learners differences for adaptive instruction in the classroom.

Section C: teaching and learning expected outcomes in adaptive instruction.

Section D: challenges of adaptive instruction to the teacher.

Section E: the use of teaching strategies in responding to varied learners

differences in the class.

Ethical Consideration

The protection of human participants and institutions through the application of appropriate ethical considerations is important in every research study (Arifin, 2018). The researcher therefore obtained an introductory letter from the Department of Basic Education and ethical clearance letter from Institutional Review Board (IRB) of the University of Cape Coast (see appendix C and D).

The process of obtaining consent consists of the following: consent should be given voluntarily, participants should understand what is being asked of them, and involved participants must be competent to consent (Arifin, 2018). This means, participants in this study needed to be adequately informed about the research. They should also be able to comprehend the information and have a power of freedom of choice to allow them to decide. Participant's agreement to participation in this study was obtained only after a thorough explanation of the research process to each participant.

An explanation was clearly given to potential participants that they had a right to withdraw from the study at any time even after the informed consent had been agreed upon. Consent to record the interview was also asked from the head teachers. Privacy and confidentiality of the interview was managed carefully during data analysis and dissemination of the findings of this research.

89

The anonymity and confidentiality of the participants was preserved by not revealing their names and identity in the data collection, analysis and reporting of the study findings. Finally, all authors cited were duly referenced at the reference section.

Data Processing and Analysis

The questionnaire was analyzed using Statistical Package for Social Science Research (SPSS) IMB Version 20 software. The data on a three- point Likert scales were coded and inputted into SPSS. In section B, items were coded as follows: exist (1), does not exist (2) and not sure (3), Section C items were coded as: agree (1), disagree (2) and not sure (3), Section D items were coded as: disagreed (1), agreed (2), undecided (3).

Data from the observation protocol were coded as "1" for "No" and "2" for "Yes". Upon the researcher establishing relevant categories, themes and codes for the responses, this quantitative data was analyzed by using descriptive statistics, which was presented in the form of frequencies, percentages, and means. The qualitative data was categorized and themes generated using codes and then keyed into the computer and analyzed using descriptive analysis. Methodological triangulation data analysis was employed to analyse the data based on the research questions for the study. Methodological triangulation was appropriate because the researcher combined both qualitative and quantitative methods of gathering data for this study. The triangulation method is also useful because it help minimized the flaws and biasness that come with using single research technique.

Research Question 1: What Learner Differences Call for the Deployment of Adaptive Instruction in Junior High Schools in the Jirapa Municipality?

Data regarding the varied learners differences for adaptive instruction was recorded according to their characteristics and numbers. This research question is answered using teachers questionnaire, interview guide for headteachers, the Municipal Education Training Officer and observation protocol. The statistical tools used to analyze this research question were, frequencies and percentages. Themes were used for the qualitative data, voices were fully captured in the analysis

Research Question 2: What Strategies do Teachera Feel are Helpful in Responding to the Varied Learners Differences in the Classrooms?

To analyze data on strategies of responding to learners' individual differences in classroom teaching and learning, responses were grouped into commonly used ways, coded and summarized in percentages, and frequencies. This research question was answered using teachers questionnaire, learners questionnaire, interview guide for headteachers, the Municipal Education Training Officer and observation protocol. Statistical tools used were frequencies and percentages. Themes were also used for the qualitative data, voices were fully captured and transcribed then analysed.

Research Question 3: What are the Outcomes of Adaptive Instruction in the Classroom?

Data regarding the outcomes of adaptive instruction was coded and analyzed into suitable sub-headings and reported using frequencies and percentages. This research question was answered using teachers

questionnaire, interview guide for headteachers,the Municipal Education Training Officer and observation protocol. Statistical tools used were frequencies and percentages. Themes were also used for the qualitative data, voices were fully captured in the analysis.

Research Question 4: How Does Adaptive Instruction Pose a Challenge to Teachers.

To analyze data on the challenges of adaptive instruction to the teacher, data was coded and analyzed into suitable sub-headings and presented and reported using, frequencies and percentages. This research question was answered using teachers questionnaire, interview guide for headteachers, the Municipal Education Training Officer and observation protocol. Statistical tools used were frequencies and percentages. Themes were also used for the qualitative data, voices were fully captured in the analysis.

Hypotheses

The following research hypotheses are tested in this study:

Hypotheses 1: H0: There is no significant difference in teachers employing adaptive instruction to meet varied learners' differences in the classroom.

One sample t-test was employed as the statical tool to ascertain if there was no significant difference for teachers applying adaptive instruction to meet varied learners' differences in classroom.

Hypotheses 2: H0: There is no significant difference in teaching outcomes between male and female teachers who employ adaptive instruction.

Independent sample t-test was employed as the statistical tool to ascertain if there was no significant difference between male and female teachers in the outcomes of adaptive instruction.

In the testing of the hypotheses, the degree of significance was set at 0.05 (i.e. 95% confidence level) significant level (2-tailed).

Chapter Summary

The research design employed for the study was cross-sectional survey design. One hundred and forty-eight (148) teachers and eighty (80) Junior High School learners in the Jirapa Municipality were selected through cluster, simple random and purposive sampling procedures. Questionnaire, semi-structured interviews and observational protocol were used to gather information for the study. All three instruments were pretested in the Wa Municipality of the Upper West Region. A Cronbach's alpha reliability coefficient of 0.725 was computed. The hypotheses were tested using one sample t-test and independent sample t-test statistical tools.
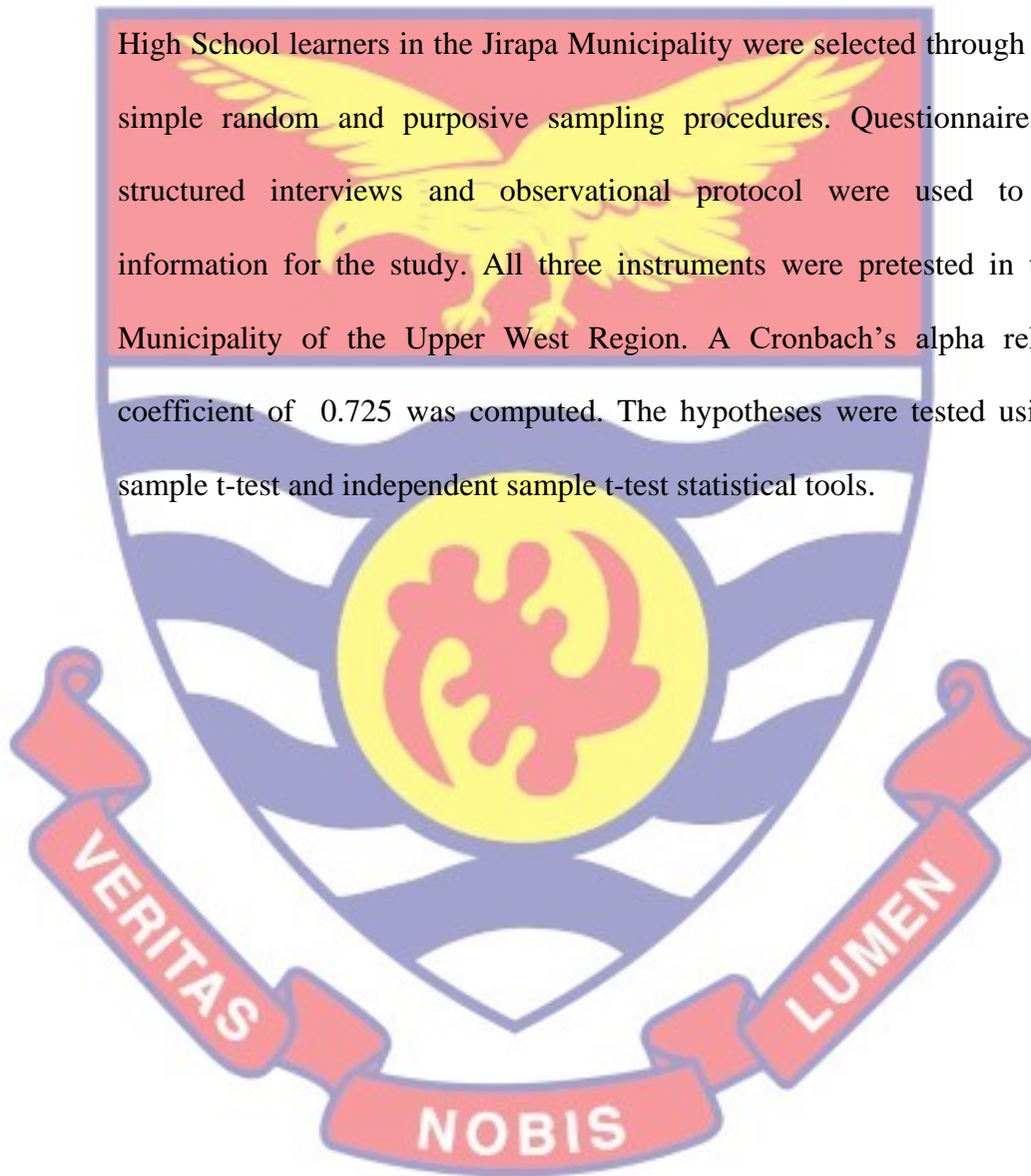
CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The Chapter presents the analyses and discussion of teachers' and learners' biographic information. Also, the Chapter presents analyses and discussions that answer the research questions. Again, the chapter tested two research hypotheses; 1) H0: There is no significant difference in teachers employing adaptive instruction to meet varied learners' differences in the classroom. 2) H0: There is no significant difference in teaching outcomes between male and female teachers who employ adaptive instruction. The first hypotheses was tested using one sample t-test and independent sample t-test analysis for the second hypotheses. A significance level of 0.05 was used to confirm or reject the decisions.

Background Information of Teacher and Learners

This section analyzed the biographic information of teachers and learners. Amongst the teacher respondents, information sought included: gender, age, form of teaching, school location, years of teaching experience and academic qualification. Whilst that of learners captured: gender, age, whom learner is staying with and their parents and or guardian educational status. This information was sought because of its relevance to answer the research questions, and objectives. Table 2, presents the biographic information of teachers whilst Table 3, shows that of learners.

Table 2-*Teachers Biographic Data*

Bio-Variables	Response Categories	Frequency	Percent
Gender	Female	33	22.3
	Male	115	77.7
	Total	**148**	**100.0**
Age	20 - 25yrs	2	1.4
	26-30yrs	39	26.4
	31-35yrs	46	31.1
	36-40yrs	35	23.6
	41-45yrs	19	12.8
	46-50yrs	7	4.7
	Total	**148**	**100.0**
Form of teaching	JHS 1	21	14.2
	JHS 2	32	21.6
	JHS 3	34	23.0
	JHS 2&3	4	2.7
	JHS 1-3	57	38.5
	Total	**148**	**100.0**
School location	Urban	33	22.3
	Rural	115	77.7
	Total	**148**	**100.0**
Years of teaching experience	1-5yrs	38	25.7
	6-10yrs	71	48.0
	11-15yrs	28	18.9
	16-20yrs	7	4.7
	26-30yrs	4	2.7
	Total	**148**	**100.0**
Academic qualification	SSS, O-level/ A-levels	9	6.1
	Diploma in Education	80	54.1
	First degree	48	32.4
	Masters	11	7.4
	Total	**148**	**100.0**

Source: Field Survey, 2020

In Table 2, out of the total teacher respondents (148), the males, 115 (77.7%) were the majority who participated in the survey.The females were, 33 (22.3%). This affirmed the earlier data gathered from the Jirapa Municipality, which showed that male teachers dominate their female's counterpart in the Junior High Schools. On their age distribution, it was found thatmajority of the teachers, 141 (96.3%) still have more years, that is between fifteen (15) to forty (40) years ahead to be in active service and few, 7 (4.7%) had at least ten (10) years ahead to retirement. This mean majority of the teachers who participated in the survey were the youth and could receive more professional development trainingon adaptive instruction in order to meet varied learners differences in the classroom. Considering the classes taught by teacher participants, some teachers taught subjects from Form one to three, 57 (38.5%) and or Form two and threeonly, 4 (2.7%) whilst the majority, 87 (58.8%) taught a subject only in Form one, two and or three. With the location of the school, majority of the teachers, 115 (77.7%) were teaching in the rural schools and few, 33 (22.3%) in the urban schools. This means, in the event of teaching and learning using adaptive instruction to teach learners with varied learners differences, rural schools could not be disadvantaged. With regard to teachers' years of teaching experience, majority, 110 (74.7%) of the teachers had between six (6) to thirty (30) years teaching experience and possibly have the ability to prepare and teach learners of varied learners differences for adaptive instruction. Also, on the qualification of participants, the result showed, majority, 141 (94.9%) of teachers had the prerequisite academic qualification (i.e. they hold degree, and master's certificate) to teach.

Table 3-*Learners Biographic Information*

Bio-Information	Categories	Frequency	Percent
Gender	Male	28	35.0
	Female	52	65.0
	Total	**80**	**100.0**
Age	13-16	2	2.5
	17-20	44	55.0
	21 and above	34	42.5
	Total	**80**	**100.0**
Whom learner is	Both Parents	50	62.5
staying with	Guardian	22	27.5
	Father	2	2.5
	Mother	6	7.5
	Total	**80**	**100.0**
Parent/Guardian	Literate	40	50.0
education status	Illiterate	40	50.0
	Total	**80**	**100.0**

Source: Field Survey, 2020

Also, in Table 3, the gender of learners who participated in the study, suggest more females, 52 (65%) participated in the learners' survey than the males, 28 (38%). Of their age, many of the learners were between 17 – 20 years old, 44 (55%), some 21 and more years old, 35 (42.5%) and few other between 13 – 16 years old, 2 (2.5%). Also, majority of the learners were staying with both parents, 50 (62.5%) and or guardians, 22 (27.5%) whilst some few stay with either only their mother, 6 (7.5%) or father, 2 (2.5%).

97

were experienced in teaching learners with varied learning needs. Though not all the teachers in their initial trainings had training on varied learning needs, some teachers learn lessons adaptation. They learnt from their colleagues or through several years of teaching experience in the classroom.

Research Question 1: What Varied Learners Differences Call for the Deployment of Adaptive Instruction in Junior High Schools in the Jirapa Municipality?

The essence of this research question was to examine teachers' perception about the existence of varied learners differences for adaptive instruction and also observe how some teachers adapted to the variations in the classroom. Table 4, presents the results from the study.

Table 4-*Varied learners differences for Adaptive Instruction in the Classroom*

Varied Learners' Differences	Perceived Adaptive Instruction				Observed Adaptive Instruction		
	Exist	Does Not Exist	Not Sure	Total	Yes	No	Total
Cultural heterogeneity	135 (91.2)	8 (5.4)	5 (3.4)	148 (100)	4	6	10
Varied relevant prior knowledge	133 (89.0)	11 (7.4)	4 (2.7)	148 (100)	8	2	10
Gender differences	143 (96.6)	1 (0.7)	4 (2.7)	148 (100)	2	8	10
Age differences	130 (87.8)	15 (10.1)	3 (2.0)	148 (100)	7	3	10
Differences in learning styles	137 (92.6)	8 (5.4)	3 (2.0)	148 (100)	6	4	10
Different cognitive abilities	143 (96.6)	1 (0.7)	4 (2.7)	148 (100)	7	3	10
Varied emotional status	139 (93.9)	4 (2.7)	5 (3.4)	148 (100)	4	6	10
Different reception span and memory retention	141 (95.3)	4 (2.7)	3 (2.0)	148 (100)	10	2	10
Varied form of punishments	126 (85.1)	14 (9.5)	8 (5.4)	148 (100)	6	4	10

Source: Field Survey, 2020

From Table 4, majority, 135 (91.2%) of the teachers perceived that there is cultural heterogeneity in the classroom, although very few thought otherwise that such difference does not exist, 8 (5.4%); whilst some were 'not sure', 5 (3.4%) of the assertion.

With respect to varied relevant prior knowledge, 133 (89%) of the teachers believed there existed learners with already knowledge that put them far above their colleagues in the classroom. As a result, such learners are able to recap or link Relevant Prior Knowledge (RPK) to current lesson being taught.

Amongst the other varied learners' differences, such as; gender, age, learning style, cognitive ability, emotional status, reception and memory retention. Generally, majority of the teachers confirmed that these differences also existed amongst learners in the classroom.

Again, regarding varied forms of punishment, it was generally made known amongst teachers; 126 (85.1%) that teachers used different forms of punishment to punish learners in the classroom.These notably include the use of caning, insults and sacking learners from the class. Thus, it suggests that punishment may be good to control misbehaviour of learners in classroom, but when implementing should be done considering varied issues like age, emotions and guided by what really works well to correct the learner.

On the other hand, from the qualitative interviews conducted, the following views and explanations were expressed by teachers, headteachers and the Municipal Education Training Officer to answer the varied learners differences for adaptive instruction in the classroom:

100

On cultural heterogeneity, from an open ended question in the questionaire one of the teachers' explained that;

> *cultural heterogeneity truly existed amongst learners in the classroom and that, learners with different backgrounds come with different, religious beliefs and values and as teachers[we] try our best to project and promote every culture by allowing learners to cite examples or give an account of their various cultures.*

This admonishes the stand that teachers are aware of learners differences in the classrooms. This is often taken into consideration when teaching.

A teacher further explained that, "*learners' behaviour tells me that some learners' age has relationship with what they do in class. The older age learners behave well and vice versa*".
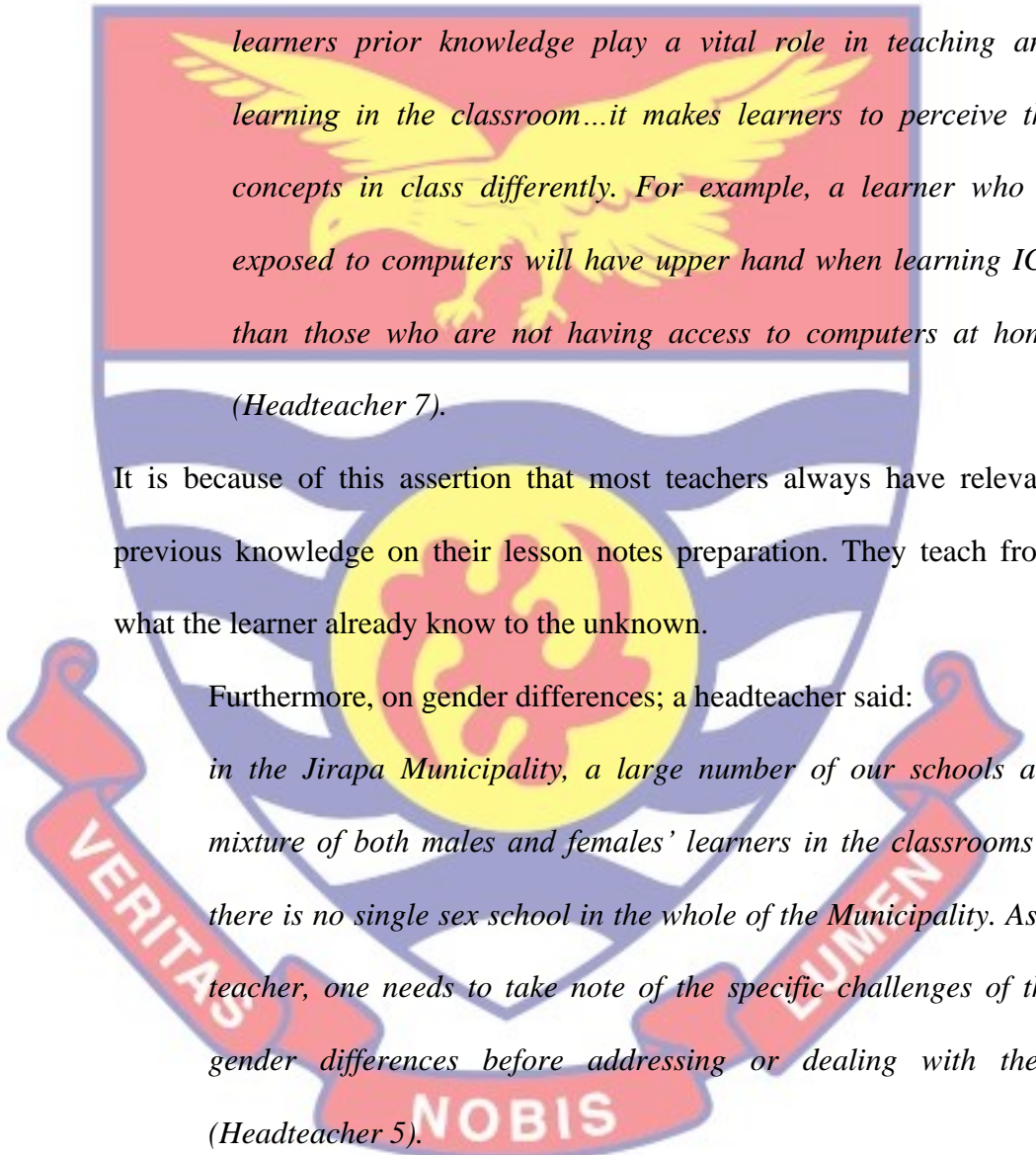
When it comes to different cognitive abilities; some teachers explained that there exist a vast difference in the cognitive abilities of learners in the classroom. Others are high achievers and others are low achievers.

In an interview with a headteacher, he similarly agreed with the teachers and said:

> *in my position as the headteacher, in this school, almost every classroom comprises learners from varied cultures i.e. Dagaabas, Frafras, Waala and others and in responding to adaptive instruction teachers are required to accommodate learners who bring their cultural orientations to bear without restriction (Headteacher 3).*

101

This is an indication that headteachers and classroom teachers recognizes the varied cultural orientations in their classroom. They will therefore cite examples mindful of the cultural differences in the classroom.

Also, on varied relevant prior knowledge; According to a headteacher:

> *learners prior knowledge play a vital role in teaching and learning in the classroom…it makes learners to perceive the concepts in class differently. For example, a learner who is exposed to computers will have upper hand when learning ICT than those who are not having access to computers at home (Headteacher 7).*

It is because of this assertion that most teachers always have relevant previous knowledge on their lesson notes preparation. They teach from what the learner already know to the unknown.

Furthermore, on gender differences; a headteacher said:

> *in the Jirapa Municipality, a large number of our schools are mixture of both males and females' learners in the classrooms… there is no single sex school in the whole of the Municipality. As a teacher, one needs to take note of the specific challenges of the gender differences before addressing or dealing with them (Headteacher 5).*

Therefore, Teachers need to be gender responsive in their teaching and learning since the classrooms are made up of both males and females.

With regard to age differences; another headteacher from the interview had this to say:

age differences exist in every classroom and that has an influence on the teaching and learning tasks a teacher is assigned to perform in the classroom. In applying adaptive instruction, teachers are required to consider each learner's age and their mental capabilities before assigning activities (Headteacher 2).

The Municipal Education Training Officer also has this to say on the issue of age differences;

age difference affect teaching and learning. This determines the level, maturity and the method to use...For example in the same class, learners are of different ages and as a result teachers are tasked to assign learners considering their ages and the difficulty level of the task (METO).
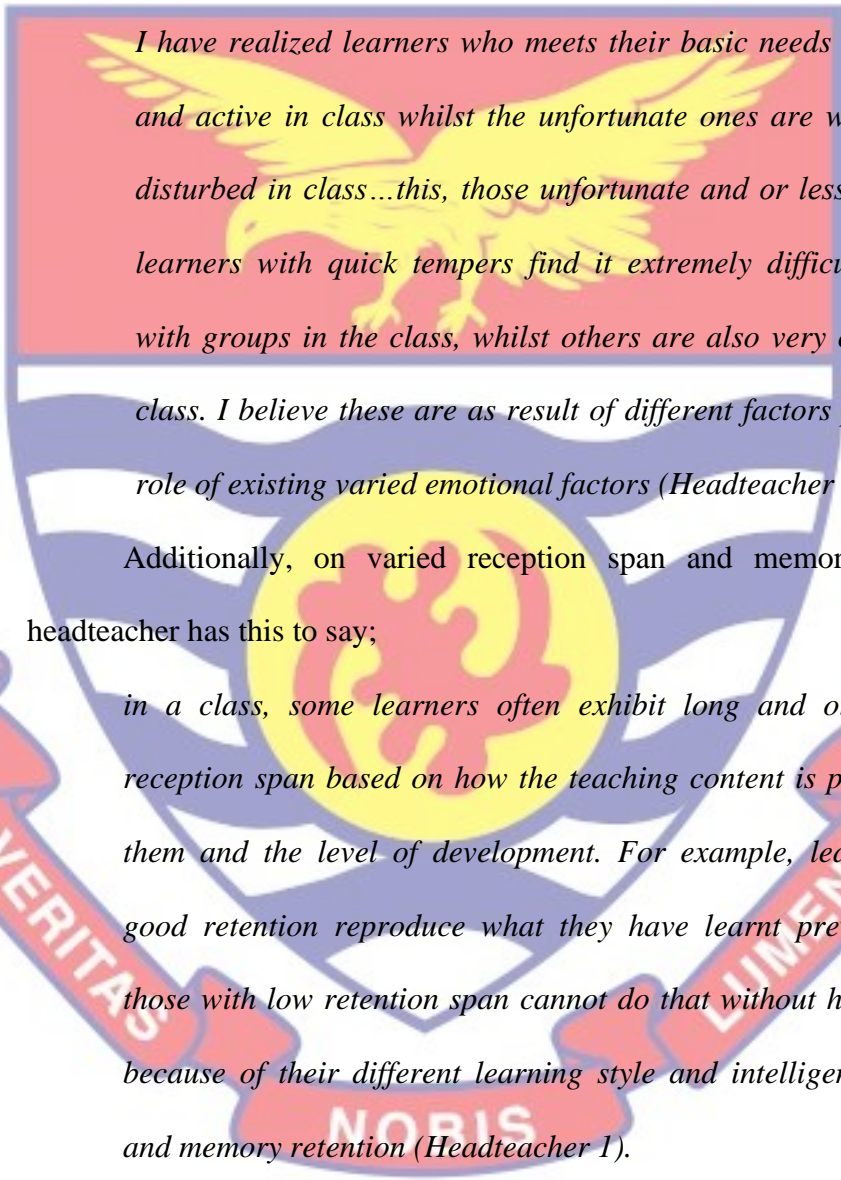
Age appropriate class activities must be given to learners. If teachers give activities such as assignment above the age level of the learners, they might struggle in understanding the work given.

On the issue of varied learning styles; a headteacher said:

test results of learners differ in class...indications are that intelligence levels exist. Some learners learn by doing, seeing, hearing, touching, discussing in groups and amongst others...so as a headteacher, I advise teachers to vary their teaching strategies and testing modes to cater for all learners in their classes. Naturally the intellectual ability of learners are not the same, teachers need to pay attention to the weak learners whilst also giving more challenging tasks to the higher achievers (Headteacher 10).

103

This means teachers should not have one strategy of teaching in the classroom as it might not fit well for some learners. Teachers should rather varied their modes of teaching and testing.

Moreover, on the issue of varied emotional status; another headteacher said;

I have realized learners who meets their basic needs look happy and active in class whilst the unfortunate ones are worried and disturbed in class...this, those unfortunate and or less privileged learners with quick tempers find it extremely difficult working with groups in the class, whilst others are also very calm in the class. I believe these are as result of different factors playing the role of existing varied emotional factors (Headteacher 2).

Additionally, on varied reception span and memory retention; a headteacher has this to say;

in a class, some learners often exhibit long and others short reception span based on how the teaching content is presented to them and the level of development. For example, learners with good retention reproduce what they have learnt previously but those with low retention span cannot do that without help. This is because of their different learning style and intelligent quotient, and memory retention (Headteacher 1).

Moreover, on whether teachers applied varied form of punishments to control learners in classroom; another headteacher expressed that;

I have asked teachers in my school to give varied punishment in class by considering age and the level of the misbehaviours. For

104

example, some punishments like kneeling down, weeding, sacking

a learner from class may not be deterring to some learners whilst

to others that may be deterring (Headteacher 5).

However, it appears teachers prefer the canning mode of punishment to any other varied form of punishment. Meanwhile corporal punishment is abolished. Teachers need to find new and innovative means of dealing with learners misbeviours in the classroom.

Also, from the foregoing interviews results and qualitative explanations, the observation protocols also revealed the following:

On cultural heterogeneity; from the observation protocol to find out how teachers applied adaptive instruction to meet the varied needs of learners, it was found that four (4) out of the ten (10) selected teachers applied the concept of adaptive instruction by allowing learners to cite examples that brought to bear their cultural heterogeneities without restriction. This means, though teachers believed learners existed with varied cultural heterogeneity, not all the teachers created the enabling environment for learners with cultural heterogeneity especially when citing examples in the classroom.

With varied relevant prior knowledge, in observing this protocol, the result revealed that eight (8) of the teachers observed prepared their lesson and taught learners using demonstrations concepts which helped learners linked their prior knowledge to that of the current lesson taught in the classroom.

Furthermore, on how teachers applied adaptive instruction to meet varied differences to include that of age, differences in learning styles, cognitive abilities, and reception span and memory retention. It was observed that majority of the teachers were able to apply the concept of adaptive

instruction that met learners varied differences including that of age, differences in learning styles, cognitive abilities, and reception span and memory retention whilst some few teachers could not do same to meet other varied differences such as gender (2 of the teachers observed) and emotional status (4 of the teachers observed) in the classroom.

With respect to gender differences and emotional status, it was observed that some teachers did not consider and used the appropriate teaching strategies that allowed learners with these differences to easily relate to the concepts taught in the classroom.

Also, regarding varied form of punishments, it was generally observed amongst teachers that indeed teachers used different form of punishments to punish learners differently in the classroom.

Therefore, the study finding suggest, though teachers knew varied learners' existed in the classroom, not all were able to apply the concept of adaptive instruction to meet the needs of varied learners in the classroom.

Research Question 2: What Strategies do Teachers in Junior High Schools Feel are Helpful in Responding to the Varied Learners Differences in the Jirapa Municipality?

This research question sought to examine the strategies of responding to varied learners differences in the classroom.

Table 7, presents teachers' responses on the various strategies perceived to be used and what were actually observed in the classroom.

Strategies	Perceived Responses	Observed Responses

	Agreed	Disagreed	Not Sure	Total	Yes	No	Total
Mixed Ability grouping	146 (98.6)	0 (0.0)	2 (1.4)	148 (100)	4	6	10
Ability grouping	100 (67.6)	43 (29.1)	5 (3.4)	148 (100)	2	8	10
Collaborative learning	124 (83.8)	17 (11.5)	7 (4.7)	148 (100)	6	4	10
Co-operative learning	128 (86.5)	12 (8.1)	8 (5.4)	148 (100)	6	4	10
Inquiring based learning	124 (83.8)	11 (7.4)	13 (8.8)	148 (100)	7	3	10
Microteaching	137 (92.6)	5 (3.4)	6 (4.1)	148 (100)	7	3	10
Self-directed learning	129 (87.2)	6 (4.1)	13 (8.8)	148 (100)	4	6	10
Task analysis	130 (87.8)	13 (8.8)	5 (3.4)	148 (100)	10	0	10

Table 5-*Teachers Strategies for Responding to Varied Learners'*

From Table 7, the results showed that majority, 146 (98.6%) of the teachers agreed they used mixed ability grouping as an adaptive instruction strategy to teach learners with varied learning needs. On ability grouping, also, quite a number, 100 (67.6%) of the teachers agreed they used ability grouping as mechanism for responding to varied learners' differences, though some few, 43 (29.1%) disagreed.

With respect to other strategies like collaborative learning, co-operative learning, and inquiring based learning, about 125 (84.7%) of the teachers again agreed they used such strategies in teaching learners with varied learners' differences, though a very few other disagreed.

From table 7, strategies like microteaching, 137 (92.6%), self-directed learning, 129 (87.2%) and task analysis approach, 130 (87.8%); majority of the teachers again agreed they used these strategies also in the classroom.

From the qualitative interviews and teachers explanations, a teacher explained that, *"mixed ability grouping mean putting learners into smaller groups regardless of each learner capabilty."*

Also, on co-operative learning, teachers employed this strategy to measure a specific learning indicator in class normally organized for inter – class quiz for learners. Whilst inquiring based learning is applied during personal assignment or homework". Generally, teachers explained that these strategies enabled learners to broaden their horizons and learned better through extensive research and colleague's assistance.

some of the informing thoughts sought from teachers and headteachers suggested teachers used collaborative learning as a strategy of adaptive instruction for varied learners' by grouping the learners to learn through participation, social grounding, performance analysis and group processing, application of active learning conversation skills, and promote interactions. Often learners are allowed to investigate more without restrictions.

Also, another headteacher from the interview said;

> *task analysis is reflected mostly on the scheme of work, where teachers show weekly and daily lessons in an orderly and sequential manner. Also, task analysis is done when lesson is broken into subunits and presented systematically to learners, so they could understand the concept very well (Headteacher 10).*

108

Whilst according to the Municipal Training Officer, "ability grouping is done where a teacher put learners into specific strenght groups during teaching and learning…this is to brings more competition amongst the learners"

According to the Municipal Training Officer, "microteaching is done by sometimes allowing learners to teach each other the content because peers understand one another better sometimes than their teacher…and the most appropriate way of practicing microteaching is allowing learners to do group presentation on a topic in classroom"

From the observation protocols, it was found that four (4) out of the ten (10) selected teachers observed truly practice mixed grouping in the classroom.

This observation also revealed eight (8) out of the ten (10) teachers observed did not practiced ability grouping in the classroom.

Considerably, from the observational protocol it was revealed that many teachers truly used these strategies in responding to varied learners differences in classroom. Thus, the observation showed that amongst the selected teachers observed, many of the teachers admittedly used microteaching (7) and task analysis approach (10) as strategies for responding to varied learners' difference but unfortunately could not apply same for self-directed learning (4).

Therefore, it was realized that some teachers engaged their learners in projects where they gather their own information about a particular learning content.

high (20%) and on the average (32%). This projects that, through co-operative learning, the learners acquired co-operative values and attitudes that moved each learner towards learning independently in the classroom to boost one's intelligence level.

Research Question 3: What are the Outcomes of the Usage of Adaptive Instruction in the Classroom?

The researcher sought to examine teachers, headteachers and the Municipal Education Training Officers' views in relation to some identified outcomes of adaptive instruction in the classroom. Similarly, these outcomes also were observed in the classroom amongst selected teachers by the researcher to match teachers' perceptions with what actually is portrayed amongst learners in the classroom. Table 5, presents the data.

Table 6-*Outcomes of Using Adaptive Instruction to Teach Varied Learners in the Classroom*

Outcomes	Responses to Adaptive Instruction				Observed Response		
	Disagreed	Agreed	Undecided	Total	Yes	No	Total
Lifelong learning	33 (22.3)	99 (66.9)	16 (10.8)	148 (100)	5	5	10
Enhanced learning preferences	24 (16.2)	86 (58.1)	38 (25.7)	148 (100)	3	7	10
Sound receptive and retentive memory	19 (12.8)	108 (73.0)	21 (14.2)	148 (100)	8	2	10
Formative assessment	19 (12.8)	104 (70.3)	25 (16.9)	148 (100)	7	3	10
Sustainability of learners' interest	27 (18.2)	97 (65.5)	24 (16.2)	148 (100)	9	1	10

Source: Field Survey, 2020. **NB:** Figure Outside Brackets are Frequencies and those in Brackets are Percentages (%)

111

The results from Table 5, showed majority of the teachers believed using adaptive instruction have positive outcomes on varied learners in the classroom. For example, many of the teachers attested to the fact that adaptive instruction makes learners acquire lifelong learning, 99 (66.9%); enhanced learning preferences, 86 (58.1%); sound receptive and retentive memory, 108 (73%); and formative assessment, 104 (70.3%). Thus, it was generally perceived that when adaptive teachers create a learning environment where teaching and learning becomes flexible, democratic and changeable based on the learner's needs, eventually throughout the learners lives, that knowledge and interest remains forever boosted and sustainable, 97 (65.5%).

Also, from the qualitative interviews conducted and explanations from some teachers, on how teachers use of adaptive instruction positively influenced classroom teaching and learning, the informants generally explained that, using adaptive instruction, learners gain lifelong learning through behaviorual changes.

On enhanced learning preferences; in an explanation by some teachers, they stated that when adaptive instruction is employed learners are able to identify the method that suits them and this turns out to promote understanding.

According to some teachers' explanation, they believed adaptive instruction makes learners to have sound receptive and retentive memory in the classroom teaching and learning because through constant engagement and involvement with colleagues, learners are able to retain and memorize what is being taught and learned in the classroom.

112

On formative assessment, some teachers were of the view that adaptive instruction helped teachers assess learners as teaching and learning is ongoing and make the necessary adjustment when appropriate for easy understanding of concepts by learners in the classroom.

According to a headteacher;

> when learners are exposed to various learning strategies, they tend to choose what they like best and in such cases, it means learners have their individual learning preferences that work best for them based on their uniqueness and teachers need to recognize that in their teaching (headteacher 8).

With sustaining learners' interest; it was said by another headteacher in an interview that;

> teachers' employ adaptive instruction because there is something in stock for every learner irrespective of one intellectual level. The purpose of adaptive instruction is to excite learners and maintain their interest. Hence, the ability of a learner to learn and retain depends on the strategy used by the teacher. However, the ability for a teacher to identify the right adaptive instruction and use it appropriately determines how the learners' interest could be sustained. (Headteacher 6).

In an interview with the Municipal Training Officer, he also alluded that,

> "regardless of each learner need, all learners of different categories need teachers support to learn well" (METO).

Similarly, from the observation protocol on the outcomes of adaptive instruction in the classroom, a number of observations were made. For example, it was observed that teachers' use of adaptive instruction promotes lifelong learning, because from the observation protocol, it was noted that when teachers used the appropriate Teaching and Learning Resources (TLRs) during lessons delivery, learners were able to understand concepts and were

able to demonstrate the concepts with little assistance in the classroom. Also, it was observed that teachers who used inquiring based learning offered learners the opportunity to search for their own knowledge which become their lifelong acquisition.

Thus, the observation protocol confirmed that some learners were able to search for content knowledge on their own, made understanding and could linked that knowledge to current lesson being taught. Though not all learners in the classrooms could do that, a good proportion of the learners observed were actually able to search knowledge on their own and linked that to the current concept taught; whilst others (5) also were unable. This means that though some teachers adapted the concept of adaptive instruction in teaching learners; not all the learners would be able to acquire a lifelong learning.

With enhanced learning preferences; in observing how teachers exhibited this in the classroom, it turned out that, in the classrooms of the selected teachers observed, seven (7) teachers could not facilitate teaching that will allow learners to learn under their best teaching and learning strategy that suit their understanding, but rather these teachers chose their own method of instruction. As such, many learners in the classroom could not have enhanced learning preferences.

Furthermore, regarding other outcomes of adaptive instruction in the classroom; observing the foregoing in the classroom amongst selected teachers, it was revealed that many teachers did apply the appropriate adaptive instruction that gave learners the benefit to enjoy those foregoing outcomes. For example, a teacher in one of the observed classes was able to put learners into groups to work to come out with answers to an English comprehension

114

passage. In the same lesson two learners were asked to complete the same task the rest were doing in groups alone.

Generally, from the study's findings, for teachers to respond positively to learners learning differences, it means they have been able to establish some kind of agreement including the capacity to adapt instruction appropriately. This implies that when classroom instructions are not adapted effectively by the teacher, teaching and learning may not produce desirable outcomes.

Research Question 4: How does Adaptive Instruction Pose Challenges to Teachers?

This section sought to examine views from teachers, headteachers, the Municipal Education Training Officer and from the observational protocol. This is on the challenges teachers are likely to encounter using adaptive instruction in responding to varied learners differences in the classroom. Table 6, presents the results.

Table 7-*Challenges of Adaptive Instruction to Teachers Teaching Varied Learners*

Challenges	Responses to Adaptive Instruction				Observed Adaptive Instruction		
	Agreed	Disagreed	Undecided	Total	Yes	No	Total
Inadequate adaptive expertise	96 (64.9)	24 (16.2)	28 (18.9)	148 (100)	6	4	10
Inadequate pre-service and in-service training	110 (74.3)	20 (13.5)	18 (12.2)	148 (100)			
Time constraint	107 (72.3)	24 (16.2)	17 (11.5)	148 (100)	7	3	10
Multi-grade teaching	88 (59.5)	38 (25.7)	22 (14.9)	148 (100)	0	10	10
Large class size	117 (79.1)	22 (14.9)	9 (6.1)	148 (100)	8	2	10
Overloaded curriculum	108 (73.0)	26 (17.6)	14 (9.5)	148 (100)			
Poor supervision	110 (74.3)	29 (19.6)	9 (6.1)	148 (100)	7	3	10

Source: Field Survey, 2020. **NB**: Figure Outside Brackets are Frequencies and those in Brackets are Percentages (%)

115

Table 6, shows that amongst the challenges, many teachers agreed that inadequate pre-service and in-service training, 110 (74.3%), time constraint, 107 (72.1%), multi-grade teaching, 88 (59.5%), large class size, 117 (79.1), overloaded curriculum, 108 (73%), and poor supervision, 110 (74.3%) affected their use of adaptive instruction in the classroom.

Also, from Table 6, the results further suggested that teachers were unable to use adaptive instruction because of teachers' inadequate adaptive expertise, 96 (64.9%) to teach learners with varied learners differences. Similarly, some teachers from an open ende question in the questionnaire explained that truly the time allocated to some lessons like mathematics and science did not permit the use of adaptive teaching and learning, therefore teachers find it difficult using multi-pedagogical approaches to teach learners. This is because in many of the schools, the number of learners in a class exceeded the recommended thirty (30) class size required by the Ghana Education Service.

Again, on overloaded curriculum, most teachers intimated that because of time constraint and overloaded curricula they did selective teaching of topic and or at times brushing through some, in order to cover up the syllabus, though that is to the disadvantage of some learners.

On the challenges that adaptive instruction poses to teachers, the interview responses gathered from the informants again revealed that;

With respect to inadequate pre-service and in-service training; some headteachers perceived that teachers hardly receive periodic in-service training and even if it happens, in most times hardly do the education directorate get qualified personnel to train teachers adequately.

116

According to a headteacher;

> *most teachers in my school do not have enough training on adaptive instruction. This is a setback hampering effective adaptive teaching and learning hence the need for periodic workshops and training for teachers…even amongst those who may have some form of training, some teachers are also ill-trained and do not know how to balance the classroom for all categories of learners (Headteacher 3).*

According to another headteacher who doubles as a classroom teacher, he could not use adaptive instruction to complete his lessons in the classroom because;
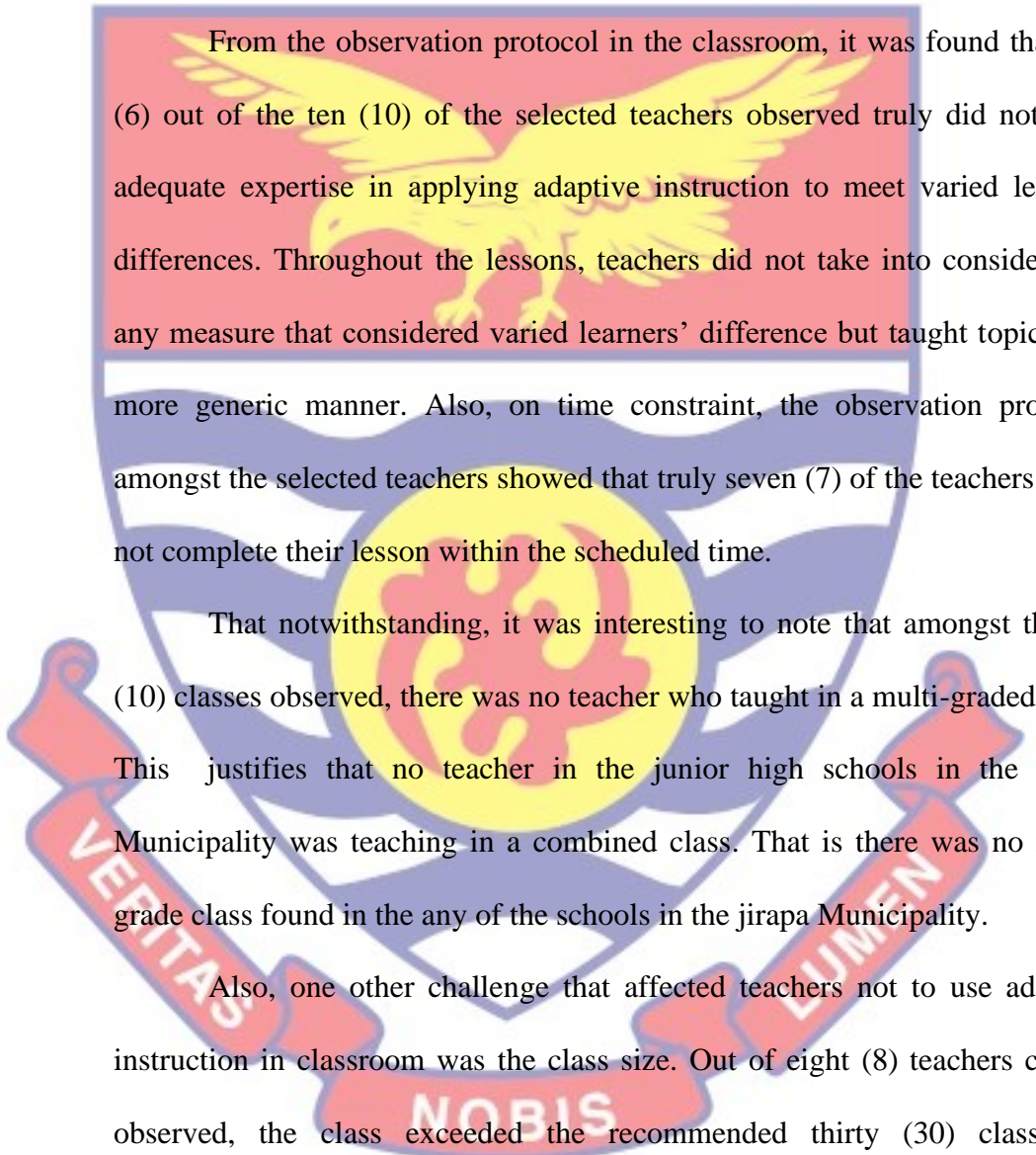
> *the time allocated for a subject like mathematic on the time table was not enough for teachers to use more than two teaching strategies in a single lesson…and frankly speaking, adaptive instruction involves a lot of preparation and require enough time, therefore not easy to go with (headteacher 9).*

According to some other headteachers, many schools in the Jirapa municipality have the challenge of large class sizes which do not create room for adaptive instruction. For example one headteacher said, "in my JHS 3 class, the learners are 65…how can a teacher teach for all learners to understand in this type of class?" (Headteacher 4).

With regard to poor supervision, the Municipal Education Training Officer in an interview revealed that;

> *poor supervision is one big challenge that makes teachers not practicing adaptive instruction in classroom. For example, he*

117

said, the amount of work and the responsibility with which adaptive instruction comes with makes most teachers overlook it except they are aware they are monitored closely by the headteacher and or circuit supervisor…but that has always been ineffective due to poor supervision.

From the observation protocol in the classroom, it was found that, six (6) out of the ten (10) of the selected teachers observed truly did not have adequate expertise in applying adaptive instruction to meet varied learners differences. Throughout the lessons, teachers did not take into consideration any measure that considered varied learners' difference but taught topics in a more generic manner. Also, on time constraint, the observation protocol, amongst the selected teachers showed that truly seven (7) of the teachers could not complete their lesson within the scheduled time.

That notwithstanding, it was interesting to note that amongst the ten (10) classes observed, there was no teacher who taught in a multi-graded class. This justifies that no teacher in the junior high schools in the Jirapa Municipality was teaching in a combined class. That is there was no multi-grade class found in the any of the schools in the jirapa Municipality.

Also, one other challenge that affected teachers not to use adaptive instruction in classroom was the class size. Out of eight (8) teachers classes observed, the class exceeded the recommended thirty (30) class size recommended by the Ghana Education Service.

Finally, with regard to supervision, it was observed amongst the selected teachers, seven (7) out of the ten (10), their lesson notes were not timely supervised by the circuit supervisor's and some headteachers.

Testing of Hypotheses

The study tested two hypotheses to include the following;

Research Hypotheses 1: H01:There is no significant difference in teachers employing adaptive instruction to meet the varied learners' differences in classroom. This hypothesis was tested using one sample t-test at 0.05 significant level. According to Kent State University Libraries (2020), one sample t-test can only compare a single sample mean to a specified constant. It can not compare sample means between two or more groups as in the case of ANOVA. This means one sample t-test is fit to test for the statistical difference for teachers applying adaptive instruction to meet varied learners' differences in the classroom. Table 8 presents the results.

Table 8-*Hypotheses 1: One Sample T-Test Analyses*

Varied Learners Differences	Test Value = 1				95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
cultural heterogeneity/differences	3.531	147	0.001	0.12162	0.0536	0.1897
varied prior knowledge	3.821	147	0.000	0.12838	0.0620	0.1948
Gender differences	2.211	147	0.029	0.06081	0.0065	0.1152
Age differences	4.270	147	0.000	0.14189	0.0762	0.2076
Differences in learning styles	3.229	147	0.002	0.09459	0.0367	0.1525
Different cognitive/intelligent abilities	2.211	147	0.029	0.06081	0.0065	0.1152
Varied emotional status	2.930	147	0.004	0.09459	0.0308	0.1584
Different reception span and memory retention	2.546	147	0.012	0.06757	0.0151	0.1200
Varied form of punishments	4.732	147	0.000	0.20270	0.1181	0.2874

119

The results from Table 8, showed there was a significant difference for teachers to adapt to the varied learners' differences (*p*-value<0.05) in the classroom. The mean differences suggest some teachers were most able to adapt to cultural heterogeneity (0.12), age (0.14), varied prior knowledge (0.12), varied form of punishment (0.20) differences; whilst others could not adapt better with gender (0.06), learning style (0.09), emotional status (0.09), cognitive abilities (0.06) and reception span and memory retention (0.06) differences in the classroom. This suggest, though teachers were aware of the existence of varied learners' differences; there were significant difference of how teachers adapted to appropriate strategies to suit the varied learners needs in the classroom in the Jirapa Municipality. Thus, supports the conceptual framework which noted that there exist varied learners' differences in classroom such as cultural heterogeneity, prior knowledge, gender differences, age difference, varied learning style, cognitive ability, emotional state, and varied form of punishments and calls for teachers' use of adaptive instructional strategies. From the survey, the finding suggests these variations maybe common in most public selected Junior High Schools within the Jirapa Municipality. Hence, for all teachers to be able to adapt very well to all the varied learners' differences, more continuous in-service training on adaptive instruction is needed for teachers to adjust themselves in content delivery and is critical in schools in the Jirapa Municipality.

Research Hypotheses 2: H0: There is no significant difference in teaching outcomes between male and female teachers who employ adaptive instruction.This hypotheses was tested using independent sample t-test at 0.05 significant level. Similarly, according to Kent State University Libraries

(2020), only the independent sample t-test cancompare statistical differences amongst the means of two or more groups. Thus, fit to test for the significant difference between male and female teachers in the outcomes of adaptive instruction.Table 9 presents the results.

121

Table 9:Hypotheses 2 - *Independent Samples T-Test between Males and Femalse on Outcome of Adaptive Learning*

Independent Samples T-Test between Males and Females on Outcome of Adaptive Learning		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Lifelong learning	Equal variances assumed	.745	.390	-1.833	146	.069	-.20316	.11083	-.42221	.01589
	Equal variances not assumed			-1.942	56.595	.057	-.20316	.10463	-.41272	.00640
Enhanced learning preferences	Equal variances assumed	1.297	.257	-1.582	146	.116	-.19974	.12623	-.44921	.04974
	Equal variances not assumed			-1.637	54.486	.107	-.19974	.12204	-.44436	.04488
Soundreceptive and retentive memory	Equal variances assumed	.071	.790	2.128	146	.035*	.21660	.10176	.01548	.41772
	Equal variances not assumed			2.547	71.261	.013*	.21660	.08504	.04705	.38615
Formative assessment	Equal variances assumed	.010	.920	.600	146	.549	.06482	.10798	-.14858	.27822
	Equal variances not assumed			.620	54.367	.538	.06482	.10454	-.14473	.27438
Sustainability of learners'interest	Equal variances assumed	.550	.460	1.233	146	.220	.14308	.11604	-.08626	.37243
	Equal variances not assumed			1.338	58.913	.186	.14308	.10698	-.07099	.35715

Source: Field Survey, 2020. **NB:** Significance level is 0.05*
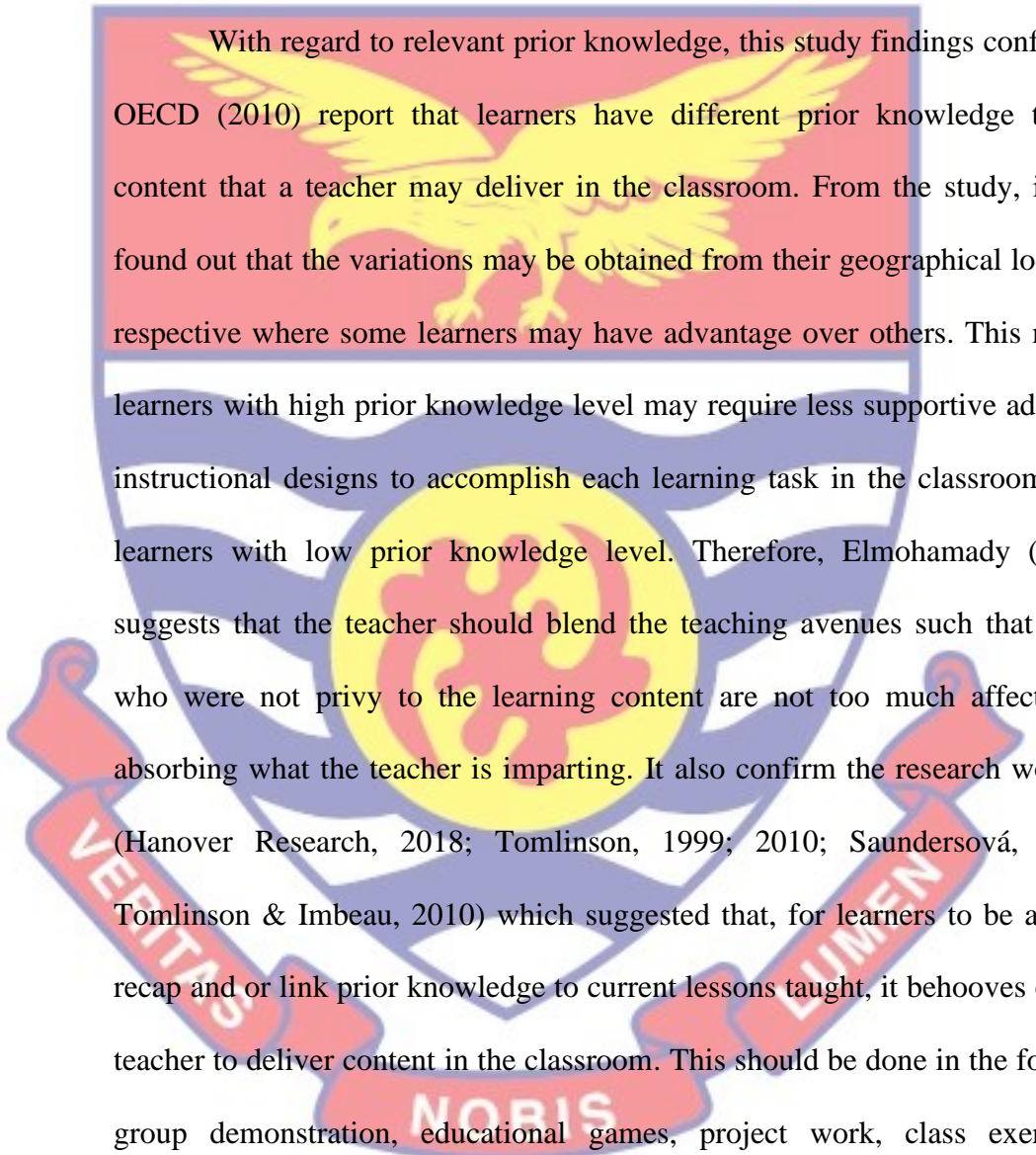
In Table 9, the test results showed, there was no significant difference between males and females in the classroom (***p*-value>0.05**) to have a lifelong learning (0.069), enhanced learning preferences (0.116), formative assessment (0.549) and sustainability of learners' interest (0.220). However, there was significant difference between males and females in the classroom (***p*-value<0.05**) to have sound receptive and retentive memory (0.035). This means in the Jirapa Municipality, males and females in the classroom had similar learning outcomes regards lifelong learning, enhanced learning preferences, formative assessment and sustainability of learners' interest; except for sound receptive and retentive memory. Again, this suggest, the use of adaptive instructional strategies in teaching and learning could have led to desirable outcomes between and within the groups of male and female learners in the class. However, it must be cautioned that teachers who pay little or no attention to learners' differences may not be responding to many learners needs in the class. This reiterate the fact that, for teachers to meet the learning needs of males and females in the classroom; more continuous in-service training on adaptive instruction is needed for teachers to adapt and the Jirapa Municipality is no exception.

Discussions

Research Question 1: What are the Varied learners differences that Call for Adaptive Instruction in Junior High Schools in the Jirapa Municipality?

From the study findings, it was revealed that cultural heterogeneity is a major varied learners' difference that teachers need to be conscious of in the classroom teaching and learning. This collaborate with Tomlinson (2015)

assertion that, cultural heterogeneity is one of the learners' differences noted in the classroom. Therefore, OECD (2010) advises teachers to ensure diverse cultures are brought to bear in the classroom teaching. Also, teachers must include methods and topics that interest learners from their varied cultural perspectives for common understanding by all learners.

With regard to relevant prior knowledge, this study findings confirmed OECD (2010) report that learners have different prior knowledge to the content that a teacher may deliver in the classroom. From the study, it was found out that the variations may be obtained from their geographical location respective where some learners may have advantage over others. This means learners with high prior knowledge level may require less supportive adaptive instructional designs to accomplish each learning task in the classroom than learners with low prior knowledge level. Therefore, Elmohamady (2017) suggests that the teacher should blend the teaching avenues such that those who were not privy to the learning content are not too much affected in absorbing what the teacher is imparting. It also confirm the research work of (Hanover Research, 2018; Tomlinson, 1999; 2010; Saundersová, 2014; Tomlinson & Imbeau, 2010) which suggested that, for learners to be able to recap and or link prior knowledge to current lessons taught, it behooves on the teacher to deliver content in the classroom. This should be done in the form of group demonstration, educational games, project work, class exercises, homework and any other methods that learners can use to access and recall key content from previous lessons in the curriculum.

Also, on other varied learners' difference, for example; gender, age, experiences, emotional status, etc.; the study confirmed Elmohamady et al.

(2016) study that in the classroom gender difference is fundamental issue that affects teaching and learning outcomes.

Similarly, the findings of this study support Rasheed & Wahid (2018) findings which revealed that, cultural hererogeinities, gender, age, experience, prior knowledge, learning preferences, cognitive variations and amongst others are some of the diversities of learners in the classroom. On these, Tomlinson (2003) suggests teachers' teaching with the learners' indicators in mind, ought to mirror the understanding of these differences in the learners and complement his or her teaching strategies to incorporate the disparities in learners' talents or dispositions for collective understanding.

Research Question 2: What Strategies do teachers in Junior High Schools Feel are Helpful in Responding to Varied learners differences in the Jirapa Municipality?

From the questionnaire answered by teachers, it is discovered that varied learners differencesexisted amongst learners and teachers employed various strategies to respond to these variations. Thus, the findingsconfirm the assertion that, amongst all the strategies examined; collaborative learning, co-operative learning, inquiring based learning and task analysis approach were best strategies for adaptive instruction for responding to varied learning differences. These amongst other strategies, supports Saban and Coklar (2013); and Ismail and Elias (2006) findings which found that microteaching and task analysis approach are popularized, commonly practiced, and a requirement in most initial teacher training institutions, known as On Campus Teaching Practice (OCTP) (Francis and Gould, 2014) in Ghana, hence many teachers were familiar of how to use these concepts in teaching varied

125

learners. Thus, this was consistent with Corbin (2017) studies on assessing differences in learning styles at the tertiary level in the Caribbean.

From the learner's perspective, the findings suggested that collaborative and co-operative learning was the most preferred learning style preferred by many learners based on the mean scores of Grasha-Riechman rating norms. This corroborates Ikwumelu, Oyibe and Oketa (2015) findings that teachers adapting cooperative learning as adaptive strategy creates an interactive platform for learners to be impressed with their teaching pedagogy.

Though Tomlinson (2015) and Alhassan and Abosi (2014) believe that group working is a valuable strategy in a single classroom teaching and learning process. It is found that teachers often do not like to group learners either mixed or based on their learning abilities because that seem to disadvantage the low achievers in terms of group exercise within the class. According to the OECD (2018) these learners are often not sure of the contributions to offer the group, for the fear of uttering wrong statements. As such they prefer to work independently on their books, even when they are giving the wrong answers.

Therefore, thestudy findings generally support Gokhale (1995) assertion that collaborative and or cooperative learning allows teachers to throw classroom teaching that traditionally would have been the responsibility of the teacher, back to the learners to construct and discuss the learning process actively within their own understanding and ability level.

Research Question 3: What are the Outcomes of the Usage of Adaptive Instruction by JHS teachers in the Jirapa Municipality?

From the study, it was found that when a learner is guided to discover by himself or herself some knowledge, that knowledge remains with him or her in a lifelong time and not easily forgotten. This complements Curado (2017) suggestion that, the concept of lifelong learning connects individual learning experiences with formal, non-formal and informal learning.

Elmohamady et al. (2016) explained that an enhanced learning preference in an adaptive instruction classroom occurs when learners get to be aware of their learning options. This means, the teacher should be able to exhibit suitable learning materials to facilitate the learning process. The study revealed that though teachers believed adaptive instruction leads to an enhanced learning preference in classroom, unfortunate, this could not happen because, many of the teachers observed did not get to know the learner's learning preferences. From the interview explanations, this made it difficult for the teachers to adjust, review or create the teaching styles that accommodate suitable materials in harmony with the learners' learning preferences.

Amongst other outcomes of adaptive instruction assessed, many teachers disclosed that adaptive instruction helped learners to have sound receptive and retentive memory, formative assessment aided classroom evaluation, which sustain learners' interest. These corroborate with the research works which identified that adaptive instruction allows the teacher to gain learners' attention during instruction in the classroom (Alhassan &Abosi, 2014); inform teacher's choice of instructional strategies and learning aids

(Tomlinson, Brimijoin & Narvaez, 2008) and satisfy learners' needs most especially when the teacher is conscious of the learners' learning environment, knowledge and pace of learning (OECD, 2010).

Research Question 4: How Does Adaptive Instruction Pose Challenges to Teachers?

Ineffective pre-service and or in-service training for teachers: according to the Ministry of Education (2018), institutionalization of in-service training for teachers on the academic time table of schools have not been followed through by many schools and the Jirapa Municipality is no exception. Hence, Scott (2002) suggested that pre-service and in-service training need to address not only the issue of providing teachers with a broad knowledge based in the area of reading but also need to address teaching style, teacher belief and teachers' ways of knowing. This implies, in order for teaching pedagogy to be adaptive enough to meet varied learners differences, the Ghana Education Service with its other stakeholders have to make pre-service and in-service training of teachers a priority without fail.

Inadequate knowledge/expertise of teachers applying adaptive instruction to meet varied learners differences in classroom: the study findings confirmed the study by Alhassan and Abosi (2014) who also observed that teachers possess limited adaptive or no adaptive expertise at all in the classroom. As a result, Bachari, Abelwahed and Adnani (2012) conferred that it is extremely cumbersome for a teacher to determine the best learning style for each learner in the same classroom. Even if the teacher is able to identify each learner learning style, it still would be extremely difficult to apply multiple teaching strategies in a real teaching environment. This implies that it

128

might be impossible meeting the learning needs of each learner in a single classroom instruction.

On time constraint, this study also confirmed what Valiandes and Neophytou (2017) and Haddad and Kalaani (2014) found that lesson delivery in the classroom is really confronted with insufficient time even when the teacher tries to help each learner to achieve the teaching and learning indicators. Therefore, Taylor (2017) affirmed that time affect teachers' usability of adaptive instruction in delivery of lesson in the classroom, because it requires extra time and effort, to break instructional tasks and assessments and is very complex. This implies, teachers' inability to get maximum time to teach and meet varied learners' suitability on task served as a serious constraint for teachers to use adaptive instruction in the classroom.

Large class sizes: this affirms Alshammari (2016) assertion that, in a traditional classroom setting, adaptive instruction may be limited because of the large class sizes.

Overloaded curriculum: EFA (2013) maintained that the curriculum is at the heart of all teaching and learning in the classroom and need to be managed well. However, Ikwumelu, oyibe and Oketa (2015) noted that current global trending issues such as HIV/AIDS, gender disparity, substance abuse, human trafficking, child labour, child abuse, hunger, and prostitution have propelled curriculum designers to include these elements in school curriculum so as to educate the learners on the unbearable effects. And these inclusions though relevant seems to have overloaded the curriculum content, thus making teaching and learning within limited time difficult to meet varied learners differences.

129

Poor supervision: the study findings discovered thatsupervision was a big challenge that affected teachers use of adaptive teaching and learning strategies in the classroom. This is because it was observed that many teachers often did not get their lesson notes supervised and vetted to ensure inclusion to meet varied learners differences during lesson notes preparation. According to Adedeji and Olaniyan (2011) supervision is a forward-looking process that enable teachers to select the most appropriate strategies in his or her classroom in order to meet most of the learners learning needs in the classroom. Hence, they affirmed that supervision though a complex process that must play a prominent function in the classroom teaching and learning. This is often short-changed to mean the implementation of adaptive instruction in classroom if it fails to deliver the desired outcome to the learners due to poor supervision (Taylor, 2017). Thus, teachers who may lack the essential principles for supervision may encounter classroom management challenges. This implies, in every school system, the level of administrative support to supervise teachers can affect the effective implementation of an adaptive instruction in the classroom.

Research Hypotheses 1: H01:There is no significant difference in teachers applying adaptive instruction to meet varied learners' differences in classroom. The results suggest, though teachers were aware of the existence of varied learners' differences; there were significant difference of how teachers adapted to appropriate strategies to suit the varied learners needs in the classroom in the Jirapa Municipality. This supports the conceptual framework which noted that there exist varied learners' differences in classroom such as cultural heterogeneity, relevant prior knowledge, gender differences, age

130

difference, varied learning style, cognitive ability, emotional state, and varied form of punishments and calls for teachers' use of adaptive instructional strategies. This affirms the differentiated instructional theory which purport that classroom teaching and learning should be a responsive teaching that allows teachers to adjusts content, process, and product for each learner because of their varied learning differences (Rasheed & Wahid; 2018, Saundersová; 2014, Tomlinson &Imbeau, 2010; Tomlinson, 2003).

Research Hypotheses 2: H0: There is no significant difference in teaching outcomes between male and female teachers who employ adaptive instruction. From the survey, the results suggest in the Jirapa Municipality, males and females in the classroom had similar learning outcomes regards lifelong learning, enhanced learning preferences, formative assessment and sustainability of learners' interest; except for sound receptive and retentive memory. This means teachers use of adaptive instructional strategies in teaching and learning could have led to the desirable outcomes in the class such that between male and female; learners acquire lifelong learning, enhanced learning preferences, sound receptive and retentive memory and formative assessment. This confirms the study by Jahan, Khan and Asif (2017), similar assertion that adaptive instruction is the best strategy and or form of teaching individuals between and within a group. However, it cautioned that teachers who pay little or no attention to learners' differences may not be responding to many learners needs in the class. Therefore, it reiterates the fact that, for teachers to meet the learning needs of males and females in the classroom; more continuous in-service training on adaptive

131

instruction is needed for teachers to adapt and the Jirapa Municipality is no exception.

Chapture Summary

The results and discussions of the study were done in line with the research questions that guided the study. Most teachers are aware and appreciated the varied learners differences in their classrooms.

There was a significant difference for teachers to adapt to the varied learners' differences in the classroom. However, there was no significant difference between males and females in the classroom as far as the outcomes of adaptive instructions were concerned.

132
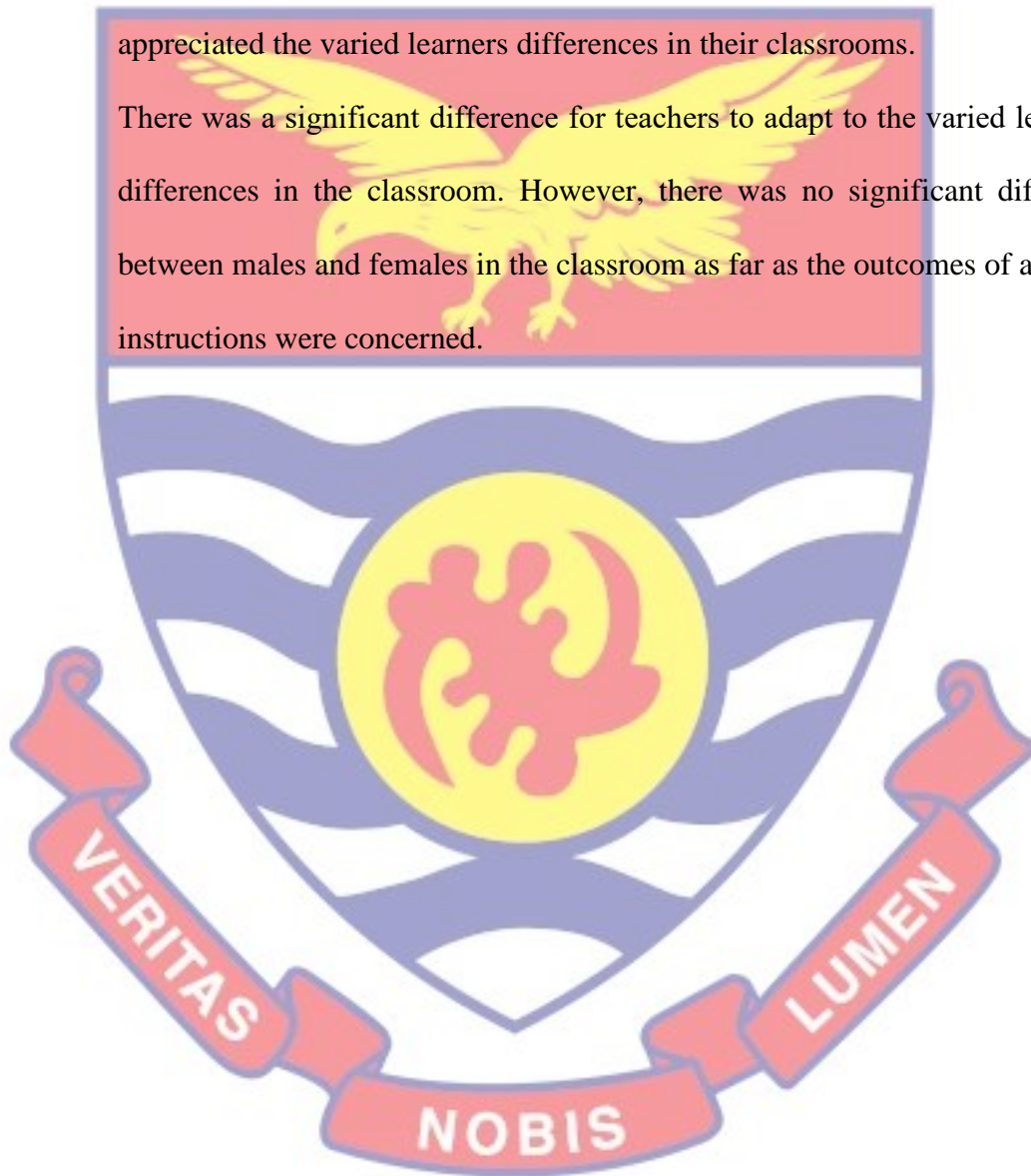
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents the summary of the study, key findings, the conclusions drawn from the findings of the study, recommendations and suggestions for further studies.

Summary of the Study

The purpose of this study was to investigate adaptive instruction in classroom teaching and learning in Junior High Schools in the Jirapa Municipality of the Upper West Region of Ghana. Specifically, it focused on the varid learners differences that call for adaptive instruction, what strategies teachers feel are helpful in responding to the varied learners differences. It further examined the outcomes of the usage of adaptive instruction. It finally looked at the challenges the usage of adaptive instruction may pose to teachers in the Jirapa Municipality in the Upper West Region of Ghana.

The study adopted cross-sectional survey design. Three instruments namely questionnaire, interviews and observation protocol were used to gather primary information from the respondents. The population of the study included all trained teachers in Junior High Schools in the Jirapa Municipality. A sample size of 239 respondents made up of 148 teachers, 10 Headteachers, 80 learners and one Municipal Education Training Officer were involved in the study. They were selected through cluster, simple random, census and purposive sampling procedures. Descriptive statistics such as frequencies and

percentages were used to present quantitative results from teachers and learners respondents using Tables, Graphs and Charts where appropriate. Similarly, data from the observation protocol was also presented in Tables comparative with that of teachers' perceived responses. On qualitative information, the relevant responses and recorded voices were transcribed and relevant information sorted based on the research questions and presented in quotations.

Key Findings

The study reveals that varied learners differences existed in the classroom. Therefore, teachers need to apply adaptive instruction in their teaching and learning processes. The varied learners differences which existed in the classroom included; cultural heterogeneity, varied prior knowledge, gender, age, learning style, cognitive or intelligent ability, emotional status, reception and memory retention differences and varied form of punishments. From the observation protocol, it was found that out of the ten (10) teachers observed, majority were able to employ the concept of adaptive instruction in their teaching and learning process; though some few could not. For example, it was observed that many teachers mirrored the understanding of learners' differences in their teaching and learning process. Teachers also considered learner variations such as cultural heterogeneity, prior knowledge, differences age, learning style, cognitive abilities, reception and memory retention differences when teaching in the classroom.

Also, in responding to what strategies teachers feel are helpful in teaching varied learners differences, majority of the teachers agreed they used mixed ability grouping; ability grouping; collaborative learning; co-operative

learning; inquiring based learning; microteaching; self-directed learning and task analysis approach as adaptive instruction strategies to teaching learners with varied learning differences. Unfortunately, in observing how teachers used the foregoing strategies in the classroom, it was found that many did not use mixed and ability grouping as a strategy in teaching varied learners in the classroom. Learners agreed that adaptive instructional strategies such as co-operative learning, collaborative learning, ability grouping and mixed grouping were good forms of learning strategies for them in teaching and learning. These were rated among the best because, learners believed that when they learn with colleagues their chances of understanding will increase significantly.

On the outcome of the usage of adaptive instruction in classroom, the findings revealed that using adaptive instruction, learners will gained desirable learning outcomes. Such as lifelong learning through behavior change; enhanced their learning preferences; had sound receptive and retentive memory; formative assessment and sustained learners' interest. However, the observation protocol in the classroom suggested that, not all teachers were able to use adaptive instruction well. This is because some teachers could not identify the right methods of teaching that will suit the varied learners differences in the classroom.

Concerning the challenges of adaptive instruction to the teacher, generally, the survey, interviews and observation protocol revealed that, teachers were unable to use adaptive instruction effectively. Teachers could not use adaptive instruction effectively because of challenges such as

135

inadequate adaptive expertise, time constraint, large class size, overloaded curriculum, multi-grade teaching and poor supervision.

Conclusions

The study investigated adaptive instruction in classroom teaching and learning in Junior High Schools in the Jirapa Municipality of the Upper West Region of Ghana. Adaptive instruction is the remedy for effective teaching and learning in the classroom if teachers are to meet the varied learners' needs in the classroom settings.

The results of the study show that most classrooms are made up of multifaceted learners. The classrooms have learners from different cultural orientation, different prior knowledge, differences in gender and age, different learning styles, emotional differences and difference in reception and memory retention. Majority of teachers are aware of the varied learner differences in the classroom. The study therefore reveals that teachers used responsive teaching and learning strategies in the classroom in order to meet each learner needs. Such responsive teaching and learning strategies included group work, collaborative learning, co-operative learning, inquiring based learning, microteaching, sef-directed learning and task analysis approach.

In addition, since teachers are not oblivious of the learner variations in the classroom, efforts are being made to reach out to every learner needs in the classroom during teaching and learning. However, teachers need to have adequate knowledge in adaptive instruction to be able to implement the adaptive instructions effectively in the classroom. This is evidence as most teachers admitted that adaptive instruction is a desireable instructional strategy and when deployed effectively the teaching and learning outcomes would be

enormous. For instance, the study reveals that inadequate pre-service and in-service training, time constraint, large class size, overloaded curriculum, and poor supervision posed significant challenges to most teachers during the implementation of adaptive instruction in the Jirapa Municipality of the Upper West Region of Ghana.

Recommendation for Policy and Practice

From the conclusions drawn from the study, the following recommendations are put forward to inform policy and practice.

Headteachers should ensure that teachers constantly vary their teaching and learning strategies in every single lesson. This would ensure that the needs of every learner is met in the classroom.

Directors, Circuit Supervisors and headteachers should ensure that regular In-Service Training programmes are organized for teachers to improve their adaptive instruction skills. Since teachers are unable to use varied strategies in their teaching and learning effectively.

It is further recommended that headteachers should conduct regular needs assessment on both teachers and learners. This will allow the headteachers to provide adequate educational support to the teachers and learners in the classrooms.

The districts and municipal education officers should encourage teachers to take up professional development programmes. As these programmes would expose teachers to educational concepts on using adaptive instruction to teacher varied learners differences.

Suggestion for Further Studies

This study is not exhaustive. It is recommended that this study should be replicated in other areas of the country to find out if the findings of the study prevail in those areas. It is further recommended that a study should be conducted to ascertain the correlation or otherwise between the concepts of adaptive instruction and inclusive teaching in schools.

Also, further research should be carried out on gendered adaptive instruction awareness, perspective of teachers in the Upper West Region of Ghana.

138
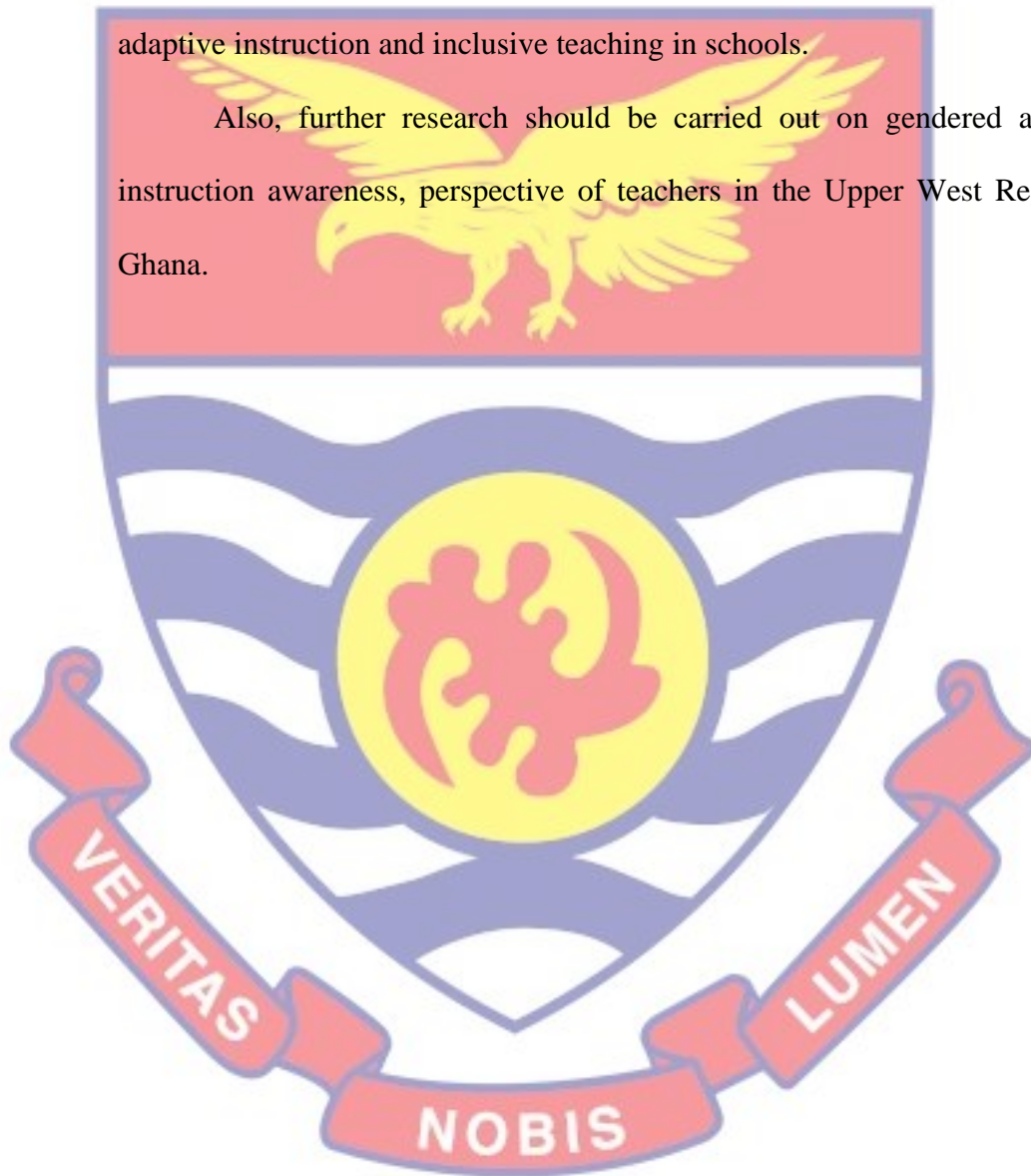
REFERENCES

Ackerman, R., Mette. I., & Bidden, C. (2018). Adaptive challenges of leadership in Maine schools. *Maine policy Review,* 27(1), 37-39. Retrieved from https://digitalcommon.library.umaineedu/mpr/vol/27/iss1/12.

Adedeji, S. O., & Olaniyan, O. (2011*). Improving the conditions of teachers and teaching in rural schools across African countries*. Fundamental of Teacher Education Development.UNESCO: International Institute for Capacity Building in Africa. Addis Ababa.

Al Ju'beh, K. (2017): Disability Inclusive Development Toolkit. ©CBM Disability-Inclusive Development Toolkit. Retrieved from https://www.cbm.org/fileadmin/user_upload/Publications/CBM-DID-TOOLKIT-accessible.pdf

Alhassan, K. A., & Abosi, O. C. (2014). Teacher effectiveness in adapting instruction to the needs of learners with learning difficulties in regular primary schools in ghana. *SAGE Publication Ltd,*

Alshammari, M. T. (2016). *Adaptation based on learning stle and knowledge level in e-learning system.* (University of Birmingham). Retrieved from https://www.researchgate.net/profile/Mohammad-

Amedahe, F. K., & Gyimah, A. K. (2018). Introduction to measurement   and evaluation. CoDE Publications, University of Cape Coast,   Ghana.

Amoako, I., Asamoah. D.,& Bortey, J. (2019). Knowledge of formative assessment practices amongst senior high school mathemetics teachers in Ghana. *American Journal of Humanities and Social Sciences Research (AJHSSR),*3(3), 08-13.

Athanases, S. A,. Bennett, L. H., & Wahleithner, J. M. (2015). Adaptive teaching for English language arts: Following the pathway of classroom data in preserves teacher inquiry. *Journal of Literacy Research.* 47(1) 83-14.

Atta-Asamoah, O., Doe, J.E., Tekpetey, & Boham, E., H., A. (2014). *Assessing teaching effectiveness of the English grammar teacher in Public senior high schools within the cape coast metropolis using the quality teaching model.* (University of Cape Coast, Ghana). Retrieved from https://files.eric.ed.gov/fulltext/ED548039.pdf

Awinyam, I. S. (2018). *An investigation of relationship between perceptions of mathematics teachers towards assessment and their assessment practices in Binduri district.* (University of Cape Coast,Ghana). Retrievd from https://www.projectreserve.com/2020/02/an-investigation-of-the-relationship-between-perceptions-of-mathematics-teachers-towards-assessment-and-their-assessment-practices-in-the-binduri-district. html

Bachari, E., Abelwahed, H., & Adnani, M. (2012). An adaptive teaching strategy model in e-learning using learners' preference: LearnFit framework. *Int.J.web science,1(3),* 257-274. Retrieved from https://www.researchgate.net/publication/268279023_An_Adaptive_Learning_Model_Using_Learner%27s_Preference

Beatty, A., & Pritchett, L. (2012). *From Schooling Goals to Learning Goals: How Fast Can Learner Learning Improve?* CGD Policy Paper 012. Retrieved from

http://www.cgdev.org/content/publications/detail/1426531. Updated Jan 29, 2013.

Bernard, R.,M., Borokhovski, E., Schmid, R.,F., Waddington, D. I., & Pickup, D. I. (2019). Twenty-first Century Adaptive Teaching and Individualized Learning Operationalized as Specific Blends of Student-centred Instructional Event: A Systematic Review and Meta-analysis. *Campbell systematic reviews*, John Wiley & Sons Ltd.

Bhattacherjee, A. (2012). *Social Science Research: Principles, Methods, and Practices*. Florida, USA: Tampa.

Bloom, B. S., Engelhart, E. J., Hill, W. H., & Krathwohl, D. R., (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain* . New York: Longmans, Green.

Bolick, K. N., & Rogowsky, B. A. (2016). Ability Grouping is on the Rise, but Should It Be*? Journal of Education and Human Development, 5(2),* 40-51.

Bowers, N., Merritt., E., & Rimm-Kaufman., S. (2019). Exploring Teacher Adaptive Expertise in the Context of Elementary School Science Reforms. *Journal of Science Teacher Education.* https://doi.org/10.1080/1046560x.2019.

Brierley, J., A. (2017). The Role of a Pragmatist Paradigm when Adopting Mixed Methods in Behavioural Accounting Research. *International Journal of Behavoural Accounting and Finance, 6 (20).* Pp. 140-154.

Brito, R. M., Rodríguez, C., & Aparicio, J. L (2018). *Sustainability in Teaching: An Evaluation of University Teachers and Learners.* Licensee MDPI, Basel, Switzerland.

Burkett, J. A. (2013). *Teacher perception on differentiated instruction and its influence on instructional practice.* (Oklahoma State University). Retrieved from https://core.ac.uk/download/pdf/215277469.pdf

Cathcart, A. M., Palmon, S., & Peterson, R. L. (2015). *Punishment. Strategy brief learner engagement project.* (University of   Nebraska-Lincoln). Retrieved from: http://k12engagement.unl.edu/punishment.

Chaudhry, I. S., & Rahman, S. (2009). The Impact of Gender Inequality in Education on Rural Poverty in Pakistan: An Empirical Analysis. *European Journal of Economics,* Finance and Administratdsive Sciences. Pp.174-188

Cohen, L. Manion., L., & Morrison, K. (2017). *Research Methods in Education.*(8th Ed.). London. https://doi.org/10.4324/97813156539.

Committee on the Foundations of Assessment (2010*). Knowing what learners know, the science and design of educational assessment.* National academy press Washington, DC.

Corbin, A. (2017). Assessing differences in learning styles: age, gender and academic performance at the tertiary level in the Caribbean. *Caribbean   teaching   scholar,   7(1),*67-91   Rtrieved   from https://www.researchgate.net/publication/318381280_Assessing_D fferences_in_Learning_Styles_Age_Gender_and_Academic_Performance _at_the_Tertiary_Level_in_the_Caribbean

Corno, L. (2008). On teaching adaptively. *Educational psychologist, 43(3)* Taylor & Francis Group, LL.

Creswell, J. W. (2014). *Research design. Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publication Ltd. UK.

Creswell, J. W., & Creswell, J. D. (2018*). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). Sage Publications India.

Cronbach, L. J. (1975). Beyond the two disciplines of scientific psychology. American Psychologist, 30(2), 116-127.

Curado, J. (2017). *How to combine formal, non-formal and informal learning in developing coaches:* ICCE, European Coaching Council. Retrieved from https://pdfslide.net/download/link/aoehow-to-combine-formal-non-formal-and-informal-learning-education-formal

Demirel, M. (2009). *Implication of long life learning on educational institutions.* Cypriot Journal of Educational Sciences.4.world education and research centre. Ankara, Turkey.

Differentiated Instructio Educator's Guide (2016). Knowing and responding to learners.

Dorgu, T., E. (2015). Different teaching methods: A panacea for effective curriculum implementation in the classroom. *International Journal of Secondary Education,*3(6-1),77-87.   Retrieved   from https://www.semanticscholar.org/paper/Different-Teaching-Methods%3A-A-Panacea-for-Effective-Dorgu/dc58952372c7724070d26fa83625baaf0a328c9f

Dumont, H. (2017). *How to deal with learners' individual differences.* Retrieved   from   https://bold.expert/how-to-deal-with-students-individual-differences/

Education For All Global Monitoring Reports (2015). Education For All 2000- 2015: Achievements and Challenges. United Nations Educational Scientific and Cultureal Organization (UNICEF).

Elmohamady, M. (2017). *Adaptive Learning Environment* (Framework *Components and Parameters).* Faculty of Graduate Studies for Education, Cairo University.

Elmohamady, M., Nabil, A., Mobarez, M., & Fakhry, A. (2016, April). *Towards Instructional Design Model for adaptive learning environments according to learning styles.* Paper presented at Egpt E-Learning University International Conference on e-learning, Egyptian e-learning University.

Exline, J . (2004). Inquiring-based learning.

Felder, R. M., & Silverman, L., K. (1988). Learning styles and teaching styles in engineering education. *Journal of Engineering Education, 78(7),* 674-681.

Francis, M., & Gould, J. (2014). *Achieving Your Award in Education and Training: A Practical Guide to Successful Teaching in the Further Education and Skill Sector (*4th Ed.*).* SAGE Publication Ltd, London UK. Retrieved from http://www.inform.nu/Articles/Vol18/ISJv18p111-125Murray1572.pdf

Frimpong, B. Appiah, G,. & Kumedzro, F. (2018). *History of educational thought.* University of Cape Coast. UCC Press. Ghana.

Gaines, M. (2001). *What Factors Effect Retention in the Classroom?*: Wakefield High School, Arlington County (VA) Public Schools.

Gardner, H. (1993). *Frames of mind: The theory of multiple inelligences.* New York, NY: Basic Books.

Geel, M. Keuning, T. Frèrejean, J. Dolmans, D. Merriënboer, J., &Visscher, A. J. (2019). Capturing the complexity of differentiated instruction, School Effectiveness and School Improvement. *An International Journal of Research, 30 (1),* 51-67.

Gentry, R. (2013). *Differentiated Instructional Strategies to Accommodate Learners with Varying Needs and Learning Style*. Presentation for The Urban Education Conference Jackson State University, Jackson, Mississippi, 18-20 November, 2013.

German Development Institute (2015). *The Sustainable Goals of the Post-2015 Agenda Comments on the Open Working Group (OWG) and SDSN Proposals*. German Development Institute, German.

Giurgiu, L. (2017). Microlearning an evolving elearning trend. Scientific Bulletin. Sibiu, Romania.

Global Initiative to End All Corporal Punishment of Children (2009), Prohibiting corporal punishment of children: A guide to legal reform and other measures. Retrieved from http://endcorporalpunishment.org/resources/resources-on- law-reform/ legal-reform-handbook-2009

Gokhale, A. A. (1995). Collaborative learning enhances. Critical thinking. *Journal of Technology Education,7 (1),* 22-30.

Graf, S., Viola, S. R., & Leo, T. (2007). In-Depth Analysis of theFelder-Silverman Learning Style Dimensions. *Journal of Research on Technology in Education, 40(1)*, 22–30.

Haddad, J. R., Kalaani, Y. (2014). *Adaptive teaching: Effective approach for learner-centred classrooms.* Conference proceddings of Electrical & Computer Engineering, Department of at Digital   Commons,   ASEE International forum, Indianapolis, Saturday   June, 14, 2014.

Hammond, J. (2001). Scaffolding teaching and learning in language and literacy education. Newtown, NSW: Primary English Teaching Association.

Hannah, R. (2013). The effect of classroom environment on learner learning. Honors Theses. Western Michigan University.

Hanover Research (2018). *Best Practices for Differentiated Instruction.* 4401 Wilson Boulevard, Suite 400, Arlington.

Hayford. J. E. (2019). *Helpful Hints for Teachers Professional Development and Management Competency.* JOHNHORDE SERIES, Ghana.

Hockett, J. A. (2018). *Differentiation Strategies and Examples: Grades K-2.* Department of Education.

Honey, P., & Mumford, A. (1982). The manual of learning styles. Maidenhead :PeterHoney. Retrieved from https://bold.expert/how-to-deal-with-learners-individual-differences/

146

Hyry-Beihammer, E. A., & Hascher, T. (2015). Multigrade Teaching in Primary Education as a Promising Pedagogy for Teacher Education in Austria and Finland. *International Teacher Education: Promising Pedagogies (Part C) Advances in Research on Teaching, 22C,* 89_113. Retrieved from https://www.researchgate.net/publication/322591820_Students%27_Perspectives_towards_Self-Directed_Learning_out_of_Classroom

Ikwumelu, S. N., Oyibe, A., & Oketa, E. C. (2015). Adaptive teaching: An invaluable pedagogic practices in social studies education. *Journal of education and practice, 6(33).*

Iloanya, J. (2014). How Mixed-Ability Grouping Works in Botswana's Schools?*International Journal of Technology and Inclusive Education (IJTIE), 1(3).*

Insana, L. E. (2015). *Understanding adaptive teaching expertise in an elementary classroom viewed as a complex adaptive system*[Doctorial dissertation, University of Illinois]. Retrieved from: https://www.researchgate.net/publication/282860544_Understanding_adaptive_teaching_expertise_in_an_elementary_classroom_viewed_as_a_complex_adaptive_system.

International Labour Organization (2019). Lifelong learning: Concepts, issues and Actions.

Ismail, N., & Elias, S. (2006). Inquiry based learning: a new approach to classroom learning. *English Language Journal, 2(1),*13-24.

Ismail, S., A., & Allaq,. K., A. (2019). The Nature of Cooperative Learning and Differentiated Instruction Practices in English Classes. Sage Doi:10.1177/2158244019856450.

Jahan, A., Khan, I. A., & Asif, F. (2017). Relevance of differentiated instructions in English classrooms: an exploratory study in the Saudi context. *International Research Journal of Human Resources and Social Sciences,* 4(9), 274-294.

Kaliska, L. (2013). Felder's Learning Style Concept and its Index of Learning   Style Questionnaire in the Slovak Conditions. *GRANT Journal,*   ISSN1805-062X,1805-0638 (online), XTTN. Retrieved from

https://www.grantjournal.com/issue/0101/PDF/0101kaliska.pdf

Kaushik,V., & Walsh, C. A. (2019). *Pragmatism as a research paradigmand its implications for social work research. Social Sciences.* Faculty of Social work , university of Calgary,   Calgary ,Canada.

Kelly, J., & Pohl, B. (2018). Using Structured Positive and Negative Reinforcement to Change Learner Behavior in Educational Settings in Order to Achieve Learner Academic Success. *Multidisciplinary Journal for Education, Social and Technological Science, 5(1),* 17-29.

Koehler, S. (2010*). Effects of differentiating for readiness, interst and learning profile on engagement and understanding mathematical and computing sciences masters.* (St. John Fisher College). Retrieved from https://core.ac.uk/download/pdf/48615663.pdf

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* New Jersey: Prentice, Hall.

Krasnoff, B. (2016*). Cultural responsive teaching: A Guide to Evidence-Based Practices for Teaching All Learners Equitably*. Equity Assistance Center. Retrieved from https://educationnorthwest.org/sites/default/files/resources/culturally-responsive-teaching-508.pdf

Kreitzer, K., E. (2016). Differentiation for all learners: Applying theory and practice so all children reach their potential. School of education and leadership student capstone. Theses and Dissertations. https://digitalcommons.hamline.edulhse-all/42008.

Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size For Research Activities. *Educational and Psychological Measurement.*(30),607-610. Retrieved from https://home.kku.ac.th/sompong/guest_speaker/KrejcieandMorgan_article.pdf

Kusi, H. (2012). *Qualitative Research: A Guide for Researchers*. Emmpong Press.

Laal, M., & Laal, M. (2011). Collaborative learning: what is it?.Collaborative learning: what is it? *Social Behavioral Sciences, 31 (2012),* 491-495.

Le, H. Janssen, J., & Wubbels, T. (2017). Collaborative learning practices: teacher and learner perceived obstacles to effective learnercollaboration. *Cambridge Journal of Education, 48(1),* 1-20. Retrieved from https://www.researchgate.net/publication/312349735_Collaborativelearning_practices_teacher_and_student_perceived_obstacles_to_effe cti ve_student_collaboration learning. *Informing Science: the*

International Journal of an   Emerging Transdiscipline, 18, 111-125.
Retrieved

Lian, Y. (2003). *Adaptive Teaching for Large Class* (National University of
Singapore). Retrieved from
https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.682.&rep=r
ep1&type=pdf

Lincoln, Y.S., & Guba, E. G. (1985). Naturalistic inquiry. Berverly Hills, CA:
Sage.

Maheshwari, V. K. (2017). *Concept of Entering Behaviour and Terminal
Behaviour*. Retrieved from www.vkmaheshwari.com:accessed on
16/10/19

Makewa, L. N., Myriam, N., & Benson, K. (2017). Teacher Perception on the
Ban of Corporal Punishment in Secondary Schools. *Saudi Journal of
Humanities and Social Sciences.* Retrieved from
https://www.researchgate.net/publication/317033349_Teacher_Percept
ion_on_the_Ban_of_Corporal_Punishment_in_Secondary_Schools

Malison, K. (2018*).* An exploratory study of self-directed learning: the
differences between it and non-it employees in Thailand*. Journal of
Entrepreneurship Education,* 21(3),1098-8394.

Manasia, L., Ianos, M. G., & Chicioreanu, T. D. (2019). Pre-service teacher
preparedness for fostering education for sustainable development: an
empirical analysis of central dimensions of teaching readiness.
*Sustainability,12(11),*166. Retrieved from
https://www.mdpi.com/2071-1050/12/1/166

Maslow, A. H. (1987). *Motivation and personality* (3rd ed.). Delhi, India: Pearson.

Matei, A., & Gogu, M. C. (2017). *Adaptive education – A systemic Proceedings of EDULEARN17 Conference 3rd-5th July 2017*, Barcelona, Spain

Mathot, G. B. (2001). *Improving Performance at the Primary Level.* Kingston, Jamaica, UNISCO.

Mentz, E., & Oosthuizen, I. (2016). Self-directed learning research. An imperative for transforming the educational landscape. AOSIS, Cape Town.

Ministry of Education (2014). Ghana 2013 National Education Assessment: Technical Report,Accra, Ghana.

Ministry of Education (2018). National Pre-tertiary Education Curriculum Framework for developing subject curricula. Ministry of Education.

Ministry of Education (2019). *Teacher DeploymentAnd Transfer Strategy.* Accra, Ghana.

Mitchell, G. J., Pilkington, F. B., Daiski, I. & Cross, N. (2017). Complexity-Based Pedagogy for E- Learning: Description of Emergence in a Graduate Nursing Program. *Open Journal of Nursing, 07(02)*, 222-241. Retrieved from https://www.researchgate.net/publication/314031265_Complexity-Based_Pedagogy_for_E-Learning_Description_of_Emergence_in_a_Graduate_Nursing_Program

151

Murray, M. C., & Pérez, J. (2015). Informing and performing: A study comparing adaptive learning to traditional

Narh, S. K. (2015). *Learning difficulties amongst primary learners:A case study in knust primary, Kumasi.* (Master's dissertation, Kwame Nkrumah University of Science and Technology).

Nartey, E. (2018). *Management a counting and supply chain performance of healthcare institutions in Ghana*. College of Humanities,   University of Ghana.

National Council for Curriculum Assessment (NaCCA) (2019). *Teacher Resource Pack Primary 1-6, Ministry of Education*, Accra. Ghana.

Neuman, W. L. (2014). *Social research methods: Qualitative and quantitative approaches (*7th ed.). Essex: Pearson.

Ntim, S. (2018). Fostering Learners Adaptive Competence: Does Acquisition of Self-Regulation and Metacognition Differentiate between Learners?*International Journal of Learning, Teaching and Educational Research,*17(9).

Ohashi, L. (2018). Self-directed learning and the teacher's role: insights from two different teaching contexts *short papers from EUROCALL 2018* (pp.236-242). Retrieved from https://doi.org/10.14705/rpnet.2018.26.843.

Olinghouse, N. G. (2008). Learner and teacher level predictors of narrative writing competence of third grade learners. *Interdisciplinary Journal, 21(3)*, 3-26.

Organisation for Economic Co-operation and Development (OECD) (2010). *The Nature of Learning Using Research to inspire Practice*. OECD.

152

Organisation for Economic Co-operation and Development (OECD) (2018). *Understanding Innovative Pedagogies: Key Themes to Analyse New Approaches to Teaching and Learning.* OECD.

Parson, S. A. (2012). Adaptive teaching in literacy instruction: Case studies of two teachers. *Journal of Literacy Research, 44(2)*, 149-170.

Pozas, M., Letzel, V., & Schneider, C. (2019). Teachers and differentiated instruction: Investigating differention practices to address learner diversity. *Journal of Research in Special Educational Needs,*(*30*), 116-127.

Randi, J. (2017). Teaching and Learning Hand in Hand: Adaptive Teaching & Self-Regulated Learning. *Teachers College Record volume 119, 130310*, Columbia University.

Randi, J., Corn, L. (2015). *Teaching and Learning Variations*. *British psychological society.* University of new York, USA.

Rasheed. F., & Wahid, A. (2018). The theory of differentiated instruction and its applicability: an e-learning perspective. *VSRD International Journal of Technical & Non-Technical Research, IX (IV), 193-202.*

Rodriguez, & Astrid, I. (2016). Impact of chronological age differences on the academic performance of learners in a first-grade classroom, *Journal of Interdisciplinary Undergraduate Research,* 8(2), 1-23. Retrieved from https://knowledge.e.southern.edu/jiur/vol8/iss1/2

Rotter , K. M. (2009). Enhancing memory in your learners: Compose yourself. Teaching exceptional children plus. 5(3).

Row, M. E. (2016*). An investigation into the experiences of learners in ability and mixed ability grouping in anindependent secondary girls' school.* College of Business, Arts and Social Sciences Department of Education Brunel University, London.

Rusdin, N. M. (2018).Teachers, Readiness in Implementing. *Journal of Academic Research in Business and Social Sciences,* 8 (4), 1271-1284.

Ruys. I., Defruyt, S., Rots, I., & Aelterman, A. (2013). Differentiated instruction in teacher education: A case study of congruent teaching. *Teachers and Teaching,* 19(1), 93-107.

Saban, A. & Coklar, A. N. (2013). Pre-Service Teachers' Opinions about the Micro-Teaching Method in Teaching Practice Classes. *The Turkish Online Journal of Educational Technology*, (12), 234-240.

Safi, S. (2014). In-service Training programs for schools teachers in Afghanistan teachers' views about effectiveness of the in-service training. Faculty of Arts and Social Science.

Santamaria, L. J. (2009). Culturally responsive differentiated instruction: Narrowing gaps between best pedagogical practices benefiting all learners. Teachers College, 111(1).

Sauer, K. (2012). The impact of learner interest and instructor effectiveness on learner performance. Fisher Digital Publications. School of Arts and Sciences. St. John Fisher College.

Saundersová, R. (2014). Differentiation in primary schools[Diploma thesis, Masaryk University]. Retrieve fromhttps://is.muni.cz/th/bcpuz/Diploma_thesis_of_Radka_Saunderso va.pdf

Scott, W. (2002). *Adaptive teaching practice: teacher response to upper primary learners (years 5-6) who experience difficulty with reading* [dissertation submitted for the degree of Doctor of Philosophy within the School of Education, Victoria University]. Retrieve from   https://vuir.vu.edu.au/15684/1/Scott_2003compressed.pdf

Shak, S. R., & Udgaonkar,U. S. (2018). Influence of gender and age of teachers on teaching: learners perspective. *International Journal of Current Microbiology and Applied Sciences*, 7(01), 2436-2441. Retrieved from. 2018/Shilpa%20Rajesh%20Shah%20and%20Usha%20Subodh%20 Ud gaonkar.pdf

Sherman, T., M., & Wildman, T., M. (1980). Linking Task Analysis with Student Learning. Paper presented at the Annual Convention of the Association for Educational Communications and Technology, Denver, Co, April 21-24.

Sileyew, K. J. (2019). Research Design and Methodology. Addiss Ababa

Singh, H. (2014). *Differentiating classroom instruction to cater learners of different styles.*Teacher SDMC Pratibha Vidyalaya EOK ,NewDelhi, India.

155

Sloan, A., & Anderson. L. (2018). *Learning Unplugged: Why Instructors Matters More than Ever.* Retrieved from https://er.educause.edu: accessed on 20/12/19

Smale-Jacobse, A. E., Helms-LORENZ, M., & Maulana, R. (2019). Differentiated instruction in secondary education: A systematic review of research evidence. *Frontiers in psychology.* Retrieved from http://www.ncbi.nlm.gov

Smit, J., van Eerde, D., & Bakker, A. (2013). A conceptualisation of whole-class scaffolding. *British Educational Research Journal, 39*(5), 817–834.

Smit, R., & Humpert, W. (2012). Differentiated Instruction in Small Schools. Teaching and Teacher Education. University Of Teacher Education,St. Gallen, Muller-Friedberg STR. 34, 9400RORCHACH,SWITZERLAND.

Sottilare, R. (2018). Community models to enhance adaptive instruction. Retrieved from http://www. Researchgate.net

Steele, A. S. (2017). An alternative collaborative supervision practice between University-based teachers and school-based teachers. *Educational Resarch, 27(3),*582-599. Retrieved from: http://www.iier.org.au/iier27/steele.html.

Stepanek, J. (1999). Meeting the Needs of Gifted Students: Differentiating Mathematics and Science Instruction. Northwest Regional Educational Laboratory, Portland.

Sternberg, R. J., & Williams, W. M. (2002). Educational Psychology. Boston. MA: Allyn & Bacon.

Sumuer, E. (2018). Factors Related to College Students' Self-directed Learning with Technology. *Australasian Journal of Educational Technology, 34(4).* https://doi.org/10.14742/ajet.3142

Taylor, S. (2017). Contested Knowledge: A Critical Review of the Concept of Differentiation in Teaching and Learning. *Warwick Journal of Education*. Woodrush High School, Birmingham, B47 5JW 2 School of Education, Worcester University, Worcester, WR2 6AJ.

Tomlinson, C. A. (1999). *Observed that the theory allows teachers to differentiate their classroom teaching.* Alexandria, VA: ASCD.

Tomlinson, C. A. (2000). *Differentiation of instruction in the elementary grades*. Reston, VA: ERIC Digest. (ERIC Document Reproduction Service No. ED443572). Alexandria, VA: ASCD.USA

Tomlinson, C. A. (2001). *How to Differentiate Instruction in Mixed Ability Classrooms.*(2nd Ed.). Association of Supervision and Curriculum Development. Alexandria, VA: ASCD. USA

Tomlinson, C. A. (2003). *Differentiation in Practice: A Resource Guide in Differentiating Curriculum, Grade 5-9.* Association of Supervision and Curriculum Development. Alexandria, VA: ASCD.USA.

Tomlinson, C. A. (2015). *Teaching for Excellence in Academically Diverse Classrooms*. *Society* 52 (3), 203–209.

Tomlinson, C. A., & Imbeau, M. B. (2010). *Leading and managing a Differentiated Classroom. Association of Supervision and Curriculum Development* Alexandria, VA: ASCD. USA

Tomlinson, C. A., & McTighe, J. (2006). *Integrating Differentiated Instruction Understanding by Design.Association of Supervision and Curriculum Development.* Alexandria, Virginia .USA.

Tomlinson, C. A., & Moon, T. R. (2013*). Assessment and Learners Success in Differentiated Classroom.* Association of Supervision and Curriculum Development.Alexandria, VA: ASCD. USA.

Tomlinson, C. A., BrimijoinK., & Naevaez, L. (2008). *The Differentiated School:* Making Revolutionary Changes in Teaching and Learning.

Tomlinson, C.A. (1999). *The Differentiated Classroom: Responding to the Needs of All Learners.* Association of Supervision and Curriculum Development. Alexandria, VA: ASCD.USA

Tools for Schools (1998). Learning forward. The professional learning association, 2(11). Access from: https://learningforward.org/tools-for-learning-schools/

Turkson, E. (2011). *Learners research project: How to obtain top grades*. *Understanding innovative pedagogies: key themes to analyse new approaches to teaching and learning*. OECD Education Working Paper No. 172.

UNICEF (2018). *Corporal punishment in ghana: A position paper on the legal and policy issues.* Department of children, Ministry of Gender children and Social Protection and UNICEF, Ghana.

United Nations Educational and Scientific Cultural Organisation (UNESCOS) (2016). What Makes a Quality Curriculum? In-Progress Reflection No.2 on Current and Critical Issues in Curriculum and Learning.

Valiandes, S. & Neophytou, L. (2017). Teachers' professional development for differentiated instruction in mixed-ability classrooms: investigating the impact of a development programmes on teachers' professional learning and on learners' achievement. *Teacher Development,* p.1-16.

Vygotsky, L. S. (1978). *Mind in Society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press. Retrieved from https://www.researchgate.net/publication/282860544.pdf

Vygotsky, L. S. (2004). Imagination and creativity in childhood. J*ournal of Russian and East European Psychology*, Moscow.

Wang, M. C. & Zollers, N. J. (2016). Adaptive Instruction: An Alternative

Wang, M. C. (2010). Adaptive instruction: Building on diversity. *Theory into practice,19(2),*122-128.

Wang, M. C., & Walberg, H. J. (1983). Adaptive Instruction and Classroom Time. *American Educational Research Journal,* 20(4), 601-626.

Wehrwein, E. A., Lujan, H. L., & DiCarlo, S. E. (2006). Gender differences in learning style preferences amongst undergraduate physiology learners. Advances in Physiology Education. VOL 31.

Welker, B. (2017*). How Adaptive Learning is Changing Traditional Teaching Methods*. Retrieved from https://www.gettingsmart.com/2017/07/how-adaptive-learning-is-changing-traditional-teaching-methods/

World Bank (2019). *Every learner matters: Unpacking the learning crisis for children with disabilities.* 1818 H Street, NW Washington DC.

APPENDENCES

160

APPENDIX A

DETERMINING SAMPLE SIZE FOR RESEARCH ACTIVITIES

ROBERT V. KREJCIE
University of Minnesota, Duluth

DARYLE W. MORGAN
Texas A. & M. University

The ever increasing demand for research has created a need for an efficient method of determining the sample size needed to be representative of a given population. In the article "Small Sample Techniques," the research division of the National Education Association has published a formula for determining sample size. Regrettably a table has not bee available for ready, easy reference which could have been constructed using the following formula.

$$s = X^2 NP(1-P) \div d^2(N-1) + X^2 P(1-P).$$

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

1.96 x 1.96 = 3.8416

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

No calculations are needed to use Table 1. For example, one may wish to know the sample size required to be representative of the opinions of 9000 high school teachers relative to merit pay increases. To obtain the required sample size enter Table 1 at N = 9000. The sample size representative of the teachers in this example is 368. Table 1 is applicable to any defined population.

The relationship between sample size and total population is illustrated in Figure 1. It should be noted that as the population increases the sample size increases at a diminishing rate and remains relatively constant at slightly more than 380 cases.

REFERENCE

Small-Sample Techniques. *The NEA Research Bulletin*, Vol. 38 (December, 1960), p. 99.

TABLE 1

Table for Determining Sample Size from a Given Population

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.

APPENDIX B

DERTIMINING RELIABILITY COEFFICIENT

163

APPENDIX C

INTRODUCTORY LETTER

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
FACULTY OF EDUCATIONAL FOUNDATIONS
DEPARTMENT OF BASIC EDUCATION

Telephone: +233-(0)3321 33379
Cables: University, Cape Coast
Email: basiceducc@gmail.com

UNIVERSITY POST OFFICE
CAPE COAST, GHANA

Our Ref:

Your Ref:

27th August, 2020

The Head
Institutional Review Board
University of Cape Coast
Cape Coast

Dear Sir/Madam,

TO WHOM IT MAY CONCERN

I write to introduce Mr. Ebenezer Nabiebakye, a student with Registration number **EF/BEP/18/0008** to you. He needs your assistance to be able to go and collect data for his work.

Thank you for your cooperation.

Yours faithfully,

Nana (Dr.) Aaron Osafo-Acquah
HEAD OF DEPARTMENT
DEPARTMENT OF BASIC EDUCATION
UNIVERSITY OF CAPE COAST
CAPE COAST

164

APPENDIX D

ETHICAL CLEARANCE

UNIVERSITY OF CAPE COAST

INSTITUTIONAL REVIEW BOARD SECRETARIAT

TEL: 0558093143 / 0508878309
E-MAIL: irb@ucc.edu.gh
OUR REF: UCC/IRB/A/2016/898
YOUR REF:
OMB NO: 0990-0279
IORG #: IORG0009096   10TH FEBRUARY, 2021

Mr. Ebenezer Nabiebakye
Department of Basic Education
University of Cape Coast

Dear Mr. Nabiebakye,

ETHICAL CLEARANCE – ID (UCCIRB/CES/2020/92)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted **Provisional Approval** for the implementation of your research titled **Exploring Classroom Teaching and Learning through Adaptive Instruction in some Selected Junior High Schools in the Upper West Region of Ghana**. This approval is valid from 10th February, 2021 to 9th February, 2022. You may apply for a renewal subject to submission of all the required documents that will be prescribed by the UCCIRB.

Please note that any modification to the project must be submitted to the UCCIRB for review and approval before its implementation. You are required to submit periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Samuel Asiedu Owusu, PhD
UCCIRB Administrator

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST

165

APPENDIX E

LETTER FROM MUNICIPAL EDUCATION DIRECTORATE

GHANA EDUCATION SERVICE

MUNICIPAL EDUCATION OFFICE

P.O.BOX 14.

JIRAPA, UPPER-WEST REGION

TEL: +233 392 91083

Email: gesjirapa1@gmail.com

In case of reply the

number and date of this

Letter should be quoted.

REPUBLIC OF GHANA

My Ref: GES/UWR/JM/155/VOL.3/3

12th February, 2021

RE: REQUEST FOR TEACHERS AND STUDENTS DATA

I forward to you data on number of Circuits, Junior High Schools, Staffing and enrolment for the 2019/2020 academic year for your study and necessary action.

LEONARD B. ANGNONOBAALA

(MUNICIPAL DIRECTOR OF EDUCATION)

NABIEBAKYE EBENEZER

ST. CECILIA JUNIOR HIGH SCHOOL

POST OFFICE BOX 521

WA – UW/R.

166

APPENDIX F

UNIVERSITY OF CAPE COAST

COLLEGE OF EDUCATION STUDIES

DEPARTMENT OF BASIC EDUCATION

INVESTIGATING ADAPTIVE INSTRUCTION IN CLASSROOM

TEACHING AND LEARNING IN JUNIOR HIGH SCHOOLS IN THE

JIRAPA MUNICIPALITY OF THE UPPER WEST REGION OF

GHANA

QUESTIONNAIRE FOR TEACHERS

I am Ebenezer Nabiebakye, an M. Phil. Learner of the University of Cape

Coast, writing my thesis on the topic: Investigating adaptive instruction in

classroom teaching and learning in Junior High Schools in the Jirapa

Municipality of the Upper West region of Ghana

I would be grateful if you could spend 30 minutes of your time to

answer the questionnaire below:

Confidentiality and anonymity of your responses will be guaranteed. Your

views, in combination with those of others, are extremely important and there

is no right or wrong answer. I therefore promise that it is for academic purpose

and hence any information provided will be private and strictly confidential.

Your participation in this study will be greatly appreciated.

 Thank you.

Adaptive instruction: *using different teaching methods in a single lesson to*

meet different learners' needs such as different: Cultures, prior relevant

knowledge, gender, age, learning styles, cognitive abilities, receptive and

memory retention, and different forms of punishments in the classroom teaching and learning.

Instruction: Tick the appropriate bracket [ ] representing your response to the question or statement or write your response in the blank spaces where necessary.

Section A: Demographic Information

Instructions: Please provide or tick [ ] a response that best describes your background.

1. Gender: Female [1] Male [2]

2. Age: _____

3. Class/form you teach? _____

4. School location: urban [1] rural [2]

5. Number of years as a teacher_____

6. Please tick your academic qualification:

a. SSS, "O" Levels/ "A" Levels [1]

7. Please tick your highest academic qualification:

a. 3-Post Secondary teachers' Cert "A" [1]

b. Diploma [2]

c. Degree [3]

d. Masters [4]

e. Others, please specific [5]_____

8. Do you have any training on how to teach learners with varied learning needs?

Yes [1] No [2]

168

9. If yes, in what specialty…………………………………….………………..

10. Do you have experience in teaching learners with varied learning needs?

Yes [1] No [2]

Section B: Varied learners differences for Adaptive Instruction in the Classroom

Choose ONLY ONE option by ticking either exist (1), does not exist(2) or, not sure(3) in the boxes to indicate the existence or otherwise of varied learners 'differences amongstlearners in the classroom and explain ON THE DOTTED LINES how each variation exist in the teaching and learning.

Varied learners differences for adaptive instruction in the classroom	adaptive instruction		
	1	2	3
1. cultural heterogeneity			
Explain…………………………………………………………………. ……………...……………………………………………………. .... ………………………………………………………………. ………………...……………………………………………			
2.Varied relevant prior knowledge			
Explain……………………………………………………………… ……………...…………………………………………………. .... …………………………………………………………… ……………...……………………………………………			

169

3.Gender differences Explain………………………………………………………………… ………………………………………………………………………… .... ………………………………………………………………………… ……………………………………………………………………………			
4. Age difference Explain………………………………………………………………… ………………………………………………………………………… .... ………………………………………………………………………… ……………..………………………………………….................……			
5. Differences in learning styles Explain………………………………………………………………… …………..…………………………………………………………… ....…… …………………………..……………………………………………… ……………………..…………….………			
6. Different cognitive abilities Explain………………………………………………………………… ………………..………………………………………………………… .... ……………………………………………………………….....…… …………………………………………………………………………			

7.Varied emotional status Explain…………………………………………………………… …………………………………………………………………………… .... …………………………………………………………………………… ………………………………………………………………………………			
8. Different reception span and memory retention Explain…………………………………………………………… …………………………………………………………………………… .... ………………………………………………………………………… ………………..…………........			
9. Varied form of punishments Explain…………………………………………………………… …………………………………………………………………………... .... …………………………………………………………………………… …………………………………………………………………………			

Specify others and explain…………………………………………………...

Section C: **Outcomes of Adaptive Instruction in the Class**

Choose **ONLY ONE** option by ticking either *disagreed (1),* agreed (2), undecided (3*)* in the boxes to indicate your level of agreement on the outcomes of adaptive instruction in the classroom and explain **ON THE DOTTED LINES** how each outcome may exist.

Outcomes of adaptive instruction in theclassroom	Adaptive teaching		
	1	2	3
1. Lifelong Learning: This is learning throughout the life of a learner Explain…………………..…………………… ………………………………………………............ ....………………………………………… ....……………………………………………			
2. Enhanced Learning Preferences Explain……………….…………………………… …………………………………............................. ....…… ……………………………………………………			
3. Sound Receptive and Retentive Memory Explain…………….………………………… …………………………………................................ ....…… …………………………………………..……….			

172

4. Formative Assessment: *This is a continuous form of assessment as teaching and learning is ongoing in the classroom.* Explain…………………..………………………… …………………………………….......................... ....…… ……………………………………………………			
5. Sustainability of learners' interest Explain…………………..………………………… …………………………………….......................... ………………………………….......................…… ……………………………………………………			

Specify others and explain...

173
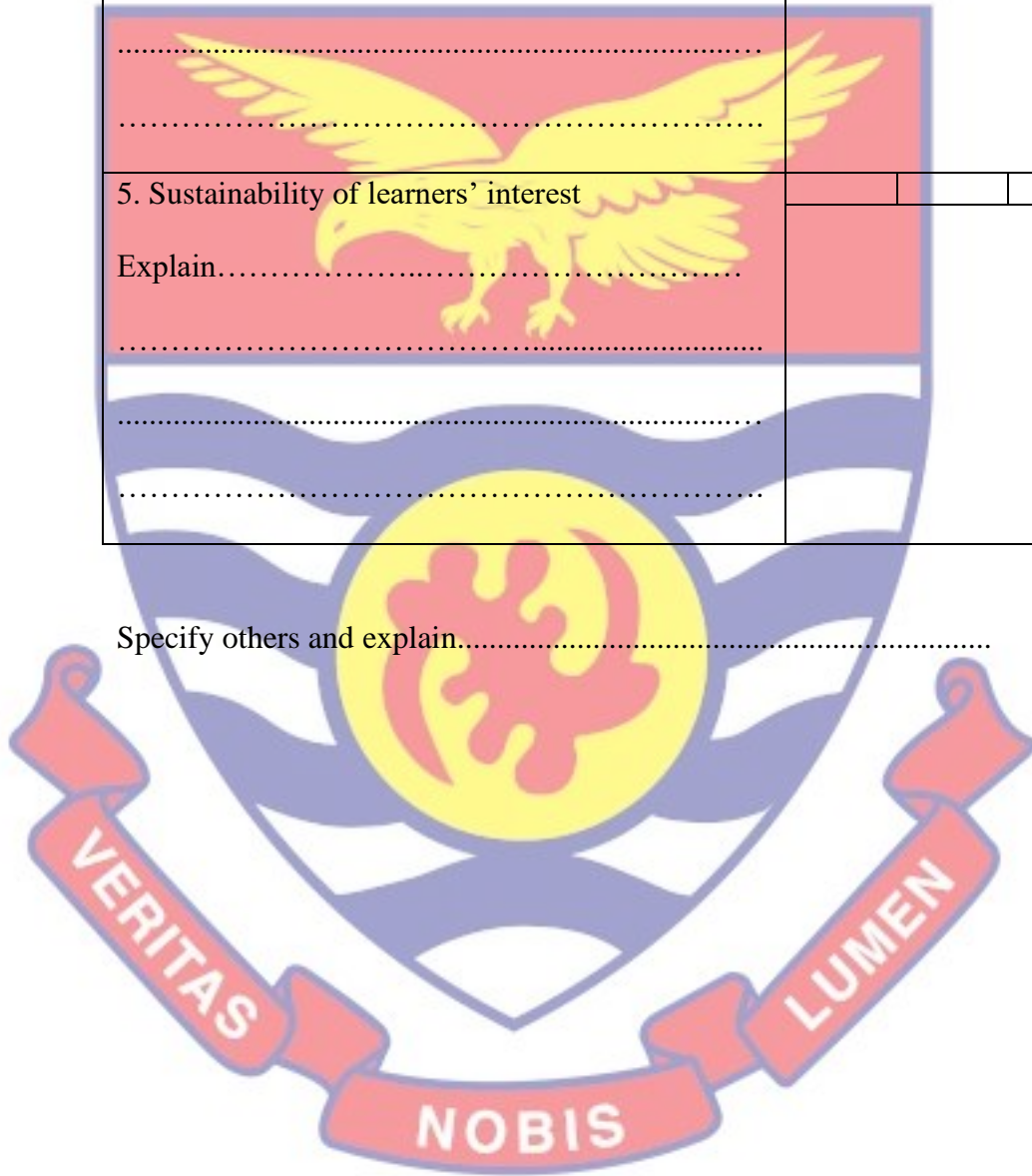
***Section D*: Challenges of Adaptive Instruction to the Teacher**

Choose **ONLY ONE** option by ticking agreed (1), disagreed (2), undecided (3) in the boxes to indicate the extent of challenges of adaptive instruction to the teacher and explain **ON THE DOTTED LINES** how each is a challenge.

Challenges of adaptive instruction to Teacher in classroom	Adaptive teaching		
	1	2	3
1. Inadequate adaptive expertise: *This is where teachers have little or no knowledge adaptive instruction* Explain………………………………………………… ………………………………………………………… ………………………………………………………… ……………………………………………………………			
2. Inadequate pre-service and in-service training Explain……………..………………………………… ………………………………………………………… ………………………………………………………… …………………………………………………………			
3. Time constraint Explain…………….………………………………… …………………………………................................. ....…………………… …………………………………………………………			

4. Multi-grade teaching: *This is where one teacher combines two or more classes of different levels (e g. form1 and 2) and teach at the same time in one classroom.* Explain……………..………………………………… …………………………………………………………........ ……………………………………………………………… …………………………………………………………			
5. Large class size Explain…………………………………………………… ………………………………………………………………… ……………………………………...……………………. ………………………………………………………….…			
6.Overloaded curriculum Explain……………..………………………………… ………………………... ....……………………… ……………………………………………………			
7.Poor supervision Explain……………..………………………………… ………………………... ....……………………… ……………………………………………………			

Specify others and explain ....

175

Section D: **Strategies for Responding to Varied learners differences in the Classroom**

Choose ONLY ONE option by ticking either agree (1), disagree (2) or, not sure (3) in the boxes to indicate whether these strategies are used in the classroom teaching and explain **ON THE DOTTED LINES** how each strategy is demonstrated in your teaching strategies.

Responding to varied learners differences in the Classroom	Adaptive instruction		
	1	2	3
Group work: 1. Ability grouping: *This is grouping learners into group(s) with similar learning abilities* Explain...			
.... 2. Mixed ability grouping: *This is grouping learners into group(s) with different learning abilities* Explain...			
3. Collaborative learning: *supportive learning amongst*			

176

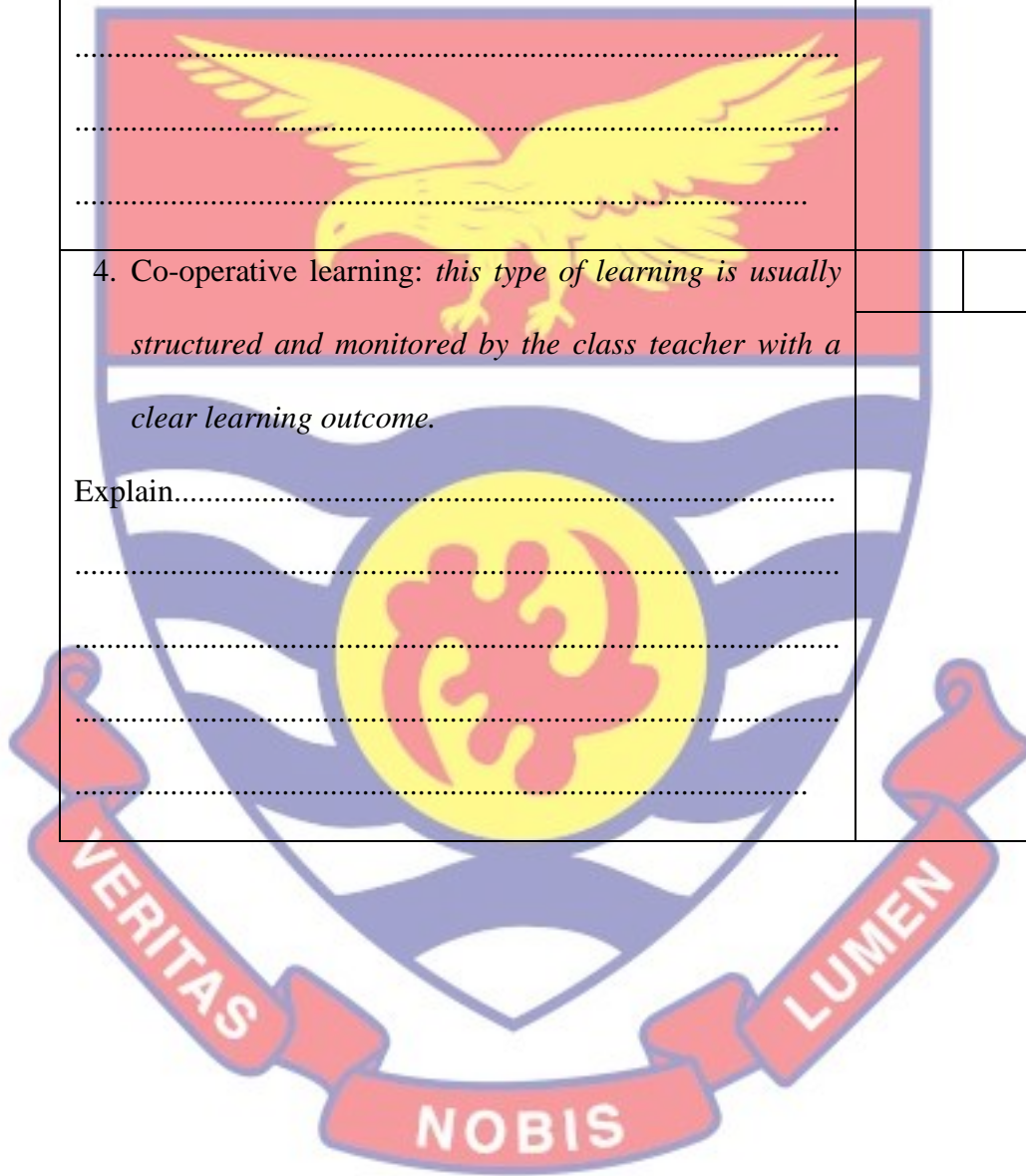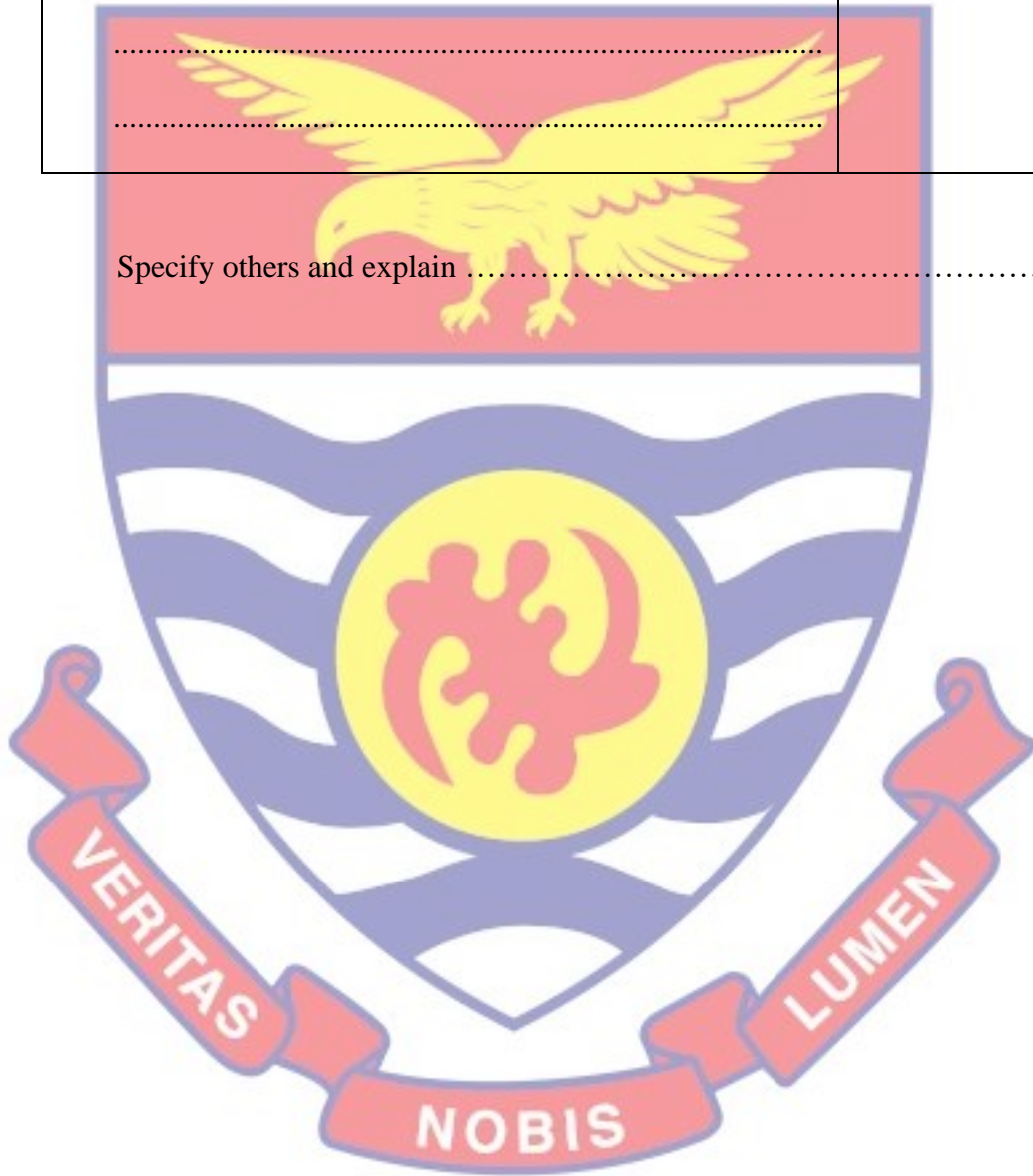|	
small groups within a whole class. Teachers do not actively monitor this type of grouping, but rather, provide encouragement when the need arises. Explain...	
4. Co-operative learning: *this type of learning is usually structured and monitored by the class teacher with a clear learning outcome.* Explain...	

5. Inquiring based learning: *this is where learners embark on personal discovery, gather their own information leading to the understanding of teaching and learning.* Explain..			
6. Microteaching: *This is where learners tend to teach their peers based on the learner own understanding of what has been taught and learnt* Explain..			
7. Self-directed learning: *Teachers often use classroom activities such as project, exercises, questions and answers, discussion techniques to allow the learners to be responsible for their own learning in the class.* Explain.. ....…………………………………………….……….………			

178

8. Task analysis approach: *This is where class activities are broken into smaller units and presented in bits for learners to understand.* Explain...			

Specify others and explain ……………………………………………

179

APPENDIX G

OBSERVATIONAL PROTOCOL ON CLASSROOM TEACHING AND

LEARNING THROUGH ADAPTIVE INSTRUCTION

Section A

Date…………………………

Name of school…………………………………………………………..........

Time of the observation……………………start…………. end……………....

Class/Form………………………Teacher's

gender…………………………....

Number of learners……………………………….

Subject………………………………………………….............................

Topic…………………………………………………….………………….

taught…………………………………………………………………………..
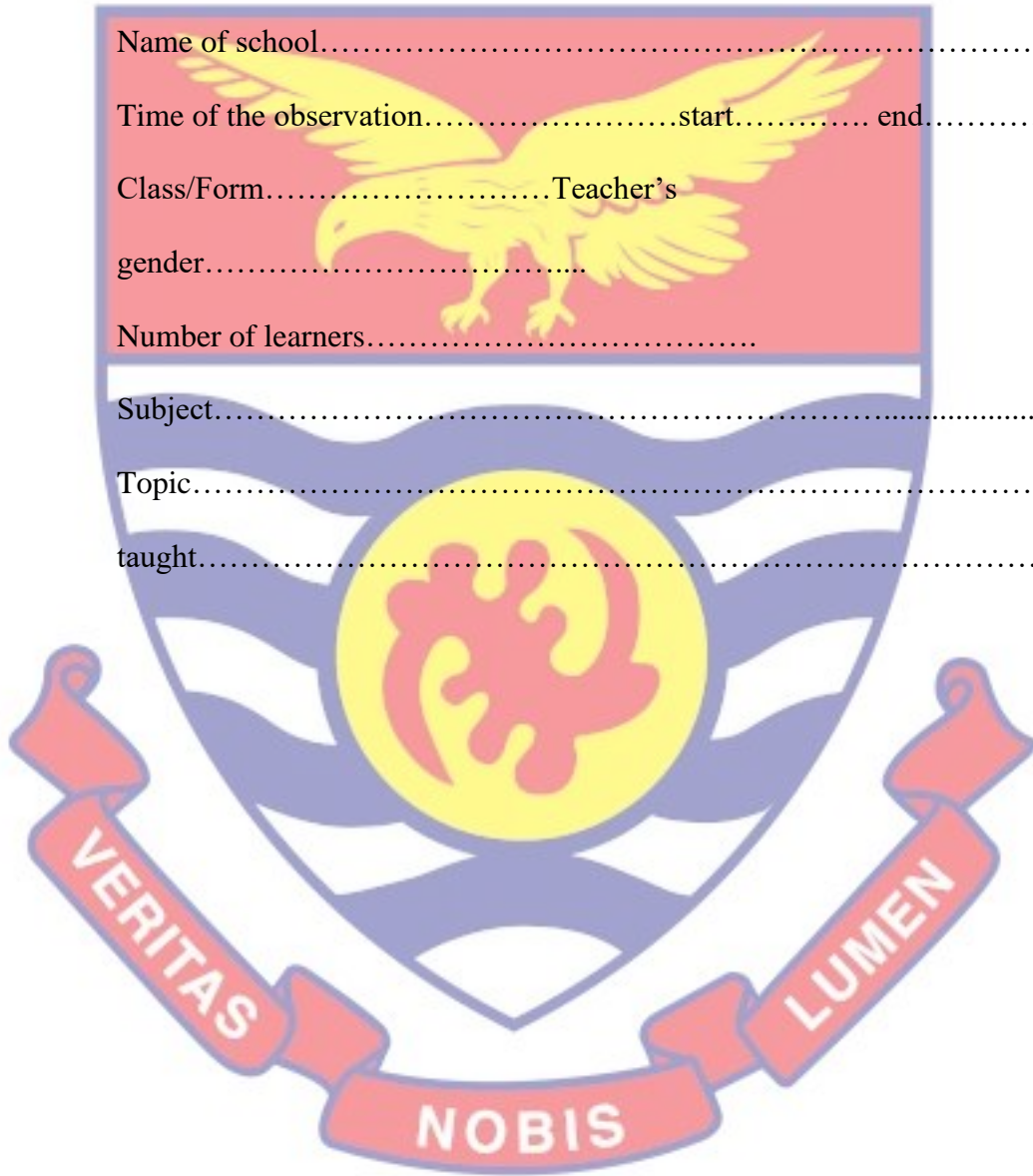
Section B: Teacher Ability to Recognise Varied learners differences for Adaptive instruction in the Classroom.

Statement	Yes[1]	No[2]	Remarks
1.Respect for cultural hererogeinities in the class			
2.Lesson delivered on learners prior knowledge			
3.Gender awareness noticed in class			
4. Age differences is considered during task performance			
5. Opportunity for learners to learn on their preferences			
6. Learners cognitive abilities are considered in the class			
7. Teacher respect learners emotions			
8. Duration of lesson adhere to			

181
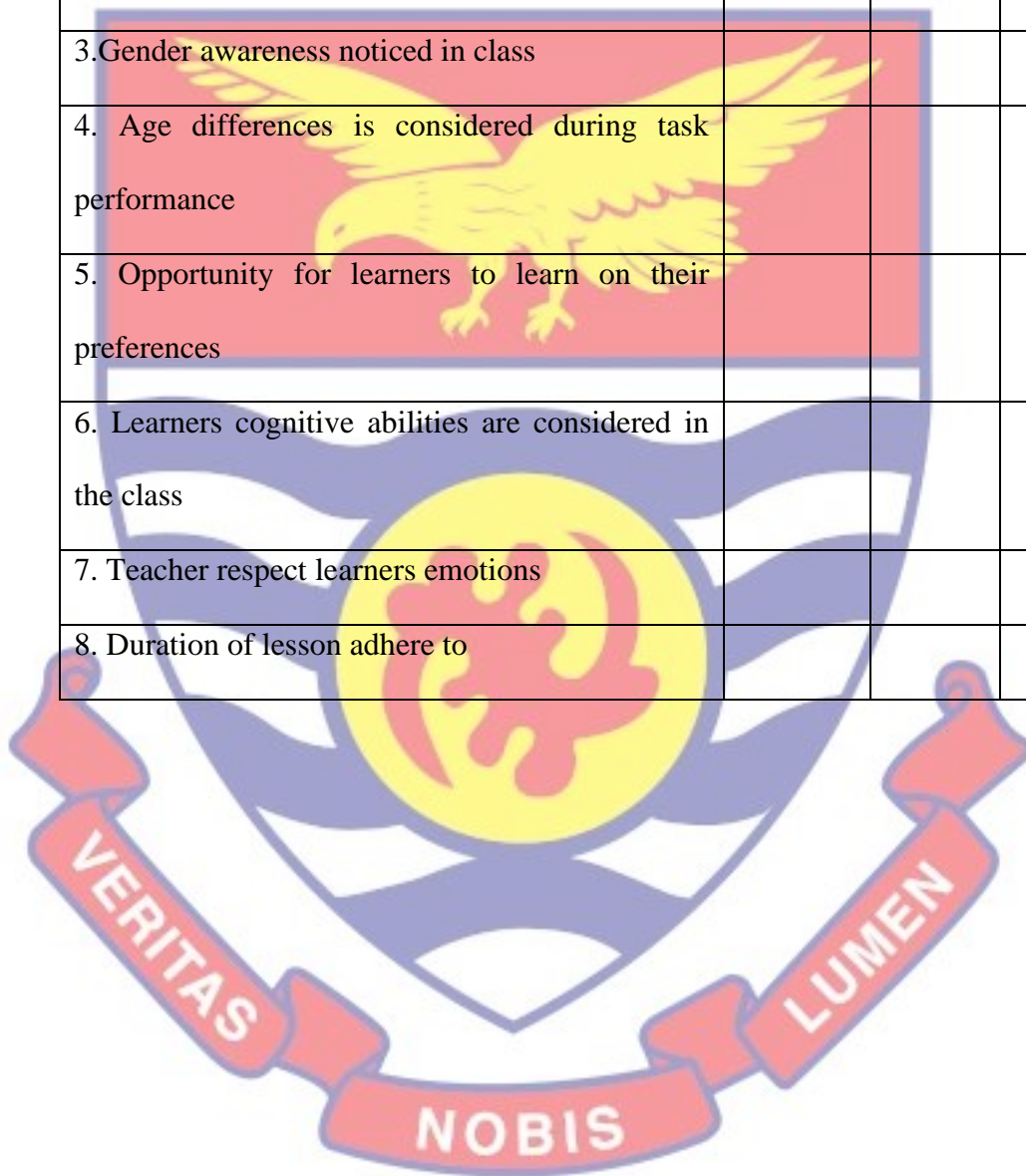
Section C: Teacher Uses Multiple Teaching and Learning Strategies in Responding to Varied learners differences in the Class

Statement	Yes[1]	No[2]	Remarks
Does the teacher employs or facilitates the following strategies during teaching?			
a. Group work			
b. Collaborative learning			
c. Co-operative grouping			
d. Inquiring based learning			
e. Microteaching			
f. Self-directed learning			
g. Task analysis approach			

Section D: Expected Outcomes of Adaptive Instruction in the Class

Statement	Yes[1]	No[2]	Remark
1. Learners demonstrate practical understanding of the lesson			
2. Teacher encourages learning based on learners' individual preferences			
3. Learners actively participated in the lesson			
4. Teacher assess learners as teaching and learning is in progress			
5. The teacher is supportive to learners in class			

182

Section E: Challenges of Adaptive Instruction to the Teacher

Statement	Yes [1]	*No [2]*	Remarks
1. Teacher demonstrated adaptive competencies			
2. Effective utilization of instructional time			
3. Is the class a multi-grade class?			
4. Effective classroom control management			

183
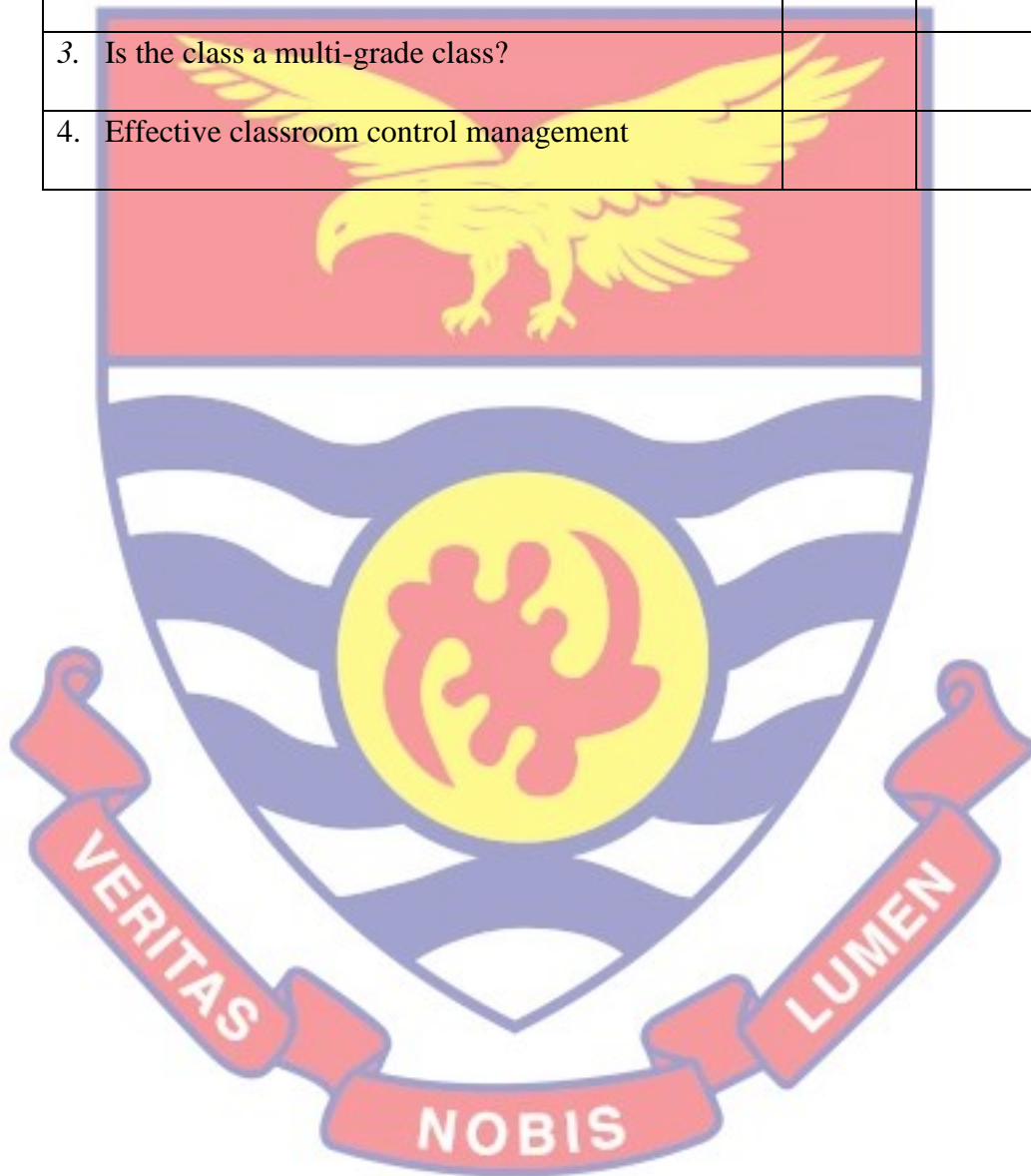
APPENDIX H

QUESTIONNAIRE FOR LEARNERS

I am Ebenezer Nabiebakye, an M.Phil. Learner of the University of Cape Coast, writing my thesis on the topic: Investigating adaptive instruction in classroom teaching and learning in Junior High Schools in the Jirapa Municipality of the Upper West Region of Ghana.

I would be grateful if you could spend 25-30 minutes of your time to answer the questionnaire below:

Confidentiality and anonymity of your responses will be guaranteed. Your views, in combination with those of others, are extremely important and there is no right or wrong answer. I therefore promise that it is for academic purpose and hence any information provided will be private and strictly confidential.

Your participation in this study will be greatly appreciated.

Thank you.

Instruction: Tick the appropriate bracket [ ] representing your response to the question or statement or write your response in the blank spaces where necessary.

1. Sex: male [1] female [2]

2. Date of Birth..

3. Age:…………………..

4. Tribe:……………………………………

5. Occupation of your father:…………………………………………

6. Occupation of your mother:…………………………………………

7. With whom are you staying with?:…………………………………

8. Parent/guardian you stay with is: literate [1] illiterate [2]

184

Rank the following teaching and learning strategies from 1,2,3,4,5,6 to 7, that your teachers use in teaching you in the classroom. for example, out of the number of strategies, write 1 inside the brackets the one you like most, 2 inside the one you like next, 3 inside the one next, in that order up to 7 which will be the one you don't like at all.

NOTE: Take Time to Go Through All before you Begin to attach the numbers
The teaching and learning strategies are also explained below each.

1. **Ability grouping [ ]**

[when teachers put learners into groups with different learning abilities]

2. **Mixed ability grouping[ ]**

[when teachers put learners into groups with similar learning abilities]

3. **Collaborative learninig[ ]**

[supportive learning amongst small groups within a whole class. Teachers do not actively monitor this type of grouping, but rather, provide encouragement when the need arises]

4. **Co-operative learning[ ]**

[this type of learning is usually structured and monitored by the class teacher with a clear learning outcome]

5. **Inquiring based learning[ ]**

[*this is where learners embark on personal discovery, gather their own information leading to the understanding of teaching and learning]*

6. Microteaching[ ]

[This is where learners tend to teach their peers based on the learner own understanding of what has been taught and learnt

7. Self-directed learning[ ]

[Teachers often use classroom activities such as project, exercises, questions and answers, discussion techniques to allow the learners to be responsible for their own learning in the class]

8. Task analysis approach[ ]

[This is where class activities are broken into smaller units and presented in bits for learners to understand]

Explain any other thing your teachers do that make you learn better or not able to learn

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………
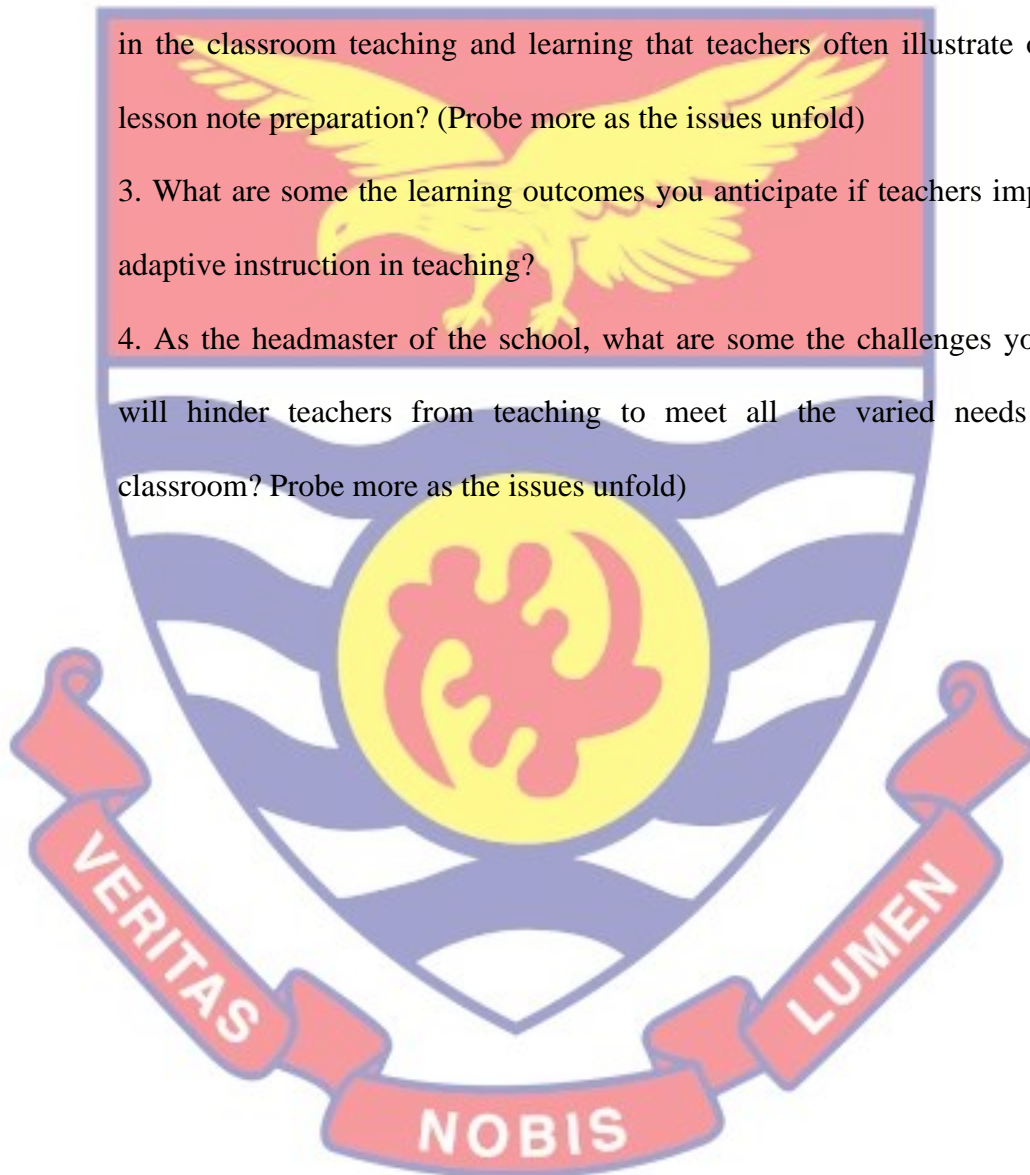
186
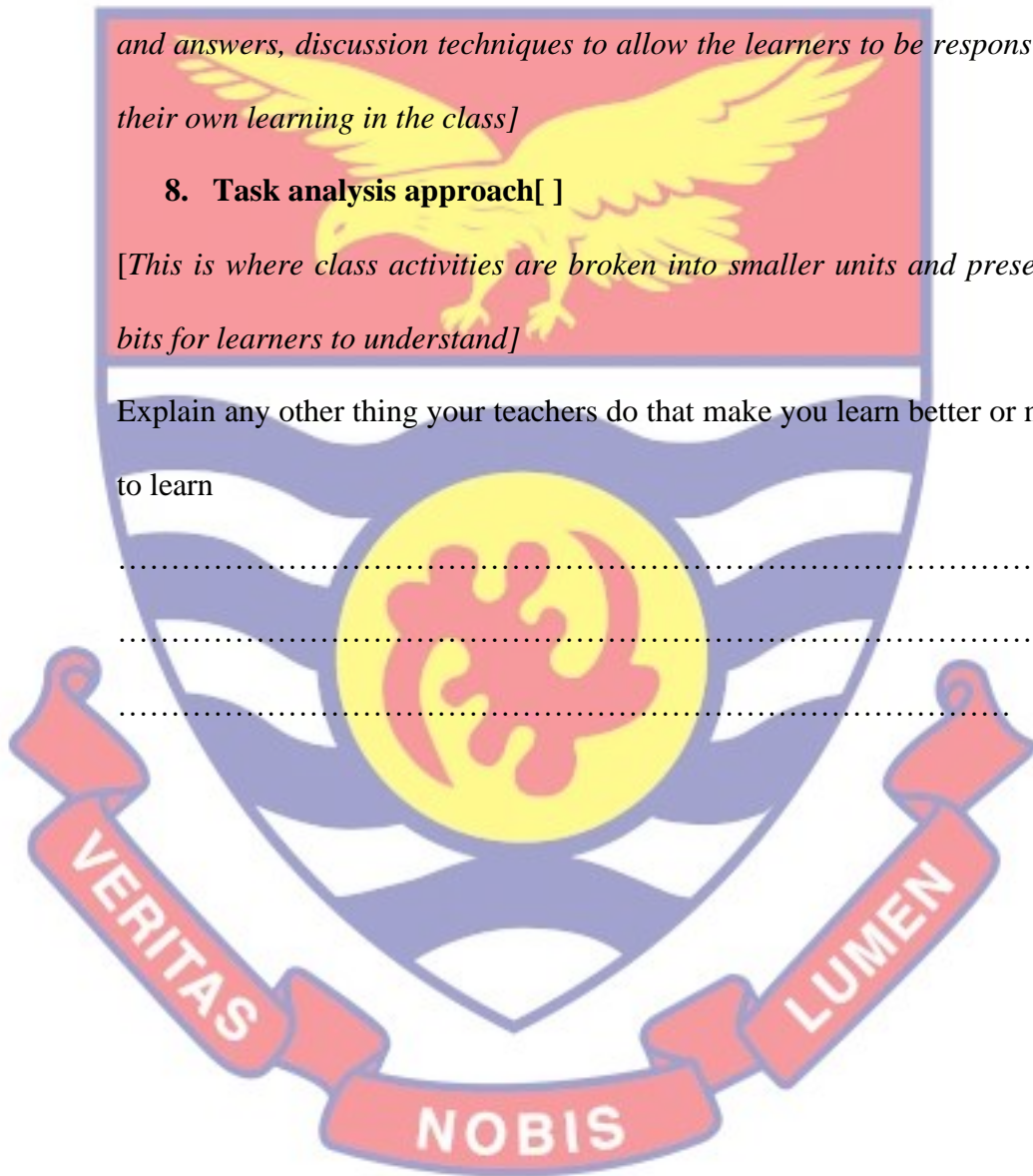
APPENDIX I

Headteachers' Interview Guide

1.   What   are   some   of   these   learning   variations   that   exist amongstlearners?(Probe more as the issues unfold)

2 what are some of the strategies of responding to varied learners differences in the classroom teaching and learning that teachers often illustrate on their lesson note preparation? (Probe more as the issues unfold)

3. What are some the learning outcomes you anticipate if teachers implement adaptive instruction in teaching?

4. As the headmaster of the school, what are some the challenges you think will hinder teachers from teaching to meet all the varied needs in the classroom? Probe more as the issues unfold)

187

APPENDIX J

Municipal Training Officers' Interview Guide

1. What are some of the varied learners differences in classrooms the will call for the training of teachers in the municipal? Probe more as the issues unfold)

2. What are some the strategies you will want to train teachers on so that they can teach to meet all learners needs in the classroom? Probe more as the issues unfold)

3. What do you think learners in your classroom stand to benefit if teachers are able to implement teaching strategies that will meet each learner needs?

4. What challenges do you think your teachers will encounter in teaching to meet the varied learners differences in the classroom? Probe more as the issues unfold)