

UNIVERSITY OF EDUCATION, WINNEBA

**PERCEIVED EFFECTS OF LARGE CLASS SIZE ON STUDENTS'
ACADEMIC PERFORMANCE**



MASTER OF PHILOSOPHY

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**A thesis in the Department of Educational Administration and Management,
School of Education and Life-Long Learning, submitted to the School of
Graduate Studies in partial fulfilment
of the requirements for the award of the degree of
Master of Philosophy
(Educational Administration and Management)
in the University of Education, Winneba**

JULY, 2023

DECLARATION

Student's Declaration

I, Yahaya Shamsu, declare that this thesis, with the exception of quotations and references contained in published works that have been duly cited and acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature:

Date:

Supervisor's Declaration

I hereby declare that the preparation and presentation of this dissertation was supervised in accordance with the guidelines for supervision of dissertation as laid down by the University of Education, Winneba.

DR. JUDITH BAMPO (Supervisor)

Signature:

Date:

DEDICATION

I would like to dedicate this thesis to my indefatigable friend, Daniel Bonsu. Your tireless support and guidance throughout this journey have been invaluable to me. I am profoundly grateful for everything you have done. It is difficult to find words that adequately express my thanks and appreciation for your constant presence and assistance. Your friendship has been a source of strength and inspiration, and I am truly fortunate to have you by my side. Thank you so much for everything!



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I would also like to express my sincere gratitude to all the participants who generously dedicated their time and willingly shared their experiences for the purpose of this study. Their valuable contributions have played a vital role in the success of this research. Without their cooperation and willingness to participate, this work would not have been possible.

Once again, I am truly grateful to Dr. Judith Bampo and all the participants for their significant contributions, which have greatly enriched this study and its findings.

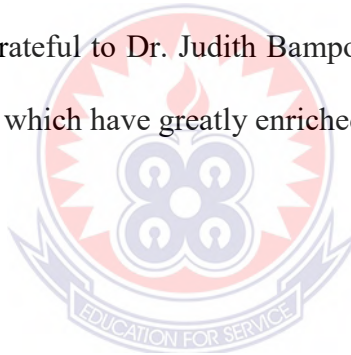


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LIST OF ACRONYMS

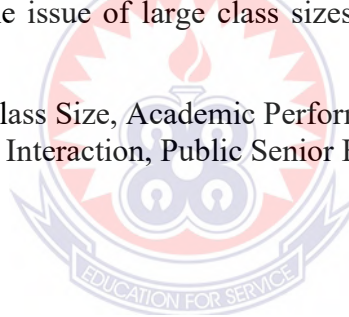
BED	:	British Education Department
CSR	:	Class Size Reduction
GES	:	Ghana Education Service
PSHSs	:	Public Senior High Schools SHSs: Senior High Schools
STAR	:	Student-Teacher Achievement Ratio
TIMSS	:	Trends in International Mathematics and Science Study
ZPD	:	Zone of Proximal Development



ABSTRACT

This study examined the perceived effects of large class size on student's academic performance. The researcher used a cross-sectional design and adopted stratified and simple random sampling techniques to select two-hundred and eighty (280) students from four public senior high schools in the Akwapim South District of the Eastern Region. To collect data, a structured questionnaire was utilized, which demonstrated good reliability with a Cronbach's alpha coefficient of 0.791. Descriptive statistics, including frequency, percentages, mean, and standard deviation, were employed for data analysis, along with inferential statistics such as correlation and regression. The findings of the study indicated that large class size negatively affected students' academic performance and limited their learning opportunities. Additionally, it was discovered that the psychological classroom environment significantly influenced students' academic performance. As a result, the study recommended that teachers and head teachers adhere to the recommended teacher-to-student ratio of 1:40 set by the Ghana Education Service, as smaller class sizes and a positive psychological classroom environment enhance student performance. Teachers should strive to create an inclusive environment that encourages student participation in classroom activities. Furthermore, the study demonstrated that students achieved better outcomes in smaller class sizes and favorable psychological classroom environments. Therefore, it was suggested that the government should hire more teachers and construct additional classrooms to address the issue of large class sizes in public senior high schools in Ghana.

KEY WORDS: Large Class Size, Academic Performance, Psychological Classroom Environment, Classroom Interaction, Public Senior High Schools



CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Education is the foundation for any civilized country. Education is crucial for both individual growth and the advancement of the economy. It is the pathway for acquiring skills, values, skills beliefs and knowledge to become useful to society. The essence of it cannot be overemphasized. Every individual needs education to help him or her become a well-rounded member of society.

The objective of education is to help people become problem solvers and critical thinkers. It also promotes self-awareness while readying individuals for the hurdles and opportunities in life.

Education is one the key sectors of every country because of the vital role it plays. It is not surprising that countries that are serious allocate a huge chunk of their budget to the education sector. Education facilitates in the transmission of culture. Without education the continuous existence of society would be in danger Dewey (2005). One of the most effective ways of developing human resource is through education and training. Some developing countries find it difficult to develop their human resource owing to the kind of attention they pay to the education. There is a need for proper needs assessment if developing countries want to be on track with respect to education.

Aikaman & Unterhalter (2005), argued that the most effective medium for positive social change is education. Nsubuga (2003) postulated that social and economic process depend on many factors, but the most crucial of all is human resource. Natural resources are important but without effective and efficient human resource a nation will be stuck where it is. No progress will be made if a nation

abandons or does not put in extra effort to develop its human resources. Quality human capital promotes economic growth, enhance productivity and innovation, foster social development and contribute to long term sustainability. Investing in human capital is essential for individuals, communities and nations to prosper and grow in a world that is dynamic.

The quality of human resource of every country depends on its education system and the quantum of investment in human capital. Countries that invest in human capital such as professional development and vocational training, tend to have human resource that is able and competent. Education is vital for a nation's progress, serving as an essential element for development. High-quality education is indispensable for advancement. According to Chinn (1994) education is a process where various learning programmes are organized by society to help individuals to acquire knowledge, skills and attitudes. Education helps to pass down knowledge and values from one generation to the next. Education also prepares individuals for their future careers and experiences. The education one has can determine his or her position in society (Gollnick & Chinn, 1994).

Education can be grouped into several types. The common classification is formal, non-formal and informal (Afful-Broni & Ziggah, 2006). Formal education is type that takes place in schools, colleges and universities. The facilitators are trained and the system is guided by curriculum is carefully designed. Formal education is scientific, systematic, literacy based. The learners undergo formative and summative evaluation at the end their study. Non-formal education on the other hand, happens outside the main stream of formal education. Under this form of education, the individual acquires knowledge, skills, and values under supervision. A typical example is adult literacy classes.

With respect to informal education, learning takes place through the personal initiative of the learner. It is not systematic. Every responsible adult can facilitate the process. The process of learning happens through personal observation and experience of the learner. Informal education is by oral transmission. Much of the learning is unconscious (Bonsu, Boateng and Boahen, 2016).

In Ghana, the Ministry of Education and Ghana Education Service regulate the pre-tertiary level. The National Council for Curriculum and Assessment (NACCA), an agency under ministry of education is charged with the mandate to design curriculum for schools. The council determines the goals and structure of courses at the various levels of pre-tertiary education. The council also ensures inclusive and representative curriculum development. All pre-tertiary schools in Ghana are guided by syllabi from (NACCA). The education sector has gone through many reforms. The country was using the British system introduced during the colonial era. The British system was structured into a 21year program. The government felt both the duration and scope were wrong. So in September 1987, the first educational reform took place that replaced the British system. The new system reduced the number of years to eighteen years. The current system of education in Ghana was a result of the 2007 education reforms. The reforms mainstreamed kindergarten, introduced ICT and French and placed more emphasis on technical, Agriculture and vocational training.

Oduro (2000) opines that basic education lays the foundation for individuals to climb the educational ladder. Persons who go through basic education can easily move to the tertiary level to further their education. Hansen (2008) also postulates that quality education is key to the growth and development of every country. The challenge of large class size is among the pertinent issues that school administrators are grappling with. The introduction of school feeding program in 2004 and free

senior high school aggravated the issue of large class size in public senior high schools.

A plethora of educational policies have been implemented to address educational challenges in Ghana, including addressing large class sizes in public senior high schools. However, the pass rate of some public senior high schools is still not encouraging. According to Lockheed and Verspoor (1991), the training teachers go through, supervision by education regulatory bodies and availability of teaching and learning materials are very important to ensuring success in the education sector. Delong and Winter (1998), add that strategies to manage large class sizes has the potential to improve the academic performance of students. Quality education relies on class size and the ability of the teacher to supervise his or her students during lessons (Hansen 2018).

Class size is a topical issue in most countries, especially developing ones. However, research findings on the topic so far do not consistently point in one direction. The research outcomes regarding the influence of class size on students' academic performance differ. Some studies have reported a notable correlation between class size and students' achievement, while other research has indicated that class size has no effect on students' academic performance. Policy regarding class has changed in many countries. In the United States of America for example, policy with respect to class size in favour of small class sizes. England and Wales have also come out with policies that favour small class sizes. The policy in England recommends 30 children per class for children that are from four years to seven years. Policies in Scotland also favour small class sizes. In East Asia, numerous countries and cities, including Japan, Korea, Taiwan, and Hong Kong, have implemented policies that support the practice of small class teaching (Blatchford, Bassett, and Brown, 2011).

Quality education is one of the top priorities of every nation. The factors that are responsible for low standard of education are many. One of the factors at play is the issue of class size. Class size refers to the average number of students in a school classroom, representing the student enrollment in a specific class. The specific educational policies, educational level, and country context are determinants of the student population within a given classroom (Kedney, 1989).

The existing body of educational research on the relationship between class size and its impact on students' academic performance does not provide a clear consensus. Certain researchers have proposed that altering class size can potentially affect students' academic achievements. Based on the Tennessee Student-Teacher Achievement Ratio (STAR) study conducted by Word et al (1990), there was an observed enhancement in student achievement in grades K-3 when class sizes were reduced. Atta, Jamil, Ayaz, and Shah (2004) found that class sizes below 20 students had a significant positive influence on the academic performance of students in secondary schools. Brushwiler and Blatchford (2011) stated that a decrease in class size led to a half-point rise in students' grade point average, both at the primary and secondary levels. Nevertheless, several other studies have indicated that reducing class size had minimal to insignificant effects on students' academic performance. Corak and Lauzon (2009) examined the performance of Canadian fifteen-year-olds in the Program for International Assessment and found that class size had no consistent impact on student achievement. Similarly, Owoeye and Yara (2011), as well as Wyss, Tai, and Saddler (2007), discovered no statistical differences in student achievement between larger and smaller classes at the secondary level. The existing educational research literature on the influence of class size on students' academic performance lacks a definitive conclusion and is characterized by contradictory findings.

1.2 Statement of the Problem

The education sector in Ghana faces numerous difficulties. Inadequate funding is one of the major challenges. This particular issue makes it extremely challenging for schools to maintain sufficient classroom sizes and appropriate class sizes. Considering the potential influence of these factors on teachers' performance and students' academic achievements, this research aims to investigate the perceived effects of large class size on students' academic performance in the Akwapim South District of the Eastern Region.

In the pursuit of achieving global education quality, several factors have been identified as accountable for the low quality of education. One of the factors is large class size. Large class size in Ghana at the secondary level is a class that contains more than forty (40) students. The recommended student-teacher ratio by Ghana education service is 1:40. Overcrowded classrooms and underutilization of classrooms are prevalent characteristics of public secondary schools in Ghana. The implementation of the school feeding program and free senior high school policy has resulted in a substantial increase in school enrolments. However, the lack of adequate improvement in school infrastructure poses a formidable challenge for school leaders, educators, and students. The class size problem became worse after the implementation of the free senior high school policy in 2017. Student Enrolment figures doubled as a result of the implementation of free senior high school policy. Some schools in the Eastern Region have more than sixty students per class which is far more than the recommended teacher to student ratio of 1:40 by Ghana education service. Inadequate furniture compounded the problem. Owing to shortage of furniture in public senior high schools, many students are forced to stand during

lessons, raising concerns about their ability to learn and participate effectively in such an environment.

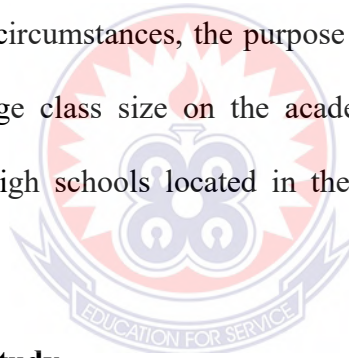
One of the contributing factors to the declining quality of education, particularly at the senior high school level in Ghana, is large class size. Adeyemi (2008) conducted a study examining the impact of class size on educational outcomes, specifically in senior high schools. The researcher discovered that students in classes with fewer than 35 students performed better compared to those in classes with more than 35 students per class. In his 2006 study, Earthman put forward the notion that creating a comfortable temperature in the classroom and having smaller class sizes can improve teachers' effectiveness and offer students the chance to receive individualized attention, engage in active discussions, reduce disciplinary issues, and achieve higher academic performance compared to students in schools with larger class sizes.

According to Oguntoye (2011), there is an inverse relationship between the size of a class and the academic performance of students in examinations. Ayeni (2012) proposes that various factors, such as overcrowded classrooms, inadequate and outdated equipment, demotivated teachers, and the psychological atmosphere in the classroom, can affect the quality of teaching and learning. These collective deficiencies may have an impact on students' academic performance. It is common to find public senior high schools in the Akwapim South district with classrooms accommodating more than 55 students. These statistics contribute to large class sizes and also have an impact on the psychological environment within the classroom. During the June 2022 annual meeting of the Conference of Heads of Assisted Secondary Schools (CHASS) held at the University of Ghana, organizers expressed

their concerns regarding the increasing student population, which exceeds the available facilities

The issue of large class sizes poses a challenge for both developed and developing countries, and there have been ongoing debate regarding the impact of class size on students' academic performance. Keil and Partell (2009) conducted a study examining this relationship and found that larger class sizes had a detrimental effect on students' academic performance. In contrast, Eke's study (1991) indicated that class size does not have an influence on students' academic performance. Therefore, the perceived effects of large class size on students' academic performance remains unresolved and requires further empirical investigation.

In light of these circumstances, the purpose of this study is to investigate the perceived effects of large class size on the academic performance of students in selected public senior high schools located in the Akwapim South District of the Eastern Region.



1.3 Purpose of the Study

The purpose of this study was to examine the perceived effects of large class size on students' academic performance in selected public senior high schools in Akwapim South District in Eastern Region.

The study aims to accomplish the following objectives:

1. Examine the perceived effects of large class size on students' academic performance.
2. Examine the perceived effects of psychological classroom environment on the process of teaching and learning.

3. Examine the perceived effects of psychological classroom environment on students' academic performance.
4. Determine strategies for effectively managing the challenges posed by large class sizes to improve academic performance in public senior high schools within the Akwapim South District.

1.4 Research Questions

The following research questions will guide the study:

1. How do students in public senior high schools in Akwapim South District perceive the impact of large class size on their academic performance?
2. What are the perceived effects of psychological classroom environment on teaching and learning in public senior high schools in Akwapim South District?
3. What are the perceived effects of psychological classroom environment on students' academic performance in public senior high schools in Akwapim South District?
4. How can large class size be handled to improve students' academic performance in public senior high schools in Akwapim South District?

1.5 Research Hypothesis

A research hypothesis is an assumption made by a researcher about a relationship between two or more variables that explain a phenomena. It is a tentative explanation for an observed phenomenon that can be tested through research. The purpose of a research hypothesis is to guide the direction of the study and provide a basis for collecting and analysing data to determine whether the hypothesis is supported or not. The following hypotheses were formulated to achieve the objectives the study.

- Ho1: There is no statistically significant relationship between class size and psychological classroom environment.
- H1: There is statistically significant relationship between class size and psychological classroom environment
- Ho2: There is no statistically significant relationship between large class size and students' academic performance
- H2: There is statistically significant relationship between large class size and students' academic performance
- Ho3: There is no statistically significant relationship between large class size and classroom interaction.
- H3: There is statistically significant relationship between large class size and classroom interaction.

1.6 Significance of the Study

First, gaining a comprehensive understanding of how large class size influence students' academic performance can provide valuable insights for shaping educational policies. Stakeholders in the education sector such as the district assembly, the district education oversight committee, parents association, etc can use the findings of this study in implementing strategies to handle large class issues and create conducive learning environment for learners at the senior high school level.

Also, the findings of the study can influence resource allocation decisions in public senior high schools. If large class sizes are found to have negative effects, it may justify the allocation of additional resources, such bringing more teachers on board, reducing large class sizes etc., to enhance teaching and learning.

Finally, Researchers with an interest in studying the relationship between class size and academic performance will find this study valuable and insightful. Additionally, this study will contribute to the existing knowledge on the influence of class size on students' academic performance, while also providing potential avenues for further research on class size specifically at the secondary level in Ghana.

1.7 Limitation

During the study, the researcher faced several challenges, including inadequate funding and time constraints. Some respondents were hesitant to share relevant information, despite reassurances that the study would only be used for academic purposes. The allocated time frame for the study posed difficulties, as it needed to be completed within a specific deadline. The researcher bore all the costs associated with the study. However, the researcher effectively strategized to mitigate potential risks and conducted a credible research work.

1.8 Delimitation

There is no research without limitations. It is important to acknowledge that every researcher has its limitations. In this regard, it is important to highlight that the focus of this study was specifically on examining the impact of both large class size and the psychological classroom environment on students' academic performance within a chosen group of public senior high schools located in the Akwapim South District of the Eastern Region.

The study employed a cross-sectional survey design and did not encompass the entire population of public senior high schools in the Eastern Region. Instead, the research concentrated on four specific public senior high schools situated within the Akwapim South District of the Eastern Region. Moreover, the study did not account

for factors such as the ethnic, cultural, and socio-economic backgrounds of the respondents.

The region has thirty-three districts. One district was selected. It will be difficult to generalize the findings of this study beyond the district that the study was conducted. It was clear that the sample size was not a true representation of the population of senior high schools in Eastern Region but it can be assumed that the schools that were selected face similar challenges and barriers with the rest.

1.9 Definition of Key Concepts

Large class size: a class that contains more than 40 students. The recommended student to teacher ratio is 40:1. So any figure above 40 is considered large.

Academic performance: this refers to the students' achievement, scores, within the class and his position relative to all his peers.

Psychological classroom environment: refers to the overall atmosphere, social dynamics, and psychological factors present within the classroom that can impact students' emotional well-being, motivation, engagement and learning outcomes.

Teacher support: this refers to the assistance, guidance and encouragement provided by teachers to students in their academic, social and emotional development

1.10 Organisation of the Study

The study was structured into five chapters. The first chapter encompassed the background of the study, the statement of the problem, the study's purpose, specific objectives, research questions, research hypothesis, and the significance of the study. This chapter also addressed the study's delimitations, limitations, defined key concepts, and outlined the organization of the study.

In the second chapter, the study's aims and objectives were expounded upon. The research questions were discussed in the context of the broader historical context of class size. Additionally, the chapter presented the theoretical and conceptual framework of the study. A comprehensive literature review was conducted, encompassing an empirical examination of class size and academic performance, as well as a thorough analysis of other relevant literature pertaining to the study. This chapter was dedicated to reviewing the existing literature.

The third chapter of the study is dedicated to the methodology. It includes discussions on the research design, paradigm, population and sample, sampling technique, research instruments, data analysis, and ethical considerations. The ontological and epistemological foundations of the study are also addressed in this chapter.

Chapter four of the study is focused on presenting and discussing the results. This chapter analyses the background characteristics of the participants and examines the research questions and hypotheses. Chapter five provides a summary of the study, conclusions drawn from the findings, and recommendations for further action and future research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

In this chapter, a comprehensive examination of pertinent literature was conducted, zeroing in on the relationship between large class and students' academic performance across various educational levels. The review was done thematically. Both primary and secondary sources were consulted. The literature review was done under the following headings:

1. Theoretical framework;
2. Conceptual framework;
3. Historical Information on class size
4. Class size and academic performance in elementary education
5. Class size and academic performance at the primary level
6. Class size and academic performance at the secondary level
7. Class size debate at the tertiary level
8. Psychological classroom environment and academic performance

2.1 Theoretical Framework

Theoretical review deals with the theories that underpin a study. In this section, a careful examination and evaluation of existing literature, theories, models, or frameworks within the specific subject area was carried out. Theoretical review helps to put research questions in proper perspective, find expert views on the issues under study, identify gaps in terms content and method and aid in formulating hypotheses and conceptual frameworks. Theoretical frameworks help researchers to formulate hypotheses and research questions based on established knowledge and theories.

Social constructivism theory by Lev Vygotsky (1978) is one of the theoretical frameworks for this study. In his work, Vygotsky (1978) highlighted the importance of cultural environment and social interaction in the cognitive development and learning process. According to Vygotsky, “learning is a social activity that takes place through collaborative interactions with others and is influenced by cultural and historical factors.” He proposed that socialization precedes development, suggesting that mental functions are shaped by relationships and social structures. He placed significant emphasis on the significance of social interaction in the process of learning. He held the belief that learning is fundamentally a social endeavor, whereby individuals acquire knowledge and skills through their interactions with others. Collaborative activities, discussions and cooperative learning are seen as effective means of promoting leaning and cognitive development (Fogarty 2003).

Social constructivism theory by Vygotsky (1978) is based on three major themes. They are the area of proximal growth, social interaction and scaffolding and cultural tools and the more experienced person. The zone of proximal development represents the potential for cognitive development and throws light on the significance of social interaction in learning. It refers to the range of activities that students find it difficult to do alone but can be done with the assistance of someone who is more knowledgeable such as a parent, peer, or teacher. The Zone of Proximal Development is essential in education as it promotes social interaction, cognitive development, and considers the cultural context of learning. Recognizing and utilizing the ZPD can lead to more effective and inclusive teaching practices, assisting to achieve their objectives (Huitt 2000). Social interaction plays a crucial role in the advancement of cognitive development. He believed that learning is facilitated through interactions with others, who give assistance in the form of scaffolding.

Scaffolding entails breaking down complex tasks in manageable ones and gradually reducing help as the student becomes capable and competent to perform the task independently. Social interaction improves social skills, cognitive development, cultural learning, while also contributing to personal development. It provides individuals with opportunities for self-reflection and self-expression, getting constructive feedback from others can help to overcome our weaknesses and improve upon our strengths.

The term "more knowledgeable other" pertains to individuals who possess a greater level of expertise or skill compared to the student in a particular activity. This role is commonly associated with teachers or older adults, although it can also include peers, younger individuals, or even technological devices such as computers. Children at the early stages develop these tools primarily as social communication to express what they need. He suggested that through social interactions and cultural tools, individuals internalize external knowledge and transform it into their own mental structures. This internalization process leads to individual learning, development, and the acquisition of higher-order cognitive functions.

In conclusion, the theory seems to be the suitable theoretical framework for delivering on the influence of large class size on academic performance in public senior high schools in Akwapim South. The application of the zone of proximal development can be useful to the study. The theory focuses on social interaction with a person who is more knowledgeable to facilitate classroom development. To assist learners in large class sizes to accomplish their goals will require a more knowledgeable person to assist them complete their tasks successfully.

According to Beers (2003), learners within the zone of proximal development require interactive teaching methods. Explanations and demonstrations are some the methods

teachers should use in the classroom to assist learners to understand the lesson. Modeling the desired tasks by teachers can improve the academic performance of learners.

Language and shared experiences play an important role in effectively implementing scaffolding as a way to facilitate learning. Through practice and inference-making, learners can identify when and what inferences are required. To assist students in the Zone of Proximal Development, teachers can make available copies of short stories with specific sentences underlined. The highlighted sentences act as signals for students to identify when they should make inferences. Consequently, students can gain, cultivate, and proficiently utilize advanced reading abilities. This is according to Daniels (2001). Scaffolding assists in simplifying the learner's role.

2.1.1 Implications of social constructivism on teaching methods

Teaching methods refer to approaches that educators use to facilitate learning and instruction in the classroom. A teaching method consists of principles used by teachers to facilitate student understanding (Omwirhiren 2015). According to Dorgu (2015), a teaching method is defined as the strategy employed by a teacher to deliver subject matter to students, aligning with predetermined instructional objectives in order to facilitate student learning. Westwood (2008) states that teaching method encompasses the principles and techniques utilized by teachers to promote student learning. The above definition highlights that teaching involves the application of principles and methods aimed at maximizing student learning. These principles and methods are based on learning theories such as social constructivism. Social constructivism asserts that knowledge is derived from social interactions and is not an individual's sole possession, but rather a shared experience.

Discussion and group work are the two major social constructivism teaching strategies. Omwirhien (2015) defines discussion method as an instructional technique uses guided interaction to explore and analyze various topics and issues. Through open and collaborative conversations, students share their experiences. The discussion method promotes active learning, enhances communication skills, and fosters a profound comprehension of the content by motivating students to share insights, and tolerate each other (Jegade 2010).

In the discussion method, the teacher assumes the role of a facilitator, motivating students to inquire, seek clarity, and actively pursue knowledge, fostering curiosity. The teacher facilitates informed discussions where students explore and uncover information on their own. This teaching method helps students to exchange of ideas among themselves and with their teachers on a selected topic and can be conducted through small group discussion. The discussion process is guided by the teacher. He makes sure that students get the chance to express their views by controlling the process. The discussion approach promotes students' interest as well as participating and paying attention in class. It leads to collaborative thinking as students engage in constructive challenges to reach a consensus. Through this process, they develop reflective thinking skills, helping deep analysis and understanding of various issues. Moreover, it enhances communication skills and tolerance. Learners learn to respect and accept opinions that are different from theirs.

Debates, role-playing, brain-storming, and other socially interactive forms of learning are some of ways the discussion method can be done by teachers and students. In addition the discussion method promotes research, and the development of speaking and listening abilities, assisting students to evaluate others' views. Group work involves small groups collaborating to achieve learning outcomes, with students

taking on various roles and reflecting on their learning process. This approach empowers students to identify their existing knowledge, areas for improvement, and how to access new information to handle challenges efficiently and effectively. In conclusion, under the discussion method, the teacher guides, supports and monitors the learning process. The idea is to encourage learners to share ideas and build confidence in addressing challenges that come their way.

According to Bell (2010), project based learning is an educational approach that highlights learning through completion of tasks or activities. The method is student centered. Students address challenges through actively investigating and solving complex problems. The teacher acts like a facilitator and allows the students to collaborate in groups. Students have the chance to conduct research, and integrate knowledge from different fields to create a final project. Project based learning is a comprehensive approach that aims to involve students in investigating authentic problems during classroom teaching and learning (Guzdial 2011).

Jigsaw is also one of the methods of group teaching. Jigsaw a cooperative learning strategy adopted in classrooms to enhance collaboration among learners. It was developed by Elliot Aronson in the early 1970s. The name "jigsaw" comes from the analogy of assembling pieces of a jigsaw puzzle. The method breaks down complex task into manageable ones. A student is then assigned one of the pieces to become an expert on that particular aspect. After a student is conversant with his or her assigned piece, the students form a new group called jigsaw groups where each member represents a different area of expertise (Aronson 1970). The jigsaw process involves expert groups, jigsaw groups, teaching and learning and discussion and integration. Jigsaw promotes communication skills and encourages cooperation and

participation. This strategy is widely adopted to ensure that all learners are involved in the lesson.

According to Ike (2016), the effectiveness of the jigsaw teaching method lies in the interdependence of students' success, where each individual's achievement contributes to the overall success of the group. This pushes the group to work together as a team. In the jigsaw classroom, a teacher with 35 students divides them into 7 home groups, each containing 5 students. Within these home groups, students are numbered from 1 to 5. The 1s, 2s, 3s, 4s, and 5s from each home group then form expert groups. The teacher assigns one aspect of a learning task, such as a lesson on farming, to each expert group. Students discuss and take notes on their assigned aspect within a limited time frame. The teacher monitors and directs the activities in each expert group while they work on their respective topics. After the time has elapsed, each student goes back to his home group to present as experts what they studied. This ensures that every student participates.

2.1.1.1 The teacher's role in the social constructivist classroom

The teacher acts as a facilitator, guide and co-learner in a constructivist classroom. The teacher is to create a supportive learning environment to promote meaningful interactions and activities that promote the construction of knowledge. Here are some key aspects of the teacher's role in social constructivism

1. **Facilitator of Learning:** The teacher acts as a facilitator who assists and guides students in their learning journey. The teacher's role is to guide learners towards becoming independent. Through this, learners become lifelong learners. The role of a teacher as a facilitator of learning involves creating an engaging and supportive learning environment, guiding students in their learning process, fostering critical thinking and self-directed learning, and

adapting teaching strategies to meet the diverse needs of students. This approach empowers students to become active participants in their own education and prepares them for a lifetime of learning.

2. The teacher creates opportunities for collaboration. Learners are encouraged to ask questions, make connections, and investigate topics independently or in groups. When students collaborate they achieve far reaching results compared to working alone. By creating these opportunities for collaboration, teachers not only enhance students' academic learning but also develop essential life skills such as teamwork, communication, and conflict resolution. Collaboration prepares students for success in the workplace and helps them become more engaged and active learners.
3. Scaffolding Support: The teacher supports learners in their journey to acquire skills and knowledge. He gives assistance, guidance, and resources as students engage in challenging tasks. Assistance is gradually withdrawn as learners become competent to perform the tasks on their own. Scaffolding is vital for supporting learners in their educational journey. It promotes the development of essential skills, fosters independence, and ensures that learners can effectively bridge the gap between what they already know and what they are striving to learn. Ultimately, scaffolding empowers learners to become self-regulated, confident, and capable learners.
4. Organizer of Collaborative Activities: the teacher places emphasis on social interaction to help deliver the learning outcomes. He makes sure students work in groups to solve challenges. A conducive environment is created to motivate learners to actively take part in lessons.

5. **Resource Provider:** The teacher serves as a resource provider, offering a variety of materials, tools, and information sources to support student learning. Teachers select and organize relevant resources, including books and online platforms, to align with the learning objectives and cater to the diverse needs of students.
6. **Promoter of Reflection and Metacognition:** The teacher encourages students to reflect on their learning processes, think critically, and engage in metacognitive activities. The teacher creates opportunities for students to set goals.
7. **Mediator of Learning:** The teacher acts as a mediator between students and knowledge, helping students make connections between prior knowledge and new information. In essence, the teacher as a mediator of learning serves as a guide and facilitator who actively supports students in their learning journey. This role acknowledges that learning is a dynamic and interactive process, and the teacher's guidance is instrumental in helping students construct knowledge, develop critical thinking skills, and become independent and lifelong learners.
8. **Culturally Responsive Practitioner:** the cultural background of every learner is taken into consideration. Teachers give diverse examples during lessons to cover the cultural context of students. The teacher creates a safe and inclusive environment for every learner. Culturally responsive practitioners play a critical role in creating inclusive and effective learning and professional environments. Their commitment to recognizing and embracing cultural diversity not only enhances the educational or professional experience but also contributes to broader social understanding and equity.

9. Continuous Learner: teachers help learners to explore more. They only facilitate the learning process. They stay updated with current research, pedagogical approaches, and educational technologies. The teacher reflects on their teaching practices, seeks feedback from students, and adapts their strategies to meet the evolving needs of students.

2.1.1.2 The implications of social constructivism on student's learning are that:

Constructivism has several implications for students' learning experiences, as it pays attention to meaning-making, and the construction of knowledge. Here are some key implications of constructivism on students' learning:

1. Active Engagement: Constructivism promotes active engagement in the learning process. Students are encouraged to construct their own knowledge through hands-on activities, exploration, and problem-solving. Learners are not passive recipients of information. Teachers encourage students to be active participants.
2. Meaningful Learning: Constructivism highlights the importance of meaningful learning. Students are encouraged to connect new information and experiences to their existing knowledge and personal experiences. Students are motivated to make sense of concepts and ideas in ways that are personally relevant and meaningful to them.
3. Knowledge Construction: students constructing their own knowledge is the main focus of constructivism. Students are seen as active sense-makers. Teachers believe students can build their own understanding through their interactions with the environment, social interactions, and personal reflection. Teachers encourage students to engage in inquiry, critical thinking, and problem-solving to construct knowledge.

4. **Social Interaction and Collaboration:** Students are prompted to exchange ideas with their classmates or engage in collaborative idea-sharing. Through sharing of ideas, co-construct knowledge. Collaborative activities foster teamwork, and the ability to consider varied opinions.
5. **Personalized Learning:** Students are encouraged to explore topics and pursue their own interests within the framework of the curriculum. Personalized learning helps to maximize the potential for academic achievement. It prepares students for challenges and opportunities ahead.
6. **Metacognitive Skills:** Constructivism leads to the development of metacognitive skills, which involve self-regulation, reflection, and awareness of one's own thinking processes. Teachers encourage students monitor their learning progress. They develop a deeper understanding of their own learning strengths and weaknesses.
7. **Authentic Assessment:** Constructivism calls for the use of authentic assessment methods that align with real-world contexts and tasks. It gives students the opportunity to demonstrate their learning in meaningful and relevant ways.

2.1.1.3 Importance of social constructivism in the teaching/learning process

Social constructivism is important in the teaching and learning process because it provides a framework that emphasizes active engagement, collaboration, and the construction of knowledge. Here are some key importance of social constructivism in the teaching and learning process:

1. **Meaningful Learning:** students are encouraged to use their own initiatives. Hands-on activities, problem-solving tasks, help student to understand and retain knowledge.

2. **Active Engagement:** Social constructivism encourages active participation in the learning process. It changes the role of students from passive recipients of information to active participants. They are able to build on their own understanding.
3. **Collaborative Learning:** the theory emphasizes the importance of social interaction in teaching and learning. It recognizes that learning is a social activity, and students learn from each through exchange of ideas.
4. **Knowledge Construction:** the concentration of social constructivism is on making sure that students are able to construct their own knowledge. Teachers create the environment for students to share ideas through that they are able to construct their own knowledge. Knowledge construction promotes understanding.
5. **Social constructivism facilitates the cultivation of advanced cognitive abilities.** Students are challenged by teachers to analyze information, and apply their knowledge in solving challenges. They develop the ability to
6. It can be challenging for a teacher to have a class comprising students from homogeneous backgrounds. However, social constructivism promotes the integration of diverse cultural perspectives. This helps to validate students' identities. This will create an environment where students will feel free to share and learn from their colleagues.
7. **Active Role of the Teacher:** the teacher becomes a facilitator in the instance. The teacher creates the environment for all learners to learn. He does not transmit knowledge, he facilitates learning in this scenario.

8. Social constructivism promotes transfer of skills and knowledge. The skills that students acquire will help them become lifelong learners.

Conclusion

Social constructivism is centered on the recognition that learning is a dynamic and social process, wherein individuals construct knowledge through interaction, collaboration, and reflection. It highlights the significance of social contexts, meaningful experiences, and the active involvement of learners in constructing their own understanding of the world.

Thorndike theory of connectivism

Connectivism is based on the premise that knowledge is distributed across networks of connections and that learning is the process of making new connections and building upon existing ones. According to George Siemens, one of the key proponents of Connectivism, “learning is a process of connecting specialized nodes or information sources” (Siemens, 2005). These nodes can be people, resources, or technologies, and they are linked together through the learner's own personal learning network. It also draws on a number of other theoretical perspectives, including constructivism, social constructivism, and chaos theory. Like constructivism, Connectivism recognizes the active role that learners play in the construction of knowledge. However, it also recognizes the importance of the broader social and technological networks that support learning.

Similarly, like social constructivism, Connectivism emphasizes the importance of social interaction in learning. However, it extends this perspective to include online communities and social networks. Finally, like chaos theory, Connectivism acknowledges the complexity and unpredictability of learning in the digital age.

Key features of connectivism

Personal Learning Networks (PLNs): In connectivism, learners are encouraged to create and nurture their own Personal Learning Networks. These networks consist of a diverse set of connections, including peers, experts, online communities, websites, social media, and various learning resources. The idea is that by tapping into these networks, learners can access a wide range of perspectives and information, facilitating more comprehensive learning.

Collaborative Learning: Connectivism promotes collaborative learning, where individuals actively engage with others in their networks. Collaborative activities, such as online discussions, group projects, and knowledge sharing, allow learners to benefit from the collective knowledge and experiences of their network.

Autonomy: Connectivism places a strong emphasis on learner autonomy. Learners are encouraged to take ownership of their learning journey. They set their own learning objectives, choose the resources and tools that best suit their needs, and design their own learning paths.

Metacognition: Self-directed learning also involves metacognition, where learners reflect on their learning process. They assess their progress, identify gaps in their knowledge, and adapt their strategies accordingly. This reflective practice is essential for becoming effective self-directed learner.

Adaptability: Connectivism acknowledges that the rapid pace of change in the digital age requires individuals to be lifelong learners. Learners must continually adapt to new information, technologies, and evolving circumstances. The skills of critical thinking, problem-solving, and information evaluation are considered crucial in this context.

Continuous Learning: Lifelong learning isn't limited to formal education. It extends beyond the classroom and encompasses informal and experiential learning. Connectivism encourages individuals to view learning as an ongoing, integrated part of their lives.

Information Literacy: In the digital era, it's essential for learners to develop strong information literacy skills. This includes the ability to evaluate the credibility and relevance of online sources, discern between reliable and unreliable information, and avoid plagiarism.

Media Literacy: Connectivism also underscores the importance of media literacy. Learners need to be discerning consumers and creators of digital content. They should understand the nuances of different media formats and be able to communicate effectively through various digital channels.

Critical Thinking and Problem-Solving: Connectivism encourages the development of critical thinking skills. Learners are urged to question assumptions, challenge existing knowledge, and engage in constructive debates within their networks. This critical approach to learning helps individuals develop a deeper understanding of complex topics.

Flexible Learning Environments: To support the principles of connectivism, educational institutions and platforms need to provide flexible learning environments. These environments should facilitate networked, self-directed, and lifelong learning. This might involve the use of online courses, digital libraries, social learning platforms, and collaborative tools.

Implications for education

Facilitating Personal Learning Networks (PLNs): Educators should recognize the importance of helping learners build and expand their personal learning networks. This involves teaching students how to connect with relevant peers, experts, and resources both inside and outside of traditional educational settings. They should also encourage the use of digital tools and platforms for networking can be beneficial. This might include guiding students on how to effectively use social media, online forums, and collaboration tools to create and maintain their PLNs.

Promoting Self-Directed Learning: To foster self-directed learning, educators should provide learners with opportunities to develop essential skills such as goal-setting, planning, and reflection. Digital tools and resources can play a vital role in supporting self-directed learning. These tools can include learning management systems, e-portfolios, and adaptive learning platforms, which empower learners to tailor their educational experiences to their specific needs and interests.

Lifelong Learning Support: Connectivism underscores the necessity of ongoing learning throughout one's life. This requires educators to move beyond traditional classroom roles and become lifelong learning facilitators. Providing ongoing support and mentoring, especially in the form of career guidance and skills development, can be a valuable service offered by educational institutions. Additionally, educators can help learners to access continuing education opportunities and professional development resources.

Openness and Sharing: Openness and sharing are core principles of connectivism. Educators should encourage learners to not only consume knowledge but also contribute to it. This can involve the use of open educational resources (OERs), where educational materials are freely available and can be adapted or

shared. Promoting a culture of knowledge sharing benefits both individual learners and the wider learning community. Developing online communities and social networks around specific topics or disciplines can create environments where learners actively engage in knowledge sharing and collaborative learning.

Assessment and Evaluation: Traditional assessment methods may need to be rethought in a connectivist educational context. Educators should consider assessing not only what learners know but also their ability to navigate and contribute to networks effectively. Assessment may involve evaluating students' ability to curate and share relevant resources, engage in meaningful online discussions, and apply knowledge within networked contexts.

Digital Literacy and Online Safety: Given the digital nature of connectivism, educators must also prioritize teaching digital literacy skills, including online safety, information evaluation, and digital citizenship. Learners need guidance on how to discern reliable sources from misinformation and how to protect their privacy and digital identities in online environments.

Conclusion

The connectivist approach to learning represents a significant shift from traditional models of education. By emphasizing the importance of networked learning, knowledge creation, autonomy and self-directed learning and diversity and openness, the connectivist approach presents a powerful alternative to traditional educational approaches.

The pedagogy of Connectivism is a new approach to teaching and learning that emphasizes the importance of networks, connections, and the integration of new information and ideas into existing knowledge structures. It is based on the theoretical foundations of Connectivism, which draw on a number of other perspectives,

including constructivism, social constructivism and chaos theory. The findings reveal that Connectivism offers a new paradigm for learning that is based on the premise that knowledge is distributed across networks of people, technologies and organizations.

In summary, the research studies related to Connectivist learning approach highlight its potential as a new and innovative approach to learning that leverages the power of networks and technology. While there are still challenges and issues to be addressed, the evidence suggests that Connectivist learning has the potential to transform the way that we think about education and learning in the digital age.

Bronfenbrenner's Ecological System Theory.

This research is guided by Bronfenbrenner's 1979 theory, which asserts that children's development is shaped by an intricate network of relationships influenced by various environmental factors across different levels. According to Bronfenbrenner (1998), child development progresses through increasingly complex interactions between children and various layers of the exosystem, which encompasses immediate surroundings like the family, peer groups, the child's unique traits, and the broader community. Essentially, the child's development and education are significantly impacted by what occurs within their settings, including family life, interactions with peers, participation in service institutions, and engagement with the larger community (Bronfenbrenner, 2005).

Bronfenbrenner's theory delineates four fundamental levels, all of which can have a direct or indirect influence on an individual child's development. These ecosystem layers consist of the microsystem, mesosystem, exosystem, macrosystem, and the chronosystem, and their impact on a child's development varies based on the nature of that influence. In essence, this theory was formulated to provide insight into how children navigate their development within a broader societal context (Goldfield,

2014) through these five systemic layers. Below is a brief explanation of these layers and how they can affect the development of early childhood development (ECD) children, regardless of the presence of policies and regulations.

Microsystem is the innermost level, the closest to the child. It encompasses individuals and factors within the child's immediate environment, such as parents, playmates, parenting style, socio-economic status, and primary caregivers, who in this case are the early childhood development (ECD) practitioners responsible for caring for the children in ECD centers (ECDCs). Therefore, the interactions among the child, siblings, parents, and ECDC caregivers have a significant impact on the child's development. In this context, the ECDC serves as a microsystem for the child due to its physical environment. It is where the child initially learns about the world (Sotuku, Okeke, and Mathwasa, 2016).

At this level, relationships can influence the child in two significant ways. The quality of the relationships during this critical period is of utmost importance (Christensen, 2010; Mlalazi, 2015). Consequently, parental involvement in the ECDC is deemed crucial for the child's development because it contributes to the child's overall well-being and healthy development.

The mesosystem is a unique layer in that it involves systems that interact with individuals within the microsystem (Clamptett, 2016). This includes entities like ECD centers in communities and schools, playmate settings, and the interplay between family experiences and experiences at the ECD center. For example, what occurs in the microsystem, such as a child's living conditions at home, has an impact on what unfolds at the ECD center, and vice versa. This relationship plays a crucial role in helping the child feel secure by bridging the gap between the home and school environments, thereby enabling children to feel safe and motivated to achieve

(Shumba, Rembe, and Goje, 2014). Consequently, interactions between parents and teachers contribute to shaping the mesosystem. Such interactions should aim to promote the development of ECD learners, ensuring that guidance continues both at home and at the educational institution.

The exosystem, as described by Bronfenbrenner and further elaborated by Volger, Crivello, and Martin (2008), consists of layers that may not directly interact with the child but still have an impact on the child's development. Examples of entities within this system include parents' workplaces, family friends, policies from government departments like the Department of Social Welfare, the Department of Health, and the Department of Education, and in the current context, research institutions. Although the ECD child may not have direct dealings with these departments, their involvement can significantly influence children's development (Chinhara, 2015).

For instance, parents may be unable to adequately care for their children due to long or late working hours (Berk, 2000). The provision of social welfare services such as supplementary food and child protection regulations can also have a profound impact on a young child's development because the absence or limitations of these services can affect the child negatively (Chinhara, 2016). Therefore, it is crucial for ECD centers to consider external factors that may have adverse effects on the child and, when necessary, take steps to address them through advocacy and parental education regarding their impact on ECD child development.

The chronosystem, which is the fifth ecological level emphasized by Bronfenbrenner, plays a unique role. It encompasses the idea that each level within the ecological system influences the one before and after it in a continuous, back-and-forth motion. Additionally, it takes into account the historical context in which a child

is raised. For example, factors such as hunger and poverty can have a significant impact on the developmental trajectory of children attending ECD centers in rural and township areas.

Conclusion

Considering the examination of the theories mentioned earlier, it's essential to acknowledge that all these theories are relevant to and offer insights into the impact of large class sizes on students' academic performance. For instance, Thorndike's theory of connectivism relates to this study by focusing on teachers' interpersonal relationships with students, student assessment, and student autonomy. Social constructivism relates to how students actively construct their own knowledge. Bronfenbrenner's ecological systems theory also connects with this study, particularly concerning teachers' interactions with students.

The explanations in the previous paragraph highlight the challenge inherent in adopting and exclusively emphasizing one theory when attempting to comprehend the effects of large class sizes on students' academic performance. Therefore, no single comprehensive and dominant theory can entirely elucidate this issue. Relying solely on one theory is insufficient for gaining a full understanding of how large class size impacts students' academic performance.

2.2 Conceptual Framework

A conceptual framework is a visual or written representation of a set of concepts and their relationships that provides a theoretical basis for understanding a phenomenon. It is used in various fields, such as education, business, to guide researchers through their studies. A conceptual framework demonstrates the connections between variables and concepts within a study, as stated by Kuranchie

(2016). Its purpose is to offer a structured and systematic comprehension of how large class size impacts students' academic performance, as well as guide the formulation of research questions and hypotheses. Conceptual frameworks often contribute to the advancement of new theories or the refinement of existing ones. Conceptual frameworks can be presented either in illustrative or narrative form (Miles & Huberman 1994). The conceptual framework of a study should incorporate the essential factors, variables, or specific topic under investigation. In this particular study, the conceptual framework was presented in an illustrative form. The objective of this research is to provide predictions regarding the variables that exhibit relationships between large class size and students' academic performance. This is depicted in Figure 1 below

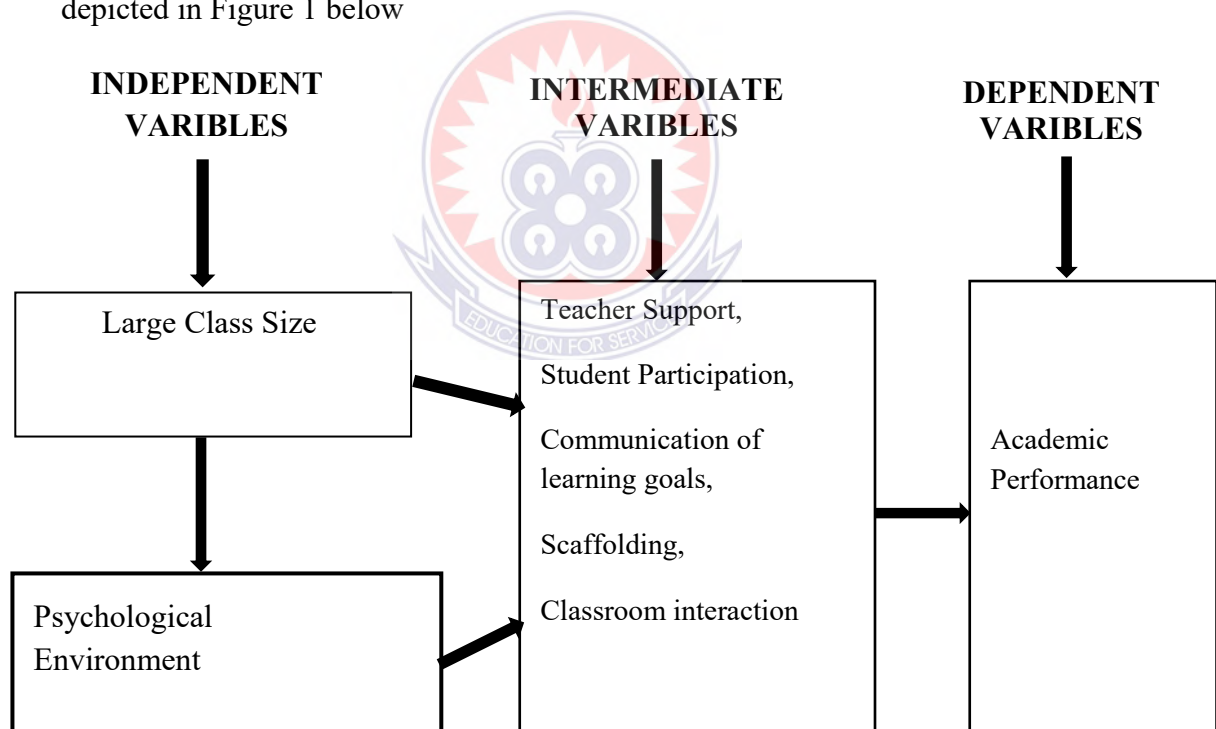


Figure 1: Conceptual Framework Source: Author's Construct, (2023)

The independent variables are large class size and psychological classroom environment. Teacher support, student participation, communication of learning goals, scaffolding and student interaction are the intermediate variables. Academic

performance is the dependent variable in this study. Large class size has a direct impact on academic performance. Likewise, class size directly influences the psychological classroom environment, which in turn affects students' academic performance. Components of the psychological classroom environment include teacher support, student participation rate, and communication of learning goals, classroom management, student-teacher relationship, and emotional climate. However, in large classes, the rate of teacher support tends to be low due to various factors. Some of the factors are limited time, classroom management, high teacher-student ratio, increased workload, student diversity, student engagement, lack of resources and teacher burnout. If the teacher-student ratio is high, it will be very difficult for teachers to attend to students individually. Large class sizes have students with varying learning needs and abilities. The teacher may encounter challenges in addressing the individual needs of each student due to the large class size. Again, one of the major reasons teacher support is low in large classes is lack of resources. Textbooks, learning materials, and technology may not be enough to assist to deliver his or her lesson successfully.

Student participation is very crucial if a teacher wants to achieve the objectives of his or lesson. Student participation in large class size is often low. Engaging students in classes with high student- teacher ratio may be challenging. Addressing individual gaps becomes a challenge for teachers handling large class sizes. Classroom management also requires significant effort to maintain order. Classroom management can leave less time for one-on-one support.

In a class with a substantial number of students, such as 58, it becomes difficult for all students to actively participate in class activities due to the limited time allocated for each lesson. But if the number is let us say 30, majority will

participate in class. Some students may feel less motivated or engaged due to the limited interaction and attention they receive from the teacher. This decreased engagement can lead affect their academic performance.

Clearly communicating learning goals to students aids in their comprehension of what is expected of them in terms of learning and achievement. It provides them with a clear direction and purpose for their learning. When students have a clear understanding of the goals, they can focus their efforts and make better decisions about how to prioritize their time and resources. When students know what they are working towards, it can enhance their motivation and engagement. Learning goals provide a sense of purpose and give students something to strive for. They can see the relevance and value of what they are learning, which can increase their motivation to actively participate and invest in their learning. Learning goals also serve as a guide for teachers in planning and designing instruction. They help teachers identify the specific knowledge, skills, and competencies that students should acquire.

Scaffolding is a teaching strategy that offers temporary support to learners during the development of new skills or knowledge. Tasks are broken down into smaller, more manageable steps and providing assistance that gradually decreases as learners gain independence. Scaffolding holds significance for various reasons.

Scaffolding helps learners by providing the necessary support to understand and complete tasks that would otherwise be too challenging for them. It bridges the gap between what learners can do independently and what they can achieve with assistance. This support enables learners to engage in higher-order thinking, problem-solving, and skill development. In a large class, the teacher may find it challenging to provide scaffolding due to the high number of students in the classroom. However, in a smaller classroom setting, the teacher is able to offer individualized support to

students until they can independently grasp and perform a concept, which ultimately contributes to better academic performance. Furthermore, classroom interaction plays a significant role in both academic performance and the psychological environment. Smaller class sizes facilitate positive interactions within the classroom, leading to improved academic performance. Classroom interaction is essential for promoting active learning, social and emotional development, creating an engaging learning environment, clarifying understanding, supporting language development, differentiating instruction, and fostering a cohesive learning community. It enhances students' learning experiences and contributes to their overall growth and academic success.

2.3 Historical Information on Class Size

In the early 20th century, class sizes varied significantly depending on the region, educational system, and socioeconomic factors. In some urban areas, class sizes were relatively large due to population growth and limited resources. However, in rural areas or smaller communities, class sizes tended to be smaller. During this time period, there was a growing recognition of the impact of class size on educational outcomes. Researchers and educators began studying the relationship between class size and student performance. Some argued that smaller class sizes allowed for more individual attention and better student engagement, leading to improved academic achievement. However, others believed that larger class sizes were more efficient in terms of resource allocation and teacher workload.

A call for schools to improve efficiency and adopt the principles of scientific management led to the initiation of the first studies on class size. Leonard P Ayres conducted one of the pioneering studies on class size. His research was conducted in 1911. Ayres (1911) conducted an analysis that examined the correlation between class

size and student achievement in 35 school systems throughout the United States .Ayres (1911) discovered a positive relationship between small class sizes and student achievement. His research indicated that students in smaller classes received more individual attention from teachers, resulting in improved learning outcomes. Ayre’s (1911) study laid the groundwork for subsequent research on class size and its potential influence on learning outcomes.

Another major study on class size and students’ academic performance was conducted by Spaulding sin 1946. Spaulding was a superintendent of schools in newton, Massachusetts. In his study, Spaulding 1946) emphasized the economic aspect of efficiency and provided examples of efficiency from his jurisdiction in Newton, Massachusetts. By analyzing per-pupil costs and pupil recitation costs, Spaulding presented a method for school districts to potentially reduce educational expenses by increasing class sizes and reducing the number of teachers (Vandenberg, 2012). Spaulding used cost to justify his plan when he was criticized (Vandenberg, 2012). One of the weaknesses of his study was that, he did not specifically address how these cost-cutting measures would impact academic achievement or student outcomes.

William MacAndrew (1926), based in Chicago, expanded on Spaulding's ideas by applying principles of scientific management to establish funding ratios per student. He also conducted his own educational research to gather evidence supporting the notion that increasing class sizes would not negatively impact academic achievement, as documented by Callahan in 1962. In the 1920s, experimental studies examining the influence of class size on students’ academic performance became popular as researchers sought to ascertain whether cost-saving

measures, such as larger class sizes, had any impact on student performance (Biddle & Berliner, 2002; Vandenberg, 2012).

Subsequent to that period, many researches were conducted on class size. The findings were diverse and frequently undermined by the methodologies employed in the research. As a result, the outcomes of these studies were inconclusive and subject to limitations in their research approaches. The increasing adoption of meta-analysis, an advanced research method, empowered educators to draw broader conclusions from research findings and apply them more effectively in shaping educational policies (Biddle, 2002).

Glass and Smith (1979) conducted a study to investigate the influence of class size on student achievement. They synthesized 700 comparisons and represented the relationship between class size and academic performance through a single curve. The researchers employed complex regression analysis in their study. Their findings indicated that as class size increased, academic achievement tended to decrease. After an increase in survey research aiming to determine whether classroom factors could explain variations in academic achievement, Hanushek (1986) argued that prior research advocating for smaller class sizes was flawed and that increased funding for smaller classes would not lead to improved educational achievement. Hanushek (1986) conducted a study to explore the impact of small class sizes on student achievement. He gathered data from 59 studies that examined the relationship between class size and student performance. Interestingly, Hanushek's findings contradicted the results of Glass and Smith (1979). However, subsequent research critiqued Hanushek's approach and identified limitations, leading to studies that supported the idea that reducing the number of students in the learning environment

does indeed have a positive effect on learning (Biddle & Berliner, 2002; Vandenberg, 2012).

Finn, Pannozzo, and Achilles (2003) expressed reservations about Hanushek's analysis of class size reduction programs, contending that the programs he examined were not the authentic implementations of class size reduction. Instead, they were analyzing the student-to-teacher ratio, which did not accurately represent the true learning environment experienced on a daily basis. The initial studies on class size primarily examined the efficiency and effectiveness of the approach, while subsequent research shifted its focus towards investigating the impact of class size on various classroom practices, such as behavior management and instructional activities. Additionally, there has been a significant emphasis on exploring the relationship between class size and academic performance.

2.4 Class Reduction in Elementary Education

A comprehensive analysis was conducted on research studies specifically carried out at the elementary level, with a specific focus on Grades K-3. This particular stage of education has received considerable emphasis when it comes to investigating the effects of class size on student achievement. Some studies have indicated that reducing class size has a positive effect on student achievement. However, other studies have found minimal to no effects, raising doubts about the reliability of studies demonstrating significant improvements.

2.4.1 Tennessee class size reduction

The State of Tennessee Class Size Reduction program was a significant class size educational initiative. The program was implemented in 1984. The objective of the program was to reduce class sizes in order to improve student learning outcomes.

The program targeted early grades. The program also provided opportunities for teacher professional development, with the objective of enhancing instructional practices. A longitudinal approach was used by the researchers. The study included a total of 79 elementary schools from various regions of Tennessee, comprising 330 K–3 classrooms that were divided into three groups. These groups consisted of small classes (13–17 students), regular classes (22–25 students), and regular classes with a teaching aide (22–25 students). To mitigate the influence of school-related factors, a within-school design was utilized, ensuring that both experimental and control groups were present in all schools included in the study. The findings of the study revealed that first-grade students in classes with fewer than 17 students demonstrated an 11-point increase in their percentile rankings for both reading and math, when compared to students in regular-sized classes

Similar improvements were observed in other grade levels, though not as substantial as in first grade. Also, the researchers found that the increase in student achievement was consistent for both novice and experienced teachers (Word et al., 1990).

The research showed that the staff development efforts had limited effects on student achievement in comparison to the impact of class size reduction. Additionally, the study findings revealed that African American students gained more advantages from class size reduction than Caucasian students. As a result of these findings, the Tennessee legislature officially proposed a gradual implementation of class size reduction, starting with kindergarten and first grade, where the benefits were most notable. 15 students was the maximum suggested per class.

2.4.1.1 Studies related to tennessee class size reduction program

Achilles (2012) used project star data to investigate whether black children benefit more from class size. The study indicated that small class sizes had short-term advantages for students' standardized scores and long-term benefits in terms of higher graduation rates and increased college attendance. However, the study also discovered that the benefits of smaller classes were not uniform across all students. The benefits were greater for black children and students from low income families. Kontonpoulous (2008) utilized Project STAR data to investigate whether reducing class sizes could potentially narrow the achievement gap between low-achieving and high-achieving students. The study revealed that while decreasing class size may enhance overall student achievement, it might not effectively diminish the achievement gap within a class.

Sims and Rivkin (2015) conducted a study that examined patterns of variability in the impact of class size on student achievement within the Project STAR classes that demonstrated improvement. The researchers discovered that smaller class sizes had positive effects on student achievement for both students attending schools with higher poverty levels and academically talented students. A study conducted by Krueger and Whitemore 2002 also investigated whether smaller class sizes would close the black-white achievement gap. The study revealed that reducing class size in the early grades, particularly in kindergarten through third grade, resulted in improved student achievement. The analysis showed that students in smaller class sizes tend to have higher test scores while their counterparts in large class size tend to have lower test scores. The researchers further revealed that black students who were placed in smaller class sizes during their early elementary years (k-3), are associated with an increased probability of taking the act and sat college entrance exams. Their average

scores on these exams are approximately 0.5 to 0.20 standard deviations higher compared to their peers who were not in smaller classes during that period.

Jacob and Brian (2016) further used project star data to examine the risks of being in very large classes. The researchers found that approximately 25% of black students are enrolled in classes that contain more than 40 students, which is more than double the rate of Hispanic students and over three times higher the proportion of white students in such large classes. Gilraine (2017) conducted a study to examine the impact of smaller class sizes on student test scores. The findings indicated that smaller class sizes had a positive effect on student test scores. The researcher also noted that reducing the average class size by four students at the grade level resulted in an improvement in math and in English scores. These estimates are similar in magnitude to those observed in randomized experiments like Project STAR. Shin and Raudenbush (2011) conducted a study using data from Project STAR to investigate the effects of smaller class sizes on reading, mathematics and listening. Their objective was to examine whether these effects varied across different schools. The researchers used Rubin's causal model. They discovered that smaller class sizes led to improved academic performance in grades K-3. However, they observed only marginal improvement in second grade. Additionally, Shin and Raudenbush found that the effects were consistent across schools and did not exhibit significant variation.

Likewise, Konstantopoulos and Chung (2009) conducted a study and found that students from various backgrounds saw greater advantages in later grades when they had been placed in smaller classes during their early years. The researchers hypothesized that reducing class size is an attractive intervention because it can be implemented effortlessly without the need for changes in teaching techniques or

instructional practices (Konstantopoulos & Chung, 2009, p. 127). They also noted that extended periods spent in smaller classes resulted in higher academic advancements for all categories of students (Konstantopoulos & Chung, 2009, p. 125).

Chingos (2013) conducted a review of a limited number of experimental and quasi-experimental studies, primarily focused on the elementary level, to provide insights for policy decisions regarding class size changes. The researcher noted that there are few high-quality research studies available, and they do not specify the optimal class sizes for all situations or contexts. Chingos (2013) discussed the results of the only modern randomized experiment on class size, Project STAR in Tennessee, which showed a positive correlation between smaller class sizes and academic achievement, particularly in the first year. However, he also presented some critiques of these findings, citing factors such as teachers being aware of their participation in the experiment. Additionally, Chingos (2013) discussed several quasi-experimental studies and statewide class size reduction policies that yielded mixed outcomes. Overall, he believed that most studies indicated some positive benefits, but the findings were generally inconsistent and relatively small. Consequently, Chingos (2013) argued that the United States had invested excessively in class size reduction and suggested that increasing class sizes might save money without harming students. However, he acknowledged the importance of striking a balance between class size and teacher salary, noting that a substantial body of research supports the notion that teacher quality significantly impacts student achievement in a substantial and sustainable manner.

When Ding and Lehrer (2010) analyzed the data from Project STAR, they also found evidence supporting the positive influence of smaller class sizes on student achievement. Their study took into account student attrition and transitions between

the test and control groups across kindergarten to third grade. The researchers specifically noted that in grades K-1, the impact of small class size on student achievement was statistically significant. However, they did not find a statistically significant improvement in students' academic performance when they were in a small class for both kindergarten and Grade 1, compared to being in a small class solely during kindergarten. The researchers suggested that this finding could be attributed to the identification of individual student needs in the initial small classroom setting. Consequently, subsequent experiences in small classes would have minimal to no additional impact on student achievement, as the necessary support and interventions were already provided earlier. Mueller (2011) conducted a study using data from Project STAR to examine the influence of small class size on student achievement. The researcher focused on analyzing standardized scores and employed value-added regression techniques. The findings revealed that reducing class size does not significantly affect student achievement when the teacher is a novice. However, Mueller (2011) discovered that class size does have an impact on student achievement when the teacher is experienced. The findings suggest that the impact class size depends on whether the teacher is an experienced teacher or a novice. Glass and Smith (1978) also conducted a meta-analysis using the same data. They discovered that class sizes that contain less than 20 students showed improved academic performance.

In 2000, McLaughlin conducted a study that examined the influence of class size on students' academic performance. He took data from more than 2,500 schools. The study analyzed student performance in state exams, which were adjusted for difficulty levels based on their scores in the national NAEP exams. This adjustment ensured that the state exams were standardized and comparable across different regions. It was found that the only factor that showed a positive association with

student test scores, after considering student backgrounds, was class size. Surprisingly, the research revealed that the link between student performance and smaller class sizes was even stronger in higher-grade levels when compared to lower-grade levels. As per Wilson's observations in 2002, the findings from the Tennessee STAR study, which involved a substantial randomized experiment spanning grades K-3, revealed that students in smaller classes had lower grade retention rates. Precisely, the data showed that out of the students in smaller classes, only 17% were retained, whereas the figures were 30% for students in "regular" classes and 44% for students in "regular plus aide" classes. Moreover, students who had the experience of smaller classes during their early grades exhibited a lower dropout rate when they reached tenth grade.

In their study on "Small Classes in the Early Grades, Academic Achievement, and Graduating from High School" (Finn et al., 2005), the researchers found that attending small classes from kindergarten to 3rd grade had a significant positive effect on high school graduation rates for all students. Students who experienced four years of small classes were approximately 80.0% more likely to graduate. The impact of small classes was particularly noteworthy for students from low-income households. Low-SES students attending small classes for three years or more saw a 67.0% increase in their odds of graduating, and those attending for four years or more than doubled their odds of graduating. These findings suggest that implementing smaller class sizes during the early grades can have a positive impact on academic achievement and improve graduation outcomes, particularly for students who come from disadvantaged backgrounds. By providing a more supportive and focused learning environment, smaller classes can potentially mitigate educational disparities and help students succeed academically.

2.4.1.2 Studies Questioning the Results of Project Star

According to Sohn's research in 2015, the number of schools demonstrating no impact, referred to as ineffective schools, was three times greater than the number of schools showing positive effects. Sohn (2015) argued that the student assignments in the Project STAR study were not randomly allocated, but rather deliberately distributed in order to achieve a specific outcome. Sohn (2015) raised concerns about the distribution of students in the Project STAR study, noting that regular-sized classes had a statistically higher proportion of children who get lunch for free compared to classes that are small. Additionally, in the smaller classes that showed improvements, there was a notably greater proportion of teachers with advanced degrees compared to the smaller classes that did not exhibit any improvement. Furthermore, upon examining schools with low academic performance, no improvements in academic achievement were found as a direct outcome of reducing class sizes (CSR). Sohn (2015) raised concerns about the inherent flaws in the Project STAR study and suggested that the researchers had a preexisting bias towards demonstrating the impact of class size reduction on student achievement. The study primarily observed improvements in a limited number of schools, while a greater number of schools exhibited negative effects rather than positive effects.

In 2011, Konstantopoulos's research supported the notion that there are concerns that the Project STAR data may not have used random student assignment and could have been manipulated to achieve desired results. Mueller's findings in 2013 contradicted the results reported by Word et al. in 1990. Mueller's research findings revealed that teacher experience had limited or no influence on the improvement of student achievement. The study showed that reducing class size had minimal or no effect on enhancing student performance in classrooms where teachers

were inexperienced. However, classrooms led by experienced teachers exhibited a significant improvement in student achievement. Mueller suggested that this difference could be explained by the experienced teachers' capability to employ a variety of teaching strategies in smaller classes, whereas novice teachers might lack the necessary skills to implement such strategies.

2.4.1.3 California class size reduction

The California class size reduction program was established due to a unique combination of circumstances. In the summer of 1996, the state anticipated a budget surplus of \$1.3 billion. In response to this situation, the Legislature, with the agreement of then-Gov. Pete Wilson, passed a class-size reduction initiative. This plan allotted districts \$650 for each student in K-12 classrooms. The objective of the policy was to decrease average class size to 20. The primary objective was to improve educational outcomes and provide more personalized attention to students. The program has been implemented through different approaches, with some schools combining state and local funds to achieve class size reduction goals. Evaluating the program's effectiveness in enhancing educational outcomes has led to varied results from different studies. Some studies show positive effects, while others suggest limited or no noticeable impact.

2.4.1.4 Studies examining California CSR

Sims (2008, 2009) investigated two other variables that could potentially explain the lack of positive results in the California CSR program. Sims (2008) stated that the insufficient availability of competent teachers couldn't explain the trends seen in standardized test scores. Sims (2009) discovered that reducing the average class size by around 9 students in first and second grade resulted in larger class sizes in

fourth and fifth grade. This increase had a negative impact, causing on fourth-grade fifth grade mathematics scores. Sims (2008) further added that many elementary schools had to implement combination classes (classes with multiple grade levels) due to budget limitations. These combination classes had a negative effect on second-grade test scores, with effect sizes ranging from 0.04 to 0.05 standard deviations. The impact on test scores in third grade was even more significant.

Funkhouser (2009) contended that the absence of favorable results in the CSR program could be attributed to the limited influence of class size on students' academic performance. By comparing kindergarten student achievement before and after the program was implemented, He observed a modest improvement in reading, while mathematics showed a statistically insignificant improvement of 0.05 standard deviations. Unlu, in a study conducted in 2005, discovered that fourth-grade students in California who experienced reduced class sizes during their K-3 years achieved significantly higher math scores on national assessments (NAEPs). The improvement in math scores ranged between 0.2 and 0.3 of a standard deviation, in comparison to closely matched students who did not have the opportunity to be in smaller classes.

Jespen and Rivkin (2009) conducted a study that revealed the influence of class size reduction through the California CSR program on students' academic performance. They found that reducing class sizes had a positive effect on students' academic performance, leading to an improvement in in math and reading standardized test scores, without considering teacher experience. However, he noted that the gains made by reducing class size was cancelled by hiring untrained. 25000 new teaching positions were created as a result of the implementation of the California class reduction program. Inexperienced teachers were hired and placed without proper credentials in classrooms. Because of that the positive results gained

by ensuring that class sizes were reduced were cancelled. A study conducted by Bressoux, Kramarz, and Prost (2009) supported their findings. They did a quasi-experimental study and investigated the influence of class size on students' academic performance. They found that, having experienced teachers rather than untrained had an equivalent effect on students' academic performance as reducing the class size by 10 students.

2.4.1.5 Canada class size reduction program

In 2008, Ontario, Primary Class Size Reduction (PCSR) initiative took place. 20 students per class was suggested at the primary level. Despite this effort, similar to the results of the Project STAR study, the law did not yield positive results. The Ontario Class Size Initiative involved providing additional funding to school boards to employ more teachers and reduce class sizes to a maximum of 20 students per class. The specific targets for class size reduction varied across grade levels and subject areas. The aim was to have an average class size of 20 students in the primary grades (Kindergarten to Grade 3) and 23 students in junior grades (Grade 4 to Grade 8).

The program was met with mixed opinions and evaluations over the years. Proponents argued that smaller class sizes allowed for more individualized attention and improved learning experiences for students. On the other hand, some critics questioned the sustainability of the program and whether the associated costs were yielding substantial improvements in student outcomes.

Mascall and Leung (2012) conducted a study comprising 24 schools in Ontario. 8 districts were selected. The study examined the effects of Primary Class Size Reduction (PCSR) initiative in elementary grades. Their findings revealed several positive outcomes resulting from the implementation of the initiative. These

included improved student-teacher interactions, helped "at-risk" students, and enhanced resource allocation for all elementary classes. The initiative also led to additional teacher training and the facilitation of diverse learning strategies through increased personal space. However, the study revealed less favorable effects of the initiative on upper grade levels. In these grades, larger class sizes, did not help disadvantaged students, limited personal space, and diminished teacher training were observed as a result of the PCSR initiative.

Haimson (2000) carried out a study to investigate the influence of class size reduction in Canadian public schools during the initial year of the program targeting grades K-3. The findings revealed that both principals and teachers reported a highly positive impact of class size reduction. Many students placed in smaller class sizes demonstrated accelerated learning progress during the year. The overall quality and quantity of teaching also experienced significant improvements due to the implementation of smaller class sizes.

Considering the findings of Konstantopoulos and Li (2012) that the advantages of Class Size Reduction (CSR) are not long-lasting, this could potentially explain the limited progress observed in the Primary Class Size Reduction (PCSR) initiative. In their examination of Ontario's school districts, Mascall and Leung (2012) discovered significant variations in the outcomes of the initiative. They observed that districts which effectively utilized allocated funds and implemented comprehensive plans to maximize available resources experienced positive impacts on student achievement through the PCSR initiative. Conversely, districts lacking such strategic plans witnessed minimal improvement in students' academic performance.

2.4.1.6 Other Studies in Elementary Education

Breton (2014) conducted a study using data from the Trends in International Mathematics and Science Study (TIMSS). 41 countries were selected. The researcher focused on the scores of fourth and eighth-grade students. Specifically, the study examined fourth-grade mathematics data in Columbia, where class sizes varied significantly, ranging from six to 80 students. The findings showed a strong association between larger class sizes and lower test scores. According to Breton's study, the presence of an additional student in the class was associated with a decrease of 0.03 standard deviations in test scores. Breton further suggested that reducing all classes to 20 students or fewer would result in a noteworthy 12% improvement in student achievement. Comparing these findings to a study conducted by Cho et al. (2012), Breton's findings indicated that Class Size Reduction (CSR) had a significantly greater impact, approximately six times more effective. It is worth noting that the outcomes achieved in Columbia were considerably higher compared to other countries involved in the TIMSS study. This difference could possibly be attributed to the notable variations in class sizes observed within the country.

A longitudinal study was carried out by Galton and Pell (2012). The study spanned over four years. The research focused on 36 primary schools in Hong Kong and produced results consistent with a research carried out by the British Department for Education in 2011. The researchers divided class sizes into two categories: regular classes with around 38 students and small classes with 25 students or less. Using a specialized test administered by the Hong Kong Education Department, they evaluated student performance in English, Chinese, and mathematics. Through the application of multi-level regression analysis, they found that class size did not have a

statistically significant effect on long-term students' academic performance. However, they did observe some academic improvements among students in small classes.

In another study conducted by Kassile (2014), the researcher investigated the influence of various resources on student achievement. The researcher concentrated on the relationship between student-teacher ratio and pass rates on the Primary School Leaving Examination in Mainland Tanzania. The findings showed a statistically significant negative correlation between student-teacher ratio and student achievement. This was supported by a Pearson correlation coefficient of 0.74176 and a p-value of .0001, suggesting that as the student-teacher ratio increased, there was a corresponding decrease in student achievement. Vaag, Iversen, and Bonesrønning (2013) carried out a comprehensive investigation that encompassed all fourth-grade students in Norway. The study aimed to examine the impact of reduced class sizes on underprivileged students in primary school. The study utilized information obtained from standardized assessments in mathematics and reading, which were given to a total of 55,322 students who participated in the research. The specific focus of the study was on two categories of vulnerable students: those whose parents did not finish secondary school and those from divorced families. The examination of the data uncovered a noteworthy yet significant enhancement in student performance as a result of decreasing class sizes. Specifically, reducing the class size by eight students corresponded to a 0.04 standard deviation increase in academic achievement for students from families where neither parent completed secondary school. Additionally, there was a 0.06 standard deviation improvement in the achievement of students from single-parent households.

Cho, Glewwe, and Whitley (2012) conducted a study that involving Third and fifth-grade students across Minnesota. Their findings indicated that reducing class size had a beneficial effect on student performance in reading and mathematics. However, upon analyzing the data, the researchers observed only a slight improvement when the class size was reduced by 10 students. They also suggested that factors such as instructional quality and classroom management may help mitigate some of the effects associated with smaller class sizes. In a subsequent investigation conducted by Nye, Hedges, and Konstantopoulos (1999), they examined the results of Project STAR, an initiative that involved small classes with 13-17 students and larger classes with 22-26 students. The researchers examined students' achievement in mathematics, reading, and science using the California Test of Basic Skills (CTBS) over a period of five years. The study focused on students in grades 4, 6, and 8 who had previously participated in the program during grade 3. The findings revealed that the beneficial impacts of reducing class sizes, although somewhat reduced, remained evident even after a period of five years. Around 70% of the initial effects were still observed. The findings supported the effectiveness of reducing class sizes to 15-17 students in the primary grades, as it was associated with higher achievement in reading and math scores. Additionally, the researchers suggested that the benefits of small class sizes may be even greater when considering social class factors.

Angrist and Lavy (1999) looked at the scholastic achievement of students in elementary schools in Israel. They focused on 4th and 5th grade students. The sample size was 6000 students. In Israel, there is a regulation influenced by Maimonides' principle that sets a maximum limit of 40 students per classroom. If the number of students exceeds 40, the class is divided into two smaller classes, each containing

approximately 20 students. Researchers have found that reduced class sizes have a substantial positive impact on the math and reading abilities of 5th-grade students. However, in 4th grade, the effects are less pronounced, with smaller class sizes leading to minor improvements in reading achievement.

Chingos (2013) conducted a comprehensive assessment of various quasi-experimental and experimental studies. His research was conducted to provide insights for policymakers regarding class size modifications. Chingos discussed the outcomes of the well-known Project STAR experiment conducted in Tennessee, which revealed a positive association between reduced class sizes and students' academic performance, particularly in the initial year. However, the author also highlighted criticisms raised against these findings, including concerns about teachers being aware of their participation in the experiment. Additionally, Chingos presented a range of quasi-experimental studies and state-wide class size reduction policies that yielded mixed results. While many studies indicated some positive benefits, the overall findings were inconsistent and relatively small. Consequently, Chingos argued that the United States may have invested excessively in class-size reduction, suggesting that increasing class sizes could save money without harming students. However, he acknowledged the importance of maintaining a balance between class size and teacher salary, noting that a significant body of research supports the significant and sustainable impact of teacher quality on student achievement. Hoxby 2000 gathered data from 649 elementary schools. He conducted a longitudinal study. His research was to look at the influence of class size on the academic performance of students. The researcher found class sizes that are small had minimal effects on students' academic performance, specifically in terms of math, reading, and writing scores in fourth and sixth grades. Additionally, Hoxby's research did not find any

indications to support the notion that smaller class sizes were more beneficial in schools with a high proportion of low-income or African American students. The analysis encompassed various class size adjustments, ranging from a reduction of 10 to 30 students.

2.4.1.7 Conclusion for primary level research

Studies conducted at the primary level has produced inconclusive results concerning the effect of class size on students' academic performance. The STAR study's researchers discovered that reducing class sizes (CSR) led to notable enhancements in student achievement, while other researches did not reach the same conclusion. Most research focused on standardized data, particularly examining math and reading skills. Several factors, such as the subject taught, school disparities, teacher expertise, and variations in CSR implementation methods, were identified as influential in elementary level investigations. The STAR study demonstrated varying levels of student progress in different grade levels, with the most substantial improvements observed in first grade. However, it is important to note that the conclusions drawn from research conducted at the elementary level cannot be generalized to other grade levels. Therefore, it becomes crucial to explore studies that specifically examine the effects of reducing class sizes on student achievement in middle school (grades 6-9) and high school (grades 10-12) levels. Investigating the impact of class size reduction in middle grades is of particular importance.

Tienken and Achilles (2009) conducted a study to examine the influence of class size on writing skills in the middle grades. It was a longitudinal study. The objective of the study was to investigate the impact of decreasing class sizes, specifically from larger classes (with 23-26 students) to smaller classes (with 12-18 students), on the development of students' writing abilities. This non-experimental

research was conducted among 123 middle school students who attended the same school, utilizing a control group design. The researchers analyzed data from pre- and posttest assessments of student writing skills using one-way analysis of variance (ANOVA). Over a period of three years with reduced class sizes, Tienken and Achilles (2009) observed significant improvements in students' performance on standardized writing exams. They also found that students who experienced smaller classes in sixth grade and larger classes in seventh and eighth grade showed better performance compared to those who had large classes throughout all three years, although the improvement was not as substantial. It is crucial to emphasize that this study specifically focused on writing skills, setting it apart from other studies that did not demonstrate similar enhancements. Altinok and Kingdon (2012) conducted a study using TIMSS test data. The researchers focused on eighth grade students in forty-one countries. The study revealed that decreasing class size had a statistically significant effect on student achievement in only 20 out of the 41 countries. Surprisingly, in seven of those countries, increasing class size had a positive impact on student achievement. Overall, their findings suggested that decreasing class size by one standard deviation would lead to a minimal increase in students' academic performance.

Dee and West (2011) carried out a study that also demonstrated the positive impact of reducing class size on student achievement. They did not focus on test scores. They defined student achievement in terms of the preservation of non-cognitive skills, including work ethics. The researchers analyzed data from the National Education Longitudinal Study of 1988. The sample was 24,599 eighth-grade students from over 1,000 schools in the United States. Their findings revealed that reducing class sizes led to substantial increase in the retention of non-cognitive skills.

Nationwide, students in smaller classes showed a 4.6% higher retention rate compared to those in larger classes. In urban schools, this increase in retention was even more pronounced at 7.9%. Dee and West concluded that while reducing class size may not always result in immediate enhancements in student achievement, it did promote the growth of essential skills that are vital for long-term success.

Akabayashi and Nakamura (2014) conducted a study to evaluate the influence of class size on standardized language arts test scores for Japanese sixth-grade students. The researchers examined test outcomes at the start and end of the academic year, utilizing a value-added model to estimate causal effects while accounting for unobserved fixed effects. The study findings indicated that class size had minimal to no effect on the academic performance of students. When a class is reduced by one student, it leads to a marginal increase of only 0.0112 standard deviations in test scores. Additionally, the study did not discover any evidence suggesting that implementing a universal class size reduction policy would help close the achievement gap between economically disadvantaged and affluent students. Oosterbeek and Ronning (2008) utilized a comprehensive administrative database from Norway to employ an independent quasi-experimental approach in assessing the influence of class size on the academic performance of lower-secondary school students. The study specifically concentrated on students in Grades 7 to 9. They evaluated student academic achievement by analyzing the results of compulsory centralized exit exams, which were taken by ninth-grade students. As class sizes in Grades 7-9 in Norway were already restricted to a maximum of 30 students, the study did not investigate the impact of larger class sizes. They concluded that class size did not have any significant impact on students' academic performance.

Conclusion for primary level

Research conducted at the primary level examining the impact of class size on student achievement has yielded uncertain results regarding the actual effects on academic performance. Studies conducted by Chingo (2012), Leuven et al. (2008), and Altinok and Kingdon (2012), which focused on standardized test scores, generally indicated minimal or negligible improvements in academic performance resulting from class size reduction. However, Tienken and Achilles (2009) conducted a focused study on a specific subject and exhibited a rise in test scores. Furthermore, Dee and West (2011) discovered that class size reduction (CSR) had a beneficial impact on the retention of essential non-cognitive skills.

2.5 Class Size Debate at the Secondary Level

Studies with respect to class size at the secondary level are not many. The outcomes of the studies done at the secondary level demonstrated considerable discrepancies. Comparable to research conducted in elementary and primary level, certain studies have shown a favorable influence of class size reduction on student achievement, while others have discovered no noticeable impact on academic performance.

2.5.1 Positive effects of class size reduction

Celik and Koc (2015) conducted a research study in Turkey with the aim of exploring the potential relationship between the student-to-teacher ratio and student achievement. To assess this, the researchers calculated the teacher-to-student ratio by dividing the total number of students in high schools by the total number of teachers in each city across Turkey. Student achievement data was based on the ranking of each city's performance in Turkey's Transition to Higher Education Exam. Spearman

Rho's analysis was employed to analyze the correlation between these variables. The analysis revealed a significant correlation of $-.561$. This moderate negative correlation indicates that cities with a higher number of students per teacher tend to exhibit lower achievement on Turkey's Transition to Higher Education Examination. Krassel and Heinesen (2014) carried a study in Danish secondary schools. They looked at the influence of class size on students' academic performance. Administrative registry data was used to determine class size and assessed student performance in 10th grade exit exams in Danish, math, and English as a measure of achievement. 46,267 students were selected to take part in the study. Their findings revealed that reducing class size had statistically significant negative influence on students' academic performance.

Harfitt (2012b, 2013, and 2014) conducted a study in Hong Kong and Asia. He targeted four secondary schools. His study was to investigate from the learners how smaller class sizes might reduce xenoglossophobia. The study was a small-scale exploratory study the study adopted multiple case studies. He discovered that students reflected on their experiences of studying in reduced-size classes with maturity and confidence. According to the students' reports, smaller classes allow facilitators or teachers to have more time for students and less to classroom management, result in fewer discipline problems and can increase student achievement in English lessons. The students also added that smaller classes are less distracting to students than a large group of children. The perspectives of the students were further supported by evidence gathered from classroom observations. In Harfitt's (2012b) research, classroom observations confirmed student participation in class is higher in smaller classes than classes that are large. In another study conducted in 2013, the researcher concentrated on teacher perceptions which is consistent with his earlier findings. It

was a case study. Four English teachers were interviewed and observed. It was noted that in smaller classrooms, teachers adapted their teaching methods and developed closer relationships with their students. The findings were that smaller classes allowed teacher to understand their students very well and give them the chance to design lessons that address the unique needs to every student.

In Harfitt's third study (2014), the focus was on pedagogical modifications implemented in secondary classrooms with reduced class sizes. The adjustments were made following input from 43 10th-grade students under the guidance of a researcher. The students proposed including more collaborative activities to maximize the limited classroom area and increase student involvement through varied coursework. Observations indicated that these modifications promoted a greater sense of togetherness and inclusion among the students, potentially leading to advancements in their academic performance.

In a study conducted by Atta (2011), the aim was to examine the opinions of 10th-grade male students from rural and urban high schools in District Dera Ismail Khan, Pakistan regarding the impact of class size on student achievement. The researchers administered a questionnaire to 400 participants and used chi-square analysis with a confidence level of .05 to analyze the data. The results showed that the students believed that class sizes that are less than 20 students had a significant positive effect on academic performance. This finding was further supported by the calculated chi-square value of 94.46, indicating a highly significant association between small class size and the perception of improved student achievement. However, it is important to note that these conclusions were based solely on the students' perceptions, and no objective measure of academic achievement was utilized. Therefore, caution must be exercised when interpreting these findings. The

study conducted by Brühwiler and Blatchford (2011) produced findings that were in line with the results obtained by Atta et al. (2011). The study involved 49 teachers and 898 students. To assess adaptive teaching competency, the researchers used a multi-method approach, including vignette and video tests. Class size data was collected through teacher questionnaires, and student achievement was measured before and after. The findings of the study indicated that smaller class sizes were associated with higher academic learning progress, better knowledge of students, and improved classroom processes.

2.5.2 No effects of class size reduction

Shin and Chung (2009) conducted a meta-analysis to investigate the influence of class size on students' academic performance. They analyzed 17 studies, comprising both published and unpublished research, using a random-effects model. The results of the study revealed that students in smaller classes demonstrated higher levels of academic achievement compared to those in larger classes, with an effect size of 0.20 standard deviations. The researchers also conducted a fixed-effects categorical analysis to identify sources of variance and moderator variables that predicted the effects of class size reduction (CSR). They observed that effect sizes tended to be higher in published studies compared to unpublished studies. Furthermore, the results suggested that CSR had generally positive effects across school subjects. The effect of CSR was more significant in elementary schools compared to secondary schools. While the overall results of CSR were positive, a notable exception was observed in 10th grade. Lastly, the findings regarding CSR were mixed but generally positive when considering the location of states.

Wyss, Tai, and Sadler (2007) conducted a study in the United States that also examined the enduring impacts of class size in high school science classes on students' academic performance. 31 states were selected. 7000 students constituted the sample. The object of the research was to analyze the grades of these students in freshman-level college science classes. Their findings revealed that there was little to no effect on student achievement until class sizes dropped below 11 students. Unlike the earlier study that concentrated on a particular subject area in middle schools and did not employ standardized tests, this study did not observe any notable alterations in student achievement.

Corak and Lauzon (2009) conducted a study in Canada that utilized PISA data and concentrated on 15-year-old students. The aim of the study was to investigate the influence of class size and time-in-term on student achievement. Their specific focus was on the reading scores of the PISA test, and they did not explore differences in other subjects. The study included a population of 30,000 students, and a random sample of students was selected from specific schools. When examining various provinces in Canada, the findings yielded uncertain results. The study conducted by Corak and Lauzon (2009) revealed that the results varied across provinces. In provinces where the mean achievement gaps were expected to be lower, it was found that not all students would benefit from class size reduction. Owoeye and Yara (2011) conducted a study in Ekiti state, Nigeria, focusing on the correlation between class size and the academic performance of students from 1990 to 1997. The study encompassed 50 secondary schools situated in both rural and urban areas of the state. They utilized data from the West African School Certificate Examinations (WASCE) conducted during the same time frame. To collect data, they employed a questionnaire called the Student Class Size Questionnaire (SCSQ), and the analysis involved

calculating means and conducting t-tests. The researchers found no significant disparity in academic achievement between students in small and large classes from urban schools ($t = 1.49$; $p < 0.05$). Similarly, they observed no significant difference in performance between students in rural large classes and those in rural small classes ($t = 0.58$; $p < 0.05$). They recommended that policymakers and the government should prioritize the construction of more classrooms to ensure that the number of students in a class does not exceed 30. The involvement of the Parent Teacher Association (PTA), philanthropists, and other charitable organizations was also encouraged to support the government's efforts in enhancing students' performance in the West African School Certificate Examinations (WASCE) by constructing more classrooms and buildings.

Jakobsson, Persson, and Svensson (2013) carried out a study in Sweden. The goal was to investigate the influence of blended learning on the academic performance of students. The study compared different teaching approaches and examined students' perceptions of their use. The study utilized a quasi-experimental design case study. 112 participants were involved. They were divided into two groups: an experimental group ($n = 61$) and a control group ($n = 51$). To ensure reliability and validity, the researchers developed an achievement test and questionnaire. The data were analyzed using SPSS. The findings indicated significant distinctions between the experimental and control groups, with the experimental group displaying superior performance and exhibiting more positive attitudes towards blended learning. Moreover, the study observed that students who excelled in science subjects demonstrated more favorable attitudes. Based on these results, the study recommends further exploration of blended learning implementation in higher education institutions.

Conclusion for secondary education

Similar to research conducted in elementary and primary level, the impact of class size on student achievement in secondary schools remains inconclusive. Various studies, including Atta et al. (2011), Brühwiler and Blatchford (2011), Heinesen (2010), and Krassel and Heinesen (2014), reported statistically significant positive effect in student achievement associated with reducing class size. However, other studies, such as Shin and Chung (2009), Corak and Lauzon (2009), Wyss et al. (2007), Owoeye and Yara (2011), and Jakobsson et al. (2013), found limited or no noticeable improvements in student achievement resulting from class size reduction. This ongoing debate regarding class size also extends to the tertiary level of education.

2.6 Class Size Debate at the Tertiary Level

Monks and Schmidt (2010) undertook a study to examine the effects of class size and student load on student outcomes within higher education. They also explored the significance of student load, which refers to the total number of students taught across all courses, in relation to educational outcomes. Through a natural experiment, they investigated the impact of class size on student-rated outcomes, such as the amount learned, instructor rating, and course rating. The study accounted for faculty, course, and time fixed effects to establish a negative association between class size and these outcomes. The findings supported previous research, indicating that the negative relationship between class size and student ratings was not solely attributed to instructors' individual preferences in class size. Even after controlling for instructor, course, and other factors, larger class sizes resulting from external policy changes were associated with lower student ratings. Interestingly, the study revealed

that the negative effect persisted regardless of the instructor's level of experience in teaching larger sections.

Additionally, the study found that class size predominantly impacts student-rated outcomes by influencing specific aspects of courses that students perceive as advantageous for learning. For example, larger class sizes were linked to decreased clarity in class presentations, lower levels of preparation, diminished enthusiasm, reduced effectiveness in stimulating interest, less effective teaching methods, insufficient graded material, delayed return of assignments, and less helpful course resources.

Orellana also conducted a study in 2006. The study investigated the perceptions of instructors regarding the optimal class size. The research also discussed the implications for both research and practice. The study utilized a Web-based survey method and focused on online courses taught by a single instructor in undergraduate or graduate programs within United States. She gathered data from higher education institutions. The analysis involved responses from 131 instructors. The findings of the study revealed that (a) instructors generally perceived their online courses as having a high level of interactivity, (b) the average class size for these online courses was 22.8 students, (c) however, instructors believed that a class size of 18.9 would be more suitable for achieving the intended level of interaction, and (d) they perceived that a class size of 15.9 would be optimal for attaining the highest level of interaction. It is important to note that no correlation was found between the actual class sizes of online courses and the level of interaction they achieved.

Parks-Stamm, Zafonte, and Palenque (2017) conducted a study analyzing 500 online courses and examining the frequency of posts in asynchronous discussion forums. The objective was to gain insights into the factors influencing student

participation. The results of the study indicated that both class size and the level of instructor participation had significant effects on student participation, with an interaction between these two factors. In courses characterized by medium class sizes, the frequency of student posts was not determined by the level of instructor participation. However, in smaller classes, the degree of student participation varied considerably based on the level of instructor involvement.

Qiu and Brett (2010) conducted a study using mixed-methods to examine the connections between class size, note reading, note writing, and collaborative discourse in online graduate-level courses. The study involved analyzing tracking logs from 25 courses (25 instructors and 341 students) and conducting interviews with 10 instructors and 12 graduate students. The findings of the research indicated that class size had an impact on the amount of note reading and writing in online graduate-level courses. The study revealed a positive correlation between class size and the total number of notes read and written by both students and instructors. But, the study revealed a negative correlation between class size and specific variables, including the percentage of notes students read, the size of their notes, and their note grade level score. In larger classes, participants were more likely to experience information overload, leading students to be more selective in their note reading. The study suggested that the negative effects of large class sizes could be alleviated by dividing students into smaller groups for discussions. This approach could facilitate more focused and meaningful collaborative discourse.

Conclusion for Tertiary Education

The influence of class size on students' academic performance at the tertiary level also remains inconclusive. Different studies have produced conflicting findings regarding the effects of class size on student achievement. Some studies have

indicated that class size does have a significant impact on academic performance, suggesting that smaller class sizes are associated with better student outcomes. Conversely, there are studies that have indicated the absence of a significant relationship between class size and academic performance in higher education. These mixed results highlight the complexity of the issue and the need for further research to better understand the specific factors that contribute to academic performance in higher education settings. Additional studies exploring the impact of class size on various disciplines, teaching methodologies, and student populations could provide valuable insights into the influence of class size on students' academic performance at the tertiary level.

2.7 Confounding Variables Impacting Students' Academic Performance

Research conducted by scholars across different educational levels to examine the influence of class size on students' academic performance has generated inconclusive findings regarding the real effects on student academic performance. These researches have failed to account for other potential confounding variables that could influence student achievement. Factors such as parenting approaches, instructional methods utilized by teachers, the influence of school administrators, school size, and even the emotional well-being of students could have potentially influenced academic performance in ways that were not fully addressed in these studies. As a result, the real effects of class size on student achievement remain uncertain, highlighting the necessity for additional research to gain a deeper understanding of the intricate relationship between class size and academic performance.

In their study conducted in Portugal, Costa and Faria (2012) investigated 380 students in grades 10-12 and found that emotional intelligence strongly predicted academic achievement. They observed that students with higher emotional intelligence tended to perform better academically.

Tulbure (2013) conducted a study with a group of 284 students aged 18-25 and explored the association between emotional state and academic achievement. The results revealed that lower academic achievement was correlated with experiences of isolation, moodiness, and low self-esteem. In contrast, higher academic achievement was linked to characteristics such as adherence, thoroughness, and self-worth. Wang et al. (2016) conducted a study involving fifth-grade students from 50 schools in Ontario. They investigated the impact of social aggression on educational attainment and examined whether a positive school environment could mitigate its effects. The results showed that social aggression had a significant negative effect on student achievement, and this effect was not influenced by the presence of a positive school success.

Gershenson and Langbeing (2015) conducted a study in North Carolina to examine the impact of school size on student achievement among fourth and fifth-grade students. The researchers employed end-of-grade tests to gauge student success. The overall results of the study demonstrated that school size did not have a statistically significant impact on student achievement. However, Gershenson and Langbeing did identify significant effects of school size on student achievement when considering specific student subgroups. The study revealed that school size had a statistically significant influence on student achievement, particularly for students with learning disabilities and those from low-income backgrounds. Additionally, when examining school size on a grade-by-grade basis, the researchers noticed a

decline in reading and math scores for every additional 10 students in a grade. These findings suggest that while school size may not have a universal effect on student achievement, it can have varying impacts depending on the characteristics of the students and the grade level. The research highlights the significance of considering the specific context and student subgroups when examining the link between school size and student achievement.

Tatlah, Iqbal, Amin, and Quraishi (2014) carried out a study in Punjab, Pakistan, to examine the influence of principal behaviors on educational attainment of tenth-grade pupils. The study involved 64 principals and 1,920 students. The researchers used annual examination results to examine their academic performance. Tatlah et al. identified that various behaviors exhibited by principals had a significant and measurable effect on student achievement. The study's results suggest that the actions and behaviors of principals have a significant influence on student academic achievement. Although the specific behaviors displayed by principals were not explicitly stated, they were found to have a positive effect on student achievement. This research emphasizes the critical role of educational leaders in creating an enriching learning environment and promoting students' academic accomplishments. The findings emphasize the significance of effective leadership practices and suggest that principals' behaviors can influence student outcomes.

Walker, Lee, and Bryant (2014) undertook a study in secondary schools located in Hong Kong to investigate the influence of specific principal leadership styles on academic success. The study encompassed 179 staff members and 2,037 students. Surveys were administered to assess leadership styles, while standardized tests were utilized to measure academic achievement. Three distinct leadership styles were examined. The findings of the study revealed that the use of communication

structures as a leadership approach had a significant positive influence on student success. This suggests that principals who effectively utilize communication systems to promote a supportive and collaborative learning environment contribute to improved academic outcomes for students. In contrast, the study found that both the quality control and accountability and resource management leadership styles had a detrimental effect on learning outcomes. It implies that an overemphasis on quality assurance measures or resource management may hinder student academic success.

In 2004, Ekembe conducted a study. The study was to investigate the influence of teaching methodology on foreign language classrooms. The study specifically focused on didactic teaching and instructor-led discourse. To investigate the effects of these teaching styles, Ekembe employed a pretest, posttest, and delayed posttest experimental design. The study involved assessing the academic achievement of students in the two groups. The findings of Ekembe's study revealed that students who received direct instruction demonstrated greater academic achievement compared to those in the instructor-led discourse group. This suggests that a structured and focused approach to teaching, as exemplified by direct instruction, resulted in higher immediate learning outcomes. However, the study also highlighted that the instructor-led discourse group exhibited higher long-term retention of the learned material. This was evident from their performance in the delayed posttest, indicating that the interactive teaching approach facilitated better retention and recall of information over time. In (2015), Chen conducted a study in China. It was to explore the influence of balanced parenting and dictatorial parenting on students' GPA, which served as a measure of academic success. The study found that students whose parents adopt balanced parenting had significantly higher GPAs compared to students whose parents used dictatorial parenting style.

In a study conducted by Bong Joo, Hyun Suk, and Se Hee (2014) in Korea, the effects of parenting behaviors on student success were assessed using an extended Study. The study involved 609 respondent from households with varying income levels. The results indicated that parenting behaviors had a statistically significant influence on student achievement, regardless of the household's income level. This suggests that effective parenting practices can have a positively influence academic success, irrespective of socioeconomic background.

How large Class Size and Psychological Classroom Environment can be managed to enhance Academic Performance.

Effective classroom management is a crucial component of successful teaching and learning. It begins with thorough and organized lesson planning, which facilitates the teaching process and aids students in their learning journey. Students tend to excel in an optimistic classroom environment where they feel secure, cared for, and actively engaged (Aslam, Sulerman, Zulfigar, Shafaat, & Sadiq, 2014). Classroom management plays a significant role in shaping the classroom's overall atmosphere, particularly concerning the environmental aspect. When students are well-behaved and focused on their tasks, it creates a sense of safety and security for all students. This, in turn, allows students to concentrate on their studies without concerns about their well-being, ultimately leading to improved performance.

Buchong and Sheffer (2009) proposed that effective teaching involves the early establishment of clear class norms and procedures that are easily understood by students. This step creates a stable and structured classroom environment, instilling confidence in students as they navigate their learning journey. The authors emphasized the importance of creating a warm and inclusive classroom atmosphere,

ensuring that all students feel welcome. To achieve this, educators can employ various methods to support diverse learners.

Buchong and Sheffer highlighted the significance of fostering a classroom environment conducive to cooperative learning. Key strategies for creating an inviting classroom included organizing the space with readily accessible resources and adding color to make it more visually appealing. They also suggested establishing traditions and holding classroom meetings to encourage students to become effective problem solvers while promoting collaboration and cooperation among diverse peers. Lastly, the authors stressed the importance of teaching students self-advocacy skills. The classroom environment plays a critical role in children's learning and growth, preparing them to participate more effectively in the world around them.

In their study, Greenberg, Putnam, and Walsh (2014) conducted an examination of 122 traditional teacher preparation programs in the United States. Their objective was to assess whether these programs incorporated research-based strategies to effectively guide teacher candidates in classroom management right from the beginning of their training. The researchers scrutinized the extent to which these programs offered opportunities for teacher candidates to practice research-based classroom management strategies, techniques, and approaches.

Greenberg et al. evaluated how each program addressed classroom management in terms of instruction, practice, and training. Their findings revealed that, despite most programs claiming to include classroom management in their curriculum, there was a notable lack of substantial time and effort dedicated to classroom management instruction and training. The study emphasized the need to prioritize classroom management in teacher preparation programs and allocate

adequate time and resources to equip new teachers with the skills and knowledge necessary for successful classroom management.

Creating a positive classroom environment through effective discipline is essential for fostering academic success among students. Mendler (2012) highlighted that students who feel encouraged and comfortable in their learning environment are less likely to exhibit disruptive behavior and are more likely to exert greater effort in their studies. To establish a positive classroom atmosphere, it is crucial to start each academic year with clear rules and procedures in place.

Various disciplinary approaches can be employed in the classroom to mitigate student misbehavior, and one such approach is positive discipline. The core principle of positive discipline is the use of encouragement. When students receive encouragement from their teachers, they become more willing to take educational risks and develop greater confidence, knowing they won't face ridicule or shame for doing so. Fostering encouragement in the classroom can be achieved through practices like praising students for their efforts and the quality of their work.

Charles and Senter (2005) conducted an examination of the implementation of positive discipline strategies within the classroom, aiming to empower students for success in various aspects of their lives. They recognized that behavior problems among students can have detrimental effects on their academic achievements. By effectively addressing and resolving behavior issues in the classroom, teachers can allocate more of their time and energy toward nurturing relationships with students and fostering a classroom community characterized by respect and kindness.

Charles and Senter identified three key empowering perceptions and essential skills that contribute to the advantages of employing positive discipline: Establishing Classroom Norms: This involves the creation of clear expectations and rules within

the classroom setting. When students understand and adhere to these norms, it enhances their behavior and contributes to a harmonious learning environment. **Class Meetings:** Class meetings serve as a platform for developing essential skills and perceptions that are valuable for success in life. These meetings provide opportunities for students to engage in open discussions, share their perspectives, and collaboratively address classroom issues. **Building Student-Teacher Relationships:** Positive discipline strategies emphasize the cultivation of strong relationships between teachers and students. When students feel a sense of connection with their teachers, they are more motivated to excel academically and actively participate in the learning process.

Charles and Senter's research underscores that positive discipline practices not only address behavior challenges but also empower students by promoting essential skills and perceptions that significantly contribute to their success across various life domains.

Evanshen and Faulk (2011) proposed that the physical layout and organization of a classroom can significantly influence students' academic achievement. It is crucial to ensure that the classroom is set up and well-organized right from the first day of school. Creating a welcoming environment that is free from clutter and exudes warmth and invitation can help students smoothly transition into a new school year and maintain their enthusiasm for learning.

One essential aspect of classroom layout is the arrangement of desks to facilitate a safe and efficient flow of student traffic while minimizing chaos and confusion. When students have adequate space and are not crowded together, it positively impacts their motivation and effort. Providing students with their own workspace can also be conducive to their engagement and productivity.

Additionally, organizing student resources is a key consideration in classroom layout. Classroom supplies and materials should be positioned where students can readily access them. Evershen and Faulk (2011) recommended an organization that ensures resources are easily reachable for students, reducing lost time and transitions.

In summary, the physical arrangement and organization of a classroom play a vital role in creating an environment that supports students' academic success. A clutter-free, welcoming space with thoughtfully arranged desks and easily accessible resources can contribute to a positive learning experience and maintain students' motivation and effort.

Johnson and Johnson (2009) emphasized that cooperative learning transforms students into active participants in their own learning journey, instilling a sense of ownership over their thinking and the skills needed to collaborate effectively with a diverse group of peers. In a cooperative learning setting, students acquire essential communication skills, learn to provide leadership, contribute to group decision-making, build trust, address emotional concerns, and gain an understanding of their peers' perspectives. Cooperative groups serve as a platform for individuals to develop interpersonal and small group skills. In this context, teachers take on the role of facilitators, allowing students to assume leadership and instructional responsibilities. Cooperative learning fosters stronger efforts to build positive relationships and enhance psychological well-being compared to competitive or individualistic learning approaches. These strategies can be employed in the classroom to help students unlock their full potential.

Schlechty (2009) expanded on the concept, highlighting that cooperative learning transcends merely placing students in groups; it involves designing classroom activities and projects that promote independence, individuality, effective

communication, social skills, and accountability. Within cooperative groups, students collaborate to solve problems and devise solutions to various challenges. Integrating cooperative groups into the classroom enriches the classroom culture by inspiring students to put forth their best efforts.

Psychological classroom environment and academic performance

Miller and Cunningham (2011) assert that apart from the physical setup of a classroom, there exists a psychological ambiance shaped by the interactions between significant figures within it, primarily students and teachers. Research in this domain has undergone diverse explorations and seen a surge in activity during the early part of the twenty-first century. Investigations have predominantly focused on metrics such as student engagement levels, teacher assistance, and the clarity of learning objectives communicated.

Numerous teachers view student engagement and focused behavior as synonymous with active classroom participation, often ranking it as a primary focus. Research aligns with teachers' observations, indicating a divergence in participation patterns between genders. Girls tend to engage in participation as a component of their relational connection with the teacher, while boys' participation correlates more strongly with their perception of the class's level of interest, showing less involvement in unstimulating contexts. This suggests that, for these students, teachers play a significant role in shaping both participation levels and learning outcomes (Miller & Cunningham, 2011).

Research consistently shows that boys tend to speak up in class about three times more often than girls, yet both genders typically view girls as better participants. While definitions of participation vary among students, the most common understanding, frequently studied by researchers, is that participation

involves responding when directly prompted with questions. Both boys and girls express a preference for relational dynamics to be present for such participation to occur; however, girls more frequently engage by answering teachers' inquiries, whereas boys often participate seeking attention or recognition from the teacher. Teachers aiming to foster relational aspects in both genders may need to employ different methods of acknowledgment for male students to enhance their sense of support as participants in the classroom (Miller & Cunningham, 2011).

The concept of feeling supported as students has been extensively explored in classroom environment literature. Miller and Cunningham (2011) as well as Patrick, Ryan, and Kaplan (2007) discovered a robust, positive correlation between students' motivation levels, engagement, and their perception of the classroom environment as socially supportive. A climate of mutual respect is crucial for students to enhance their utilization of effective study strategies and boost their confidence in successfully completing assignments. Moreover, when students feel emotionally supported by their teachers and academically supported by their peers, they are more inclined to stay focused during class and employ self-regulated learning strategies.

Another significant area of educational research revolves around the communication of learning objectives to students, coupled with individual student goals and expectations. Some classrooms and students prioritize achieving grades over mastering objectives, reflecting a performance-oriented rather than mastery-oriented approach (Miller & Cunningham, 2011). Numerous studies have delved into this social-cognitive aspect of classrooms, revealing that emphasizing performance at the classroom level correlates with various behavioral and academic outcomes. Students in performance-oriented classrooms are more prone to engage in dishonest

behaviors like cheating, avoid seeking help, and exhibit lower levels of academic involvement (Miller & Cunningham, 2011).

In contrast, students in classrooms where the emphasis is on learning and improvement demonstrate heightened levels of self-efficacy, engagement, and positive emotions (Miller & Cunningham, 2011). At the individual goal level, researchers have observed that while students prioritizing grades tend to achieve higher grades, those focusing on mastering objectives engage more in challenging academic tasks and retain learned information for longer durations (Miller & Cunningham, 2011).

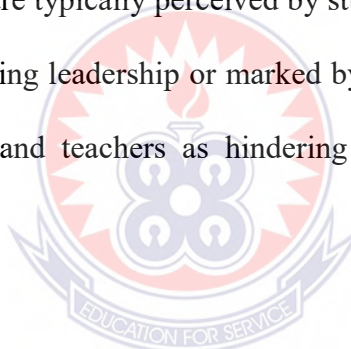
The role of teachers in shaping the psychological classroom environment

Another key focus of many investigations into classroom environments has been on teacher behaviors, particularly teacher development and school culture, and their impact on the classroom atmosphere. Some studies indicate that due to the intricacy of fostering an effective classroom environment, this task may surpass the developmental capacity of newly graduated teachers. Accordingly, some researchers suggest that professional development for new teachers should incorporate intensive mentoring and teaching partnerships to alleviate isolation and foster productive relationships with other adults in the school community (Miller & Cunningham, 2011).

Building on the research on physical and psychological environments, numerous suggestions for teachers have emerged in the literature, including the formulation of classroom management plans and strategies for cultivating better rapport with students. It is recommended that classroom rules and procedures be established early in the academic year and that consequences be consistently enforced among students throughout the year. Research indicates that routines and fairness

positively impact behavior and academic quality. Teachers who maintain respectful classrooms are reciprocally respected by their students, with students perceiving these teachers as having higher learning expectations (Miller & Cunningham, 2011). Teachers are encouraged to prioritize the learning task over the final outcome or grade assigned, though this can prove challenging if education places a strong emphasis on accountability and high-stakes testing (Miller & Cunningham, 2011).

Although most studies on classroom environments are inherently limited to individual classrooms, a few investigations have explored the influence of school culture on classroom atmospheres. Findings suggest that schools characterized by an authoritative culture—featuring clear direction, delegation of responsibilities, and mutual accountability—are typically perceived by students and teachers as successful. Conversely, schools lacking leadership or marked by frequent micro-conflicts tend to be viewed by students and teachers as hindering educational progress (Miller & Cunningham, 2011).



2.8 Summary

The effect of reducing class size on student achievement has produced inconclusive outcomes across various educational levels, including elementary, middle, and secondary schools. Different studies have yielded conflicting results, with some indicating significant positive effects on student achievement when class sizes are decreased, while others show minimal or no impact. For instance, the Project STAR study conducted at the elementary level initially demonstrated improved student achievement with smaller class sizes, but subsequent analyses of the data have generated mixed findings. Some studies support the initial results, while others raise concerns about the methodology.

At the middle school level, Chingo (2012) found little to no improvement in student achievement based on standardized test scores, while Heinesen (2010) focused on specific subjects and observed positive effects. Similarly, studies conducted at the secondary level have produced mixed findings. Atta et al. (2011), Brühwiler and Blatchford (2011), Heinesen (2010), and Krassel and Heinesen (2014) reported statistically significant improvements in academic achievement, while Wyss et al. (2007), Shin and Chun (2009), Corak and Lauzon (2009), and Owoeye and Yara (2011) found limited or no improvement. Although the impact of class size reduction on student achievement remains uncertain, there is evidence suggesting that it can enhance student engagement. Additionally, smaller class sizes generally receive positive feedback from parents, students, and teachers, as they create a more conducive learning environment.

Given the inconclusive nature of the existing research, further investigation is needed, especially at the secondary level in Ghana, to examine the perceived effects of class size on students' academic performance. The subsequent chapter will provide a detailed overview of the research design to be used in conducting the study.

CHAPTER THREE

RESEARCH METHODS

3.0 Introduction

Research methodology encompasses a structured approach and a series of protocols employed by researchers to carry out their investigations, gather data, examine data sets, and make inferences. It comprises the overall framework and strategies that guide the research process, ensuring that it is logical, reliable, and rigorous. A robust research methodology is crucial in determining the success and credibility of a research study.

A carefully crafted research methodology helps to control for biases, increase the generalizability of the results, and improve the accuracy of the conclusions. It also provides a roadmap for the researcher to follow, diminishing the likelihood of mistakes and enhancing the efficacy of the study. To summarize, the research methodology plays a vital part in establishing the quality and dependability of a research investigation. Its importance in research cannot be over-emphasized.

The objective of the study was to examine the perceived effects of large class size on students' academic performance in selected public senior high schools in Akwapim South District in Eastern Region. This chapter covered in detail the research design, population, sample and sampling techniques, instrument, data collection and data analysis. The philosophical and theoretical perspectives and how they influenced the choice of methodology for the study were also discussed in depth. To accomplish the goal of this study, the following research questions were posed:

1. How do students in public senior high schools in Akwapim South District perceive the impact of large class size on their academic performance?

2. What are the perceived effects of psychological classroom environment on teaching and learning in public senior high schools in Akwapim South District?
3. What are the perceived effects of psychological classroom environment on students' academic performance in public senior high schools in Akwapim South District?
4. How can large class size be managed to improve students' academic performance in public senior high schools in Akwapim South District?

In addition to the four research questions, three hypotheses were formulated to assist in determining the relations between the variables of the study.

3.1 Ontological and Epistemological Underpinnings

Social reality encompasses the commonly held beliefs, values, customary practices, and perspectives within a community, shaping how individuals perceive and interact with their environment. While some people perceive social reality as a static and unchanging framework, others believe it is continually shaped and constructed through human interactions and actions. Different individuals may have varied perspectives on social reality, leading to its diverse interpretations and constructions. Consequently, the choice of research methodology is influenced by theoretical and philosophical viewpoints regarding knowledge and its generation (Cohen et al., 2000).

According to Burrell and Morgan (1987), the way researchers in the field of social science perceive and study phenomena is influenced by two sets of philosophical assumptions: ontology and epistemology. Ontology refers to the underlying beliefs we hold about how we perceive the world (Burrell and Morgan, 1987). Gray (2004) explains that ontology explores the essential nature and fundamental essence of entities within the social realm. It encompasses our

perspective on the social world and the various phenomena or entities that constitute it. There are different ontological stances, including objectivism, constructivism, and realism (Mathew and Ross, 2010).

Objectivism is the ontological stance that assumes the existence of an objective reality that exists independently of human interpretation. Objectivism holds that there are objective facts, truths. A phenomena can be studied and understood through empirical observation and measurement. The object is to minimize subjective biases and personal interpretations. The focus is on gathering observable evidence and establishing causal relationships. Objectivist researchers typically value reproducibility and generalizability in their research findings. Objectivism aligns with the realist perspective Realism acknowledges the existence of an external world that is governed by natural laws and principles. It emphasizes the belief that there are real, causal mechanisms and structures underlying social phenomena. Realists recognize that social phenomena are not merely subjective constructions or products of human interpretation but are influenced by objective factors that exist outside of individual perceptions. Realist researchers often use a combination of qualitative and quantitative methods to explore and explain social phenomena (Burrell and Morgan, 1987).

On the hand, subjectivism is an ontological position that highlights the subjective nature of reality. It recognizes that human beings have unique subjective experiences. Subjective researchers often adopt qualitative research methods. Knowledge is seen as socially and context independent. The aim of subjective research is to generate rich, nuanced understandings of human experiences. Subjectivism is connected to the nominalist perspective, which argues that social reality does not have an independent, objective existence that can be accessed in an

unbiased and objective manner. Instead, it suggests that social reality is influenced and shaped by human cognition and interpretation (Burrell and Morgan, 1987).

Epistemology pertains to the investigation of how we can inquire into the various aspects of the world or determine the most effective means of understanding phenomena (Kuranchie, 2016). It encompasses our underlying beliefs regarding the optimal methods for studying the world (Burrell and Morgan, 1979). Epistemology focuses on how humans acquire knowledge and establishes the criteria for what can be considered valid knowledge within a particular field (Waliman, 2006). Epistemology deals with how knowledge is acquired and understood. It examines the various methods, theories, and frameworks that underpin different areas of knowledge and disciplines. It plays a crucial role in shaping the methodologies and approaches used in research. Epistemological perspectives can vary, ranging from empiricism to rationalism and beyond. Three epistemological positions were identified by Gray (2004). The first perspective is Objectivist epistemology, which asserts that reality exists objectively, regardless of the observer, and thus research seeks to uncover such truths through a scientific method. This epistemological standpoint is associated with the realist perspective. The second perspective is Subjective epistemology.

This position acknowledges that individuals have the capacity to construct knowledge, but contends that meaning is imposed upon actors by external objects or entities. The third is constructivist epistemology. Constructivism asserts that knowledge is actively constructed and shaped by individuals through their experiences, interactions, and interpretations of the world. It emphasizes the role of social and cultural contexts in knowledge formation and acknowledges the subjectivity and perspective of the knower. Constructivists believe that meaning is constructed not discovered. It completely dismisses the objectivist position.

Participants construct their own interpretations and meanings in diverse manners, even when considering the same phenomenon (Gray, 2004). This epistemological stance is associated with the nominalist ontological position.

In summary, ontology concerns the nature of truth, whereas epistemology focuses on the methodologies used to determine truth. This study aligns with the realist ontological stance.

3.2 Research Paradigm

A research paradigm is a framework that guides the entire research process. The fundamental beliefs, values and assumptions that shape a particular approach to scientific enquiry are defined. The common ones are positivism, interpretivism, critical theory, constructivism and pragmatism. Each has its own approach to designing, conducting and interpreting research. The methods and techniques used, the questions asked, and the interpretation of results are influenced by the choice of research paradigm. A research paradigm provides the lens through which researchers view and understand the world, and the nature of knowledge and the research process itself. This study is guided by the positivist paradigm.

3.2.1 Positivism

Positivism in research is a philosophical perspective and research paradigm that emphasizes the use of scientific methods to gather empirical evidence and uncover objective knowledge about the social world. Positivists adopt quantitative research methods such as surveys, experiments, and statistical analysis. It aims to uncover regularities, patterns, and laws that govern social phenomena. The main focus is on uncovering objective facts. Creswell (2003) argues that the world operates according to governing laws, which necessitate testing and refining in order to

achieve a more profound comprehension. Positivists maintain the conviction that there is observable and quantifiable information that is yet to be uncovered (Kuranchie, 2016).

This paradigm contrasts with interpretivism which emphasizes subjectivity, understanding subjective meanings, and exploring the social construction of reality. Positivists view the universe as deterministic, meaning they believe that events are governed by objective laws and principles. They hold the conviction that research can discover these scientifically verifiable principles that govern social existence (Babbie, 2005). Positivists assert the existence of a single objective reality that can be studied through empirical investigation. They formulate hypotheses at the beginning of a study and use gathered evidence to either confirm or refute these hypotheses (Kuranchie, 2014). According to Wilson (2010), researchers who subscribe to positivism believe that they are independent of their research. Independence connotes that the researcher maintains minimal interaction with the participants when conducting their studies the positivist approach is nomothetic, that is, it uses laws or law-like principles (Newman 2007). Researchers who believe in positivism empirically test ideas. They use quantitative techniques such as experiments, surveys, correlational and causal comparative to undertake studies. Positivism is also termed objectivism. The positivist paradigm is typically confirmed by evaluating four criteria: internal validity, external validity, reliability, and objectivity (Burns, 2000). The objective of this study aligned with a positivist approach.

3.3 Research Approach

The quantitative approach is a research methodology employed to describe or explain phenomena using numerical data and analysis. It relies on numerical data to analyze and understand a phenomenon. It is used to draw inferences, test hypotheses

and make predictions based on a set of data. Quantitative research uses research designs such as survey, experiment, correlational and ex-post facto to help describe phenomena to be investigated.

Quantitative research involves investigating relationships, causality, and the current state of phenomena by gathering and statistically analyzing numerical data (Ary et al, 2010). Researchers rely on mathematical calculations, test scores, and various measurements to explain, validate, predict, and manage the phenomena they are studying. Quantitative research follows a positivist philosophy, which asserts that new knowledge is generated through the formulation of testable and verifiable theories derived from theoretical assumptions. This approach is applicable to both natural and social sciences, as they both aim to develop theories that can be tested and confirmed to explain various issues (Ary et al, 2010).

Quantitative research employs probability sampling techniques to select participants, ensuring that every member of the target group has an equal chance of being included. These techniques, including simple random sampling, systematic sampling, stratified sampling, and cluster sampling, are utilized to generate a sample that is representative of the population under study. Primary data collection methods in quantitative studies primarily involve structured instruments, such as questionnaires, surveys, structured interviews, structured observations, tests, and content analysis. By using structured instruments, researchers ensure that respondents answer the same set of questions in the same order. Additionally, these instruments provide predetermined response formats that participants select from, facilitating the comparison of responses. The utilization of structured instruments in the quantitative approach generates numerical data that can be analyzed using descriptive and inferential statistics.

3.4 Research Design

A wide range of research designs exist, each suited to different research problems. The selection of a research design is influenced by factors such as the specific research questions, available resources, and the level of control the researcher can exert over variables of interest. Various types of research designs include experimental, quasi-experimental, correlational, descriptive, and exploratory designs. The selection of a specific research design is influenced by the distinctive characteristics of the study and the objectives it seeks to accomplish.

A survey is a research method used to gather data about a population from a sample of individuals. Surveys are commonly utilized as a research method to collect data from a sample of individuals, providing insights into a larger population. This approach involves selecting certain members of a target group to participate and extrapolating the findings to represent the entire population. Newman (200) postulates that survey research seeks to measure variables and also test multiple hypotheses to determine the relationships between variables. Questionnaires are frequently employed as the primary tool for gathering data from survey participants. The purpose of surveys is to acquire information pertaining to various aspects, including attitudes, opinions, behaviors, and demographics of the population under study. Through the administration of surveys, researchers can enhance their comprehension of the characteristics and viewpoints of the target population.

Surveys enable the collection data, which can be analyzed to draw meaningful conclusions and make generalizations about the broader population. Newman (2003) postulates that survey research seeks to measure variables and also test multiple hypotheses to determine relationships between the variables. Survey helps to gather

data on what people think, feel, and do about something, somebody, practices and policies (Kuranchie 2014).

Ary et al. (2010), indicate that surveys can be categorized based on their focus, such as census surveys (which aim to collect data from an entire population) and sample surveys (which gather data from a selected sample). They can also be classified based on their scope, including longitudinal surveys (which follow participants over an extended period) and cross-sectional surveys (which collect data at a specific point in time). Babbie (2005) further adds that surveys serve exploratory, descriptive, and explanatory purposes. Considering the limited timeframe available for data collection, I elected to use a cross-sectional survey. This decision was made because a -cross-sectional survey is expected to effectively contribute to achieving the study's objectives.

Babbie (2005) defines a cross-sectional survey as an approach that involves observing a sample or cross section of a population or issue at a single point in time. In this type of survey, data is collected only once, providing a snapshot of the population or issue under investigation. Cross sectional survey provides a snapshot of the characteristics, attitudes or behaviours of the population at a given moment, allowing researchers to make inferences about the population as a whole. The results of a cross sectional survey can be used to identify patterns, trends and relationship between variables but they do not allow for the examination of changes over time or the establishment of causality.

Hennekens and Buring (1987) provided an overview of the strengths and weaknesses of cross-sectional surveys. The strengths include their suitability for descriptive analysis, ease and speed of implementation, data collection on all variables at a single point in time, the ability to measure prevalence for all

investigated factors, the capacity to study multiple outcomes and exposures, and their usefulness for hypothesis generation. Conversely, the researchers identified several weaknesses of cross-sectional surveys. These include the limitation of measuring prevalence rather than incident cases, challenges in interpreting identified associations, difficulties in establishing the temporal sequence between exposure and outcome, susceptibility to bias due to low response rates, and potential misclassification resulting from recall bias. The researcher opted for a cross-sectional survey due to the limited duration available for data collection.

3.5 The Study Area

Site selection is indispensable in research. If the location is inappropriate it could weaken or ruin eventual findings (Berg 2004). To get the most relevant data in the region, Akwapim South District was selected for the study. Eastern region consists of 33 districts.

The district where this the study was conducted is positioned in the southeastern section of the region. It shares borders with the Nsawam/Adoagyiri Municipality to the west, the Kpone-Katamanso District to the southeast, the Ga East Municipality to the south, and the Akwapim North Municipality to the northeast. Geographically, it is located between latitudes 5.5° N and 5.58° N and longitude 0.0° W. The district's administrative center is Aburi. The district encompasses an area of 229.4 square kilometers and was selected for its strategic location as a major transit point. It holds the distinction of being the most densely populated district within the region, with a recorded population of 76,922 according to the 2020 census conducted by the Ghana Statistical Service. Additionally, it stands out as a commercial hub within the region. The district is home to a teacher training college, four public senior high schools, 102 basic schools, and 224 primary schools. Akwapim South District's

primary sources of competitive advantage and development are identified in two key sectors: agriculture and tourism. The district benefits from favorable weather conditions, which are typically cool

3.6 Population and Sample

According to Polit and Hunglar (1996), population is described as the complete collection of cases that satisfy a specific set of criteria. It represents the specific group that the researcher aims to gather information from in order to make conclusions (Kuranchie, 2021). All members of a well-defined group of people, events and objects constitute population in research. Students from four public senior high schools in Akwapim South District constitute the population for this study.

The student population of the four public senior high schools is captured in the table below.

Table 3.1: Estimated population of schools

Name of School	Student Population
Aburi Girls Senior High School	2980
Adonten Senior High School	2280
Diaspora Senior High School	2500
Presby Senior High Technical School, Aburi	2800

Source: field data (2023)

From a total student population of 10,560 in the four schools, a sample of 280 students was utilized for the study. The sample size of 280 was determined based on Krejcie and Morgan's (1970) table, which indicates that a sample of 280 from a population of 10,560 is deemed representative.

3.7 Sampling Techniques

A researcher can choose probability or non-probability sampling technique depending on the kind of research he or she is conducting. The selection of an appropriate sampling technique is crucial as an incorrect choice can pose challenges in data analysis and hinder the ability to draw valid conclusions and make accurate inferences. In this study, both stratified sampling and simple random sampling techniques were employed.

The schools involved in the study were divided into two strata: mixed schools and single sex schools. Stratified sampling was used to ensure representation from each type of school. During the data collection stage, a simple random sampling technique was employed to select the respondents. A total of 280 students were chosen from the four schools. By employing simple random sampling, every member of the population had an equal opportunity to be chosen for inclusion in the sample. This approach guaranteed fairness and unbiased representation in the selection process. The table provided below presents the names of the schools, their types, and the corresponding samples that were taken.

Table 3.2: School Name, School Type, Sample Size

Name of school	Type	Sample
Aburi Girls Senior High School	Single	81
Presby Senior High Technical School	Mixed	62
Adonten Senior High School	Mixed	78
Diaspora Senior High School	Single	59

Source: Field Data (2023)

3.8 Instrumentation

Data collection instruments refer to the tools and methods utilized to gather data for a study. Common examples include questionnaires, interviews, surveys, focus groups, and observations. The selection of a specific data collection instrument depends on factors such as the research question, the type of data being collected, and the target population. For this specific study, the researcher chose to utilize a questionnaire as the main tool for collecting data. As defined by Alhassan (2007), a questionnaire is a research instrument comprising a carefully designed set of questions intended to gather information from participants. In this study, the questionnaire was developed, consisting of 40 items, to gather data from the respondents. The questionnaire employed a Likert scale, allowing participants to express their level of agreement or disagreement with the items. It was divided into five sections, encompassing a total of 40 items. The survey used in this study was modified from a research conducted by Hansen in 2018.

3.9 Pre- Testing of Instruments

One of the schools was selected in January to pretest the questionnaire. Thirty students from Presbyterian Senior High Technical School in Aburi were selected using simple random sampling technique to participate in the exercise. The purpose of was to enhance the validity and reliability of the questionnaire. After the exercise, ambiguous questionnaire items were revised to make them clearer and more understandable to the respondents. Additionally, items that yielded similar responses were modified to improve their distinctiveness. These adjustments were made with the intention of refining the questionnaire and ensuring that it effectively captures the desired information.

3.10 Validity of the Research Instrument

The validity of a research instrument refers to how well it serves its intended purpose in research procedures, providing accurate and precise deductions based on the findings (Alhassan, 2007; Mugenda & Mugenda, 2003). It is important to pre-test study instruments before conducting actual research, as emphasized by Wiersma (1995), as this helps establish both face and content validity. In January 2023, pre-testing was successfully done, confirming the validity of the instrument.

3.11 Reliability of the Research Instrument

Reliability refers to the consistency of a research instrument in producing similar results under the same conditions on different occasions. Reliability, as defined by Hackman (2002), refers to the degree to which data exhibit consistency, accuracy, and precision. In this study, the research instrument underwent a pre-testing phase, and the reliability of the instrument was assessed using Cronach's alpha for interval consistency. The calculation was conducted using the Statistical Package for Social Sciences version 22.0, yielding a reliability coefficient of .791.

3.12 Data Collection Procedure

Before administering the questionnaire to the students, a letter was sent to the heads of the four participating schools and the district director, informing them about the data collection process. A questionnaire, consisting of 40 items, was developed to gather primary data from the participants. It was divided into six sections to cover different aspects of the study. Section A focused on collecting bio-data information from the respondents. In Section B, eight items were designed to gather data on the influence of large class size on students' academic performance. Section C aimed to examine the perceived effects of psychological classroom environment on students'

academic performance, with eight statements for participants to rate their level of agreement or disagreement. Section D examined the influence of the psychological classroom environment on teaching and learning. Section E, consisting of seven items, aimed to explore strategies for managing large class sizes to enhance student achievement. The final section, Section F, consisted of seven items and aimed to examine the perceived effects of classroom interaction on student success.

3.13 Data Analysis

I used frequency and percentages to analyze the demographic variables. Pearson product moment correlation was used to test hypotheses. Multiple regression analysis of all the variables was also done. The research questions were also analyzed using frequency and percentages. A significance level of 0.05 (alpha level) was set for the statistical analysis. The researcher utilized the Statistical Package for Social Sciences version 22.0 as the software to analyze the data for the study.

3.14 Research Ethics

Ensuring the ethical requirements and well-being of participants is a crucial and challenging responsibility for researchers. It is essential to avoid putting participants at risk or disempowering them through deceptive practices (Cresswell, 2003). Concealing the purpose of the study from participants is considered unethical. The researcher followed various guidelines, including obtaining informed consent from the participants and clearly stating that their participation was voluntary. Anonymity and confidentiality were strictly maintained throughout the study.

3.15 Chapter Summary

In this chapter, an overview of the research approach, design, data collection instrument, population, sample, and sampling technique employed in the study were discussed. It also discusses the measures taken to assess the validity and reliability of the research. Additionally, the chapter outlines the data analysis methods employed. Ethical considerations regarding the protection of respondents' privacy rights were also explained. The subsequent chapter will present the findings of the study and provide a comprehensive discussion of those findings.



CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

The aim of this study was to investigate the perceived effects of large class size on students' academic performance in public senior high schools located in the Akwapim South District of the Eastern Region. The chapter begins by providing an overview of the demographic characteristics of the participants, followed by the presentation of research findings that are categorized into four sections based on the research questions that were asked.

The end of the chapter will present a summary of the data findings as they relate to the research questions.

4.1 Questionnaire Response Rate

There are four public senior high schools in Akwapim South District and all of them were included in the study. From these four schools, two hundred and eighty (280) students were selected through stratified and simple random sampling technique. The return rate is 100%. This means all the two hundred and eighty questionnaires were distributed and filled by the participants. The views of the participants are presented in the section that follows:

4.2 Analysis of Demographic Data

The object of this section of the questionnaire was to gather personal information from the participants. Age, gender and name of school are some of the personal details that the researcher solicited from the participants.

Table 4.1: Name of Institution and Sample Size

School	Frequency	Percent
Presbyterian Senior High Technical School	62	22
Diaspora Girls Senior High School	59	21
Aburi Girls Senior High School	81	29
Adonten Senior High School	78	28
Total	280	100

Source: Field Data (2023)

Table 1 shows the four schools that took part in the study. In each school, stratified sampling technique was used to select the above figures from each school. Simple random was later adopted to ensure each participant was give and equal chance of being selected. The sample size is two hundred and eighty (280) students.

Table 4.2: Age of respondents

Age group	Frequency	Percentage (%)
15-19	280	100

Source: Field Data (2023)

The table above represents the age distribution of the respondents. All the respondents fall within the age range of 15-19 years, with a total frequency of 280, representing 100% of the respondents.

Table 4.3: Gender of Respondents

Sex	Frequency	Percentage (%)
Male	73	26.1
Female	207	73.9
Total	280	100

Source: Field Data (2023)

Table 3 represents the frequency and sex distribution of gender among the respondents. Seventy-three (73) representing 26.1% identified as male, while two hundred and seven (207) representing 73.9% identified as female. The reason why the females are more than the males is that two out of the four schools are single sex schools (girls only). Aside that, the sample was divided equally among the schools.

Table 4.4: Number of Students in Class

Class	Frequency	Percent
40-49	80	28.6
50-59	88	31.4
60-69	112	40.0
Total	280	100

Source: Field data (2023)

Table 4 shows that (80) students representing 28.6% are in classes that have 40-49 students. Eighty-eight (88) students representing 31.4% are within the class range of 50-59. One hundred and twelve students representing 40% are also within the class range of 60-69. The recommended student-teacher ratio by Ghana education service is 40:1. All the classes indicated above are more than 40 which makes them large class sizes. Some classes have more than sixty students which is way more than the recommended teacher to student ratio by Ghana education service.

4.3 Analysis of Main Data

Descriptive statistics (frequency and percentage, mean and standard deviation) and inferential statistics (multiple regression and Pearson product moment correlation coefficient) were used to analyze the research questions and hypothesis.

Research Question One

How do students in public senior high schools in Akwapim South District perceive the impact of large class size on their academic performance?

Table 4.5: Perceived Effects of Large Class Size on Students' Academic Performance

Statement	SA		A		D		SD		M	St.D
	F	%	F	%	F	%	F	%		
Large class size limits my ability to listen daily to my teacher	69	24	200	71.4	11	3.9	0	0	3.21	.102
Large class size limits my ability to participate in class activities.	65	23.2	188	67.1	13	4.6	14	5.0	3.09	.099
Large class size affects my academic performance.	57	20.4	182	65	39	13.9	2	.7	3.05	.103
Large class size limits my learning opportunities	72	25.7	151	53.9	55	19.6	2	.7	3.05	.010
Teachers do not give class exercise because of large class size.	139	49.6	116	41.4	21	7.5	4	1.4	3.39	.114

Table 5 shows how large class size affects students' academic performance. A significant number of students agreed that large class size limits their ability to listen daily to their teachers. This was confirmed by two hundred and sixty-nine (269) of the

participants representing 95%. Conversely, 11 respondents, comprising 5% of the sample, held a dissenting viewpoint, disagreeing with the notion that large class sizes impede their daily listening capacity towards their teachers. The data also reveals that large class size is a barrier when it comes to class participation. Respondents who strongly agreed that large class size affects their participation in class are 65, representing 23.2%. Those who agreed are 188 representing 67.1. %. The number of students who strongly disagree are 13, representing 4.6% and the number that disagreed is 14 representing 5%. Azigwe's (2016) results were consistent with the results obtained in this research, affirming that student engagement is diminished in larger class settings, while teachers face challenges in delivering effective and efficient instruction. The outcomes of this study provide further evidence in support of Blatchford's (2007) conclusions, which highlight how large class sizes restrict students' active participation in classroom activities.

Also 80.4% indicated that large class size affects their academic performance, however, 19.4 percent of the respondents disagreed that large class size affects their academic performance. The results of this study align with the conclusions drawn by Kornfeld (2010), who emphasized the substantial influence of large class sizes on students' academic performance. Furthermore, the outcomes of this research are consistent with the findings of Popova (2015), whose study demonstrated the impact of large class sizes on students' academic achievement. However, the findings of this study contradict the conclusions of Hattie (2009), who determined that there is no correlation between large class size and students' academic performance. Hattie (2009) additionally argued that the quality of teaching plays a pivotal role in shaping students' academic outcomes.

Moreover, it is evident that larger class sizes restrict learning opportunities, as supported by 79 percent of the participants. Conversely, 21 percent of the respondents disagreed with the notion that their learning opportunities were limited by large class sizes.

Additionally, 91 percent of the participants agreed that teachers are unable to frequently provide in-class exercises due to the constraints imposed by large class sizes. However, 9 percent of the respondents disagreed with the statement suggesting that teachers' ability to assign in-class exercises is affected by large class sizes.

These findings align with a study conducted by Amedahe (2016), which revealed that students in large class sizes experience fragmented discussion time and teachers resort to predominantly passive lecturing. As a result, there is a reduced emphasis on written homework assignments and fewer opportunities for students to engage in problem-solving activities.

Research Question Two

What are the perceived effects of psychological classroom environment on teaching and learning in public senior high schools in Akwapim South District?

Table 4.6: Perceived Effects of psychological classroom environment on teaching and learning

Statement	SA		A		D		SD		M	St D
	F	%	F	%	F	%	F	%		
The classroom environment supports cohesiveness	84	30	143	51.1	41	14.6	12	4.3	3.07	.376
The classroom environment supports participation	51	18.2	187	66.8	14	5	28	10	2.93	.094
Our classroom is favorable for forming groups to help learning for academic success.	106	37.9	104	37.1	41	14.6	29	10.4	3.02	0.12
I feel left alone during lesson period	22	7.9	61	21.8	131	46.8	66	23.6	2.14	.094
my classroom environment supports positive involvement of students ideas during classroom activities	58	20.7	143	51.1	48	17.1	31	11.1	2.81	.099
My classroom is safe for students to ask questions	94	33.6	156	55.7	21	7.5	9	3.2	3.20	.109
Teachers encourage us when we have difficulties during lessons	150	53.6	94	33.6	35	12.5	1	4	3.40	.146
Teacher communicates learning goals	161	57.5	76	27.1	30	10.7	12	4.3	3.37	.207
Teachers emphasize learning process instead of learning during lessons	38	13.6	173	61.8	62	22.1	7	2.5	2.86	.109

The findings from table 6 indicate that the psychological classroom environment has a significant positive impact on students' academic performance. The results show that 227 student respondents, accounting for 80.1 percent, agreed that their classroom fosters a sense of cohesiveness. Conversely, 53 respondents, representing 19.9 percent, disagreed with the notion that their classroom supports cohesiveness.

Again, 210 of the respondents, representing 65 percent agreed that the classroom environment is favorable for forming groups to help learning for academic success. On the other hand, 70 student respondents representing 35 percent disagreed that their classroom environment is favorable for forming groups to help learning for

academic success. These findings indicate that despite being in a large class size, students are still able to establish positive social connections. These results contrast with the conclusions drawn in the study conducted by Finn (2012), where it was found that students in smaller class sizes demonstrate higher levels of social and academic engagement compared to those in larger class sizes. The researchers in Finn's study further suggested that strong social and academic engagement contributes to improved academic performance. It is possible that cultural factors, such as the Ghanaian culture's acceptance of large social settings and individuals feeling at ease in such environments, may account for the differences observed between the present study and Finn's (2012) research.

Moreover, 83 student respondents, representing 29.7 percent agreed that they feel left alone during lesson period. On the other hand, 70.3 percent of the respondents said they don't feel left alone during lesson period. A significant majority of the participants, specifically 209 respondents, accounting for approximately 71.8 percent, expressed agreement with the notion that their classroom environment fosters positive engagement and encourages the contribution of students' ideas during classroom activities.

According to the data, a substantial majority of the respondents, around 89.2 percent, agreed that the classroom environment is safe for students to ask questions. However, a smaller percentage, approximately 9.8 percent, disagreed with this statement, indicating that they do not perceive the classroom environment as being conducive for students to freely ask questions. These findings are in opposition to the conclusions reached by Rubin (2012), whose research indicated that students in large class sizes may struggle to grasp the concepts taught due to the inhibiting nature of class size on their willingness to ask questions. Additionally, these results contradict

the study conducted by Altinok and Kingdon in 2012, which revealed that in large class sizes, students face challenges in approaching teachers with their questions. The researchers further noted that teachers handling large class sizes encounter difficulties in identifying problems during lessons and providing necessary corrections.

Furthermore, 87.2 percent of the participants agreed that their teachers provide encouragement when they encounter difficulties. This finding contradicts a study conducted by star researchers in 1978, which concluded that large class sizes pose challenges for teachers in effectively providing encouragement to most of their students. Moreover, this study's results oppose the findings of a study conducted by Lee (2002), which suggested that students in smaller class sizes receive more encouragement compared to those in larger class sizes.

Finally, the table indicates that 77.6 percent of the participants agreed that their teachers effectively communicate learning goals to them. Additionally, 73.7 percent of the respondents agreed that their teachers prioritize the learning process rather than solely focusing on the end result during lessons.

Research Question Three

What are the perceived effects of psychological classroom environment on students' academic performance in public senior high schools in Akwapim South District?

Table 4.7: Perceived Effects of Psychological Classroom Environment on Students' Academic Performance

Statement	SA		A		D		SD		M	St. D
	F	%	F	%	F	%	F	%		
Your classroom supports positive motivation	100	35.7	136	48.6	19	6.8	25	8.9	3.11	.105
Students perceive classroom environment as being socially supportive	15	5.4	192	68.6	56	20	17	6.1	2.74	.116
Students receive emotional support from teachers	94	33.6	96	34.6	83	29.6	7	2.5	2.99	.116
Students receive encouragement from teachers	157	4.3	112	40	15	5.4	1	.4	3.55	.111
teachers encourage students to talk and share ideas in class	125	44.6	121	43.2	30	10.7	4	1.4	3.31	.104
Students are given immediate feedback when they need direction to proceed	75	26.8	158	56.4	41	14.6	6	2.1	3.08	.112
Class size influences the pace of lessons in class	81	28.9	127	45.4	60	21.4	11	3.9	2.99	.111
Teachers are able to identify students who have difficulties in understanding the main ideas of a lesson	92	32.9	92	32.9	50	17.9	46	16.4	2.99	.111
Large class size increase the time teachers spend on non-instructional tasks	39	13.9	174	62.1	52	18.6	15	5.4	2.82	.118
Teachers spend a lot of time controlling students rather than teaching	83	29.6	88	31.4	97	34.6	12	4.3	2.24	.109
Teachers are able to assess the instructional needs of students	63	22.5	83	29.6	119	42.5	18	5.4	3.77	.112
Teachers are able to assess the emotional needs of students	29	10.4	97	34.6	83	29.6	71	25.4	2.3	.109

The findings of Table 7 indicate that a significant proportion of the participants agreed that both large class size and the psychological classroom environment contribute to fostering positive motivation in the classroom. Specifically, 84.3 percent of the respondents confirmed this. Conversely, 14.7 percent of the participants disagreed with the notion that large class size promotes and supports positive motivation in the classroom. The results revealed that a majority of the participants, comprising 74 percent, expressed agreement with the notion that their classroom environment is socially supportive. On the other hand, 26 percent of the respondents held a contrary opinion, disagreeing with the statement regarding the social supportiveness of their classroom. Additionally, the results show that student respondents receive emotional support from teachers. This was corroborated by 68.2 percent of the respondents. This figure was contradicted by 32.6 percent of the respondents who said large class size makes it difficult for them to receive emotional support from their teachers.

Additionally, it is evident that teachers foster an environment in which students are encouraged to communicate and share their ideas during class. This affirmation was supported by 87.4 percent of the participants. Finn (2003) conducted a study and found that students exhibit higher levels of academic and social engagement when placed in smaller class sizes. Moreover, he revealed that when there is a strong connection between academic and social aspects, students' academic performance improves. However, the findings of Finn (2003) contradict the results obtained in this study. Regarding the provision of immediate feedback to students when they need to progress, the data reveals that 83.2 percent of the respondents affirmed that their teachers do give them immediate feedback. On the other hand, 16.8

percent of the participants reported that their teachers do not provide immediate feedback when necessary.

According to Table 7, a significant proportion of the respondents, specifically 74 percent, indicated that large class size does indeed dictate the pace of lessons in the classroom. However, it is noteworthy that 36 percent of the respondents disagreed with the notion that large class size has an impact on the pace of lessons. Regarding the question of whether large class size leads to an increase in the time teachers spend on handling non-instructional tasks, the data reveals that 76 percent of the respondents confirmed that teachers do spend more time dealing with non-instructional tasks due to the impact of large class size. The data also shows that time spent in controlling students is higher than teaching. This was also corroborated by 85 percent of the student respondents.

In conclusion, a significant percentage of the participants, accounting for 57.5 percent, believe that teachers face challenges in assessing the instructional needs of students due to large class size. On the contrary, 42.5 percent of the respondents held the view that their teachers are competent in assessing their instructional needs. However, when it comes to assessing students' emotional needs, 55 percent of the participants agreed that teachers are unable to adequately evaluate these needs.

Research Question Four

How can large class size be managed to improve students' academic performance in public senior high schools in Akwapim South District?

Table 4.8: How Large Class Size Can Be Managed to Improve Academic Performance

Statement	SA		A		D		SD		M	St. D
	F	%	F	%	F	%	F	%		
By the support teachers give to students	66	23.6	178	63.6	36	12.9	0	0	3.11	.111
Through professional development of teachers	58	20.7	157	56.1	63	22.5	2	.7	2.96	.105
Through the enhancement of reduced class size	85	30.4	117	41.8	76	27.1	2	.7	3.18	.101
Employing more teachers to reduce the workload of regular teachers	81	28.9	176	62.9	17	6.1	6	2.1	3.19	.101
Enrolling according to the space that can hold the students in the class	79	28.2	185	66.1	7	2.5	9	3.2	2.86	.103
Teachers making it a priority to give students time to work together when the teacher is not directing them.	56	20.0	138	49.3	79	28.2	7	2.5	2.98	.118
I prefer clustering students desks or using tables to help students work together.	81	28.9	127	45.4	60	21.4	11	3.9	2.70	.117

Table 8 reveals that student respondents agree that large class size and psychological classroom environment can be enhanced by the support teachers give their students. 87.2 percent of the respondents confirmed that large class size and psychological classroom environment can be enhanced by the support teachers give their students. 12.8 percent of the respondents disagreed with the statement.

According to the data, a majority of the respondents, specifically 213 individuals, accounting for approximately 70.8 percent, agreed with the proposition that recruiting more teachers to alleviate the workload of regular teachers can aid in

managing large class size and improving the psychological classroom environment. However, it is important to note that 67 respondents, representing 29.2 percent, disagreed with the notion of recruiting more teachers as a solution for managing large class size and enhancing the psychological classroom environment.

Furthermore, the results reveal that through professional development, management of large class size and psychological classroom environment can be improved. This was confirmed by 72.2 percent of the respondents. 27.8 percent of the respondents disagreed that professional development can be used to enhance the management of large class size and psychological classroom environment.

In addition, student respondents are of the view that large class size can be enhanced by reducing the number of students per class. 217 of the respondents representing 72.2 percent agreed with the statement. 27.8 percent of the respondents, however, dissented.

Table 8 further shows that, admitting students according to the space that is available is one of the ways of managing large class size and psychological classroom environment to enhance students' academic performance. The above statement was confirmed by 264 of the respondents representing 94.3 percent. 5.7 percent, however, disagreed that admitting students according to the space that is available would not enhance the management of large class size and psychological classroom environment.

Finally, the data indicates that a significant portion of the respondents recognize the importance of providing students with opportunities to work together independently and prefer clustering desks or using tables to facilitate collaborative work. Specifically, 69.3 percent of the respondents agreed that teachers should prioritize giving students time to work together without direct supervision as a means

of managing large class size and promoting a positive psychological classroom environment. Conversely, 30.7 percent of the respondents disagreed with this statement.

Furthermore, a majority of 76.8 percent of the respondents agreed with the idea of clustering students' desks or utilizing tables to encourage collaborative work. However, 23.2 percent of the respondents expressed disagreement with this approach.



Hypothesis One**Table 4.9: Correlation between large class size and psychological class environment**

Variables		Large class size	Psychological class environment
Large class	Pearson correlation	1	.761
	Sig(two tailed)		.000
	N	280	280
Psychological class environment	Pearson correlation	.761	1
	Sig(two tailed)	.000	
	N	280	280

Source: field data (2023) at 0.05 level, correlation is significant (2 tailed)

The first hypothesis was tested to find the relationship between large class size and psychological classroom environment. Pearson product moment correlation was computed using statistical package for social sciences version 22.0 the correlation co-efficient was .761. The correlation coefficient shows a positive correlation between the two variables. The results also show that there is statistically significant relationship large class size and psychological classroom environment. That is $r=.761$, $P \leq 0.05$, $\text{sig} = .000$ (2 tailed).

Hypothesis Two**Table 4.10: Correlation between large class size and academic performance**

Variables		Large class size	Academic performance
Large class	Pearson correlation	1	.631
	Sig(two tailed)	280	.000
	N	280	280
Academic performance	Pearson correlation	.631	1
	Sig(two tailed)	.000	280
	N	280	280

Source: Field Data (2023) at 0.05 level, correlation is significant (2 tailed)

The objective of the second hypothesis was to test the relationship between large class size and students' academic performance. Pearson product moment correlation was computed using SPSS version 22.0. The correlation co-efficient between large class size and students' academic performance was .631. The results from table 10 shows that large class size correlated with students' academic performance. The results also revealed that there is statistically significant relationship between large class size and students' academic performance. That is $r = .631$, $P \leq 0.05$, sig = .001(2 tailed).

Hypothesis Three

Table 4.11: Correlation between classroom interaction and academic performance

Variables		Classroom interaction	Academic performance
Classroom interaction	Pearson correlation	1	.763
	Sig(2 tailed)	280	.000
	N		280
Academic performance	Pearson correlation	.763	1
	Sig(2 tailed)	.000	280
	N	280	

Source: Field Data (2023) at 0.05 level, correlation is significant (2 tailed)

The third hypothesis was tested to find out the relationship between classroom interaction and students' academic performance. The Pearson product moment correlation co-efficient was .763 which is a fairly positive correlation between the two variables. The results also revealed that there is statistically significant relationship between classroom interaction and academic performance of students. That is $r=.763$, $P=\leq 0.05$, $\text{sig} = .000$ (2 tailed).

Table 4.12: Multiple regression analysis of the variables

Model	Unstandardized co-efficient		Standardized co-efficient		
	B	Std error	Beta	T	Sig
Constant	30.723	3.237		9.491	.000
Large class size	-.555	.175	-.112	-3.236	.001
Psychological classroom environment	1.590	.117	.554	13.563	.000
Classroom interaction	.731	.096	.307	7.621	.000

Source: Field data (2023)

Table 12 presents the results of the multiple regression analysis, which examines the correlation among the independent variables. The table indicates that all the independent variables, including large class size, psychological classroom environment, and classroom interaction, have statistically significant relationships. Specifically, the p-values for large class size, psychological classroom environment, and classroom interaction are .001, .000, and .000, respectively.

The findings of this study align with the research conducted by the Heshong Mahone group (2003). The researchers found that large class size significantly impacts students' academic performance and emphasized that classroom environment is influenced by multiple factors.

4.4 Chapter Summary

The study discovered that the three independent variables (large class size, psychological classroom environment and classroom interaction) had a significant influence on the dependent variable (academic performance). It was also revealed that large class size correlated with students' academic performance. The study further discovered that classroom interaction and students' academic performance had a positive correlation. Psychological classroom environment and large class size also had a positive correlation. Finally, the study found that large class size is the highest predictor of students' academic performance, followed by psychological classroom environment and classroom interaction.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter comprises summary of the study, conclusions drawn from the study and recommendations for further action and research on the influence of large class size on students' academic performance. Educational literature does not show a clear consensus on the influence of large class size on academic performance. The study investigated the perceived effects of large class size on students' academic performance.

The study addressed four research questions and tested three hypotheses. A cross sectional survey was adopted. Frequency, percentage, mean and standard deviation were used to analyze the research questions. The hypotheses were tested using Pearson product moment correlation. Tests were conducted at 0.05 significance level.

There are many challenges facing the educational sector in Ghana. One of the challenges is inadequate funding. This challenge makes it for the objectives of the education sector to be achieved. At the secondary level, educational leaders are struggling with to address many issues. One of the issues is large class size. The recommended student-teacher ratio in Ghana is 1:40, but most of the public secondary schools have classes that contain more than the recommended student-teacher ratio by Ghana education service.

5.1 Summary of Findings

1. The findings revealed that students' academic performance was impacted by the presence of large class sizes. For instance, a notable proportion of the participants agreed that their ability to actively participate in class was hindered by large class size. Additionally, they expressed that teachers were less likely to assign them exercises frequently due to the size of the class.
2. The respondents conveyed that their capacity to listen to their teachers on a daily basis is constrained by large class size. Furthermore, they expressed that their learning opportunities are adversely affected by large class size.
3. The views and opinions of the respondents showed that psychological classroom environment had a significant influence on their academic performance. Positive psychological classroom environment sets the stage for enhanced learning, improved academic performance and student success.
4. One of the revelations was that students were not attended to during lesson period. This means that individual attention is not given to most of the students. Therefore, students would have to put in extra effort or contact teachers in their spare time to understand difficult concepts. It is important for teachers to strive for inclusion and attentive practices to ensure that all students get the support they need to thrive emotionally and academically.
5. It was also revealed that teachers did not give class exercise often. This implies that teachers do not assess their teaching effectively. It will be difficult to know whether students understand if they are tested often. Failure on the part of teachers to assess their teaching can impede students practice, mastery, examination preparation and potentially hindering their overall learning experience and academic progress.

6. The study discovered that there was a positive correlation between large class size and psychological classroom environment. This positive correlation suggests that despite the challenges that may come with large class sizes, such as increased noise levels, reduced individual attention, the psychological climate remains favourable.
7. The study also found that teachers find it difficult to control or handle non-instructional tasks. While the primary focus of teachers is on student learning, their ability to handle non-instructional tasks is crucial for creating a supportive learning environment. By effectively managing these tasks, teachers can enhance classroom learning and optimize instructional time.
8. The study revealed that students were encouraged to talk and share ideas in class. Sharing ideas in class is important for enhanced learning and critical thinking. It creates a dynamic and inclusive learning environment that helps students to grow and develop.
9. The study showed that large class size could be managed by employing more teachers. The availability of more teachers can positively influence teaching and learning, engagement and overall educational outcomes in large class settings.
10. The study further revealed that managing large class could be achieved by admitting students based on the space available. Admitting students based on the available space is essential for ensuring the safety, well-being and effective learning of students. By responsibly managing student intake, public senior high schools can provide a conducive and inclusive educational experience that benefits all learners.

5.2 Conclusion

The study investigated the perceived effects of large class size on students' academic performance in public senior high schools in Akwapim south district. Influence of large class size on students' academic performance, influence of psychological classroom environment on teaching and learning, influence of psychological classroom environment on students' academic performance, and how large class size and psychological classroom environment can be managed were the four areas investigated in this study. The study revealed that large class size has negative impact on students' academic performance. Large class size also has significant influence on the appropriateness of teachers' instructional strategies. With respect to the influence of psychological classroom environment on students' academic performance, it was discovered that students feel left alone during lesson period and also find it difficult to ask questions in large class settings. There is therefore a lot of reasons to conclude that large class size has psychological influence on students' academic performance.

Again, concerning how large class size and psychological classroom environment can be managed to enhance teaching and learning, the study revealed that recruiting more teachers and expanding infrastructure at the secondary level could go a long to reduce the negative impact of large class size on students' academic performance.

Finally, the results showed that large class had a significant negative influence on students' academic performance. As a result, Akwapim south district where this study took place could use this study as a rationale for conducting further studies prior to making changes to class size at the secondary level. To enhance teaching and learning in public senior high schools in the eastern region, the schools should comply

with the recommended student- teacher ratio by Ghana education service or scale down large class sizes.

5.3 Recommendations

1. The government should consider augmenting the budget allocation to enhance the infrastructural facilities in public senior high schools in Akwapim south district. Increasing budget allocations to enhance school infrastructure is a crucial step toward improving the quality of education, ensuring the safety and well-being of students and educators, and fostering long-term societal development and competitiveness. It is an investment in the future of a nation, as it directly impacts the quality of education and, by extension, the prospects of its citizens.
2. The Ministry of Education, Ghana Education Service, Parents Association, and Old/Past Students Association should each contribute their efforts to address the need for renovating dilapidated buildings and constructing new classrooms in Akwapim south district in order to accommodate the increasing enrolment figures in secondary schools.
3. Teachers in Akwapim south district should be given refresher courses on managing large classes from time to time. providing teachers with refresher courses on managing large classes is essential for improving the quality of education, supporting teachers in their professional growth, enhancing student engagement, and ultimately, ensuring that students receive the best possible education, regardless of class size. These courses are an investment in the continuous improvement of the education system.
4. Ghana education should take steps to employ more teachers to minimize the use of large classes. This can lead to improved learning outcomes, better

teacher-student relationships, and a more inclusive and equitable educational environment. It is an investment in the quality of education and the future prospects of Ghana's students.

5. Public senior high schools in Akwapim south district should set their priorities right to ensure that funds generated internally are channelled to more important areas such building more classrooms , acquiring more furniture and purchasing teaching and learning materials to supplement government efforts .
6. The Ghana education service should intensify supervision to make sure that teachers evaluate students regularly. Intensifying supervision to ensure regular student evaluation by teachers is crucial for maintaining high educational standards, improving learning outcomes, and fostering accountability and transparency in the education system in Ghana. It contributes to the overall quality of education and the preparedness of students for future challenges.
7. Teachers in public senior high schools in Akwapim south district should emphasize process of learning as their focus rather than the product of learning in order to maximize teaching and learning. Emphasizing the process of learning in public senior high schools can lead to more meaningful and effective education. It promotes deeper understanding, critical thinking, intrinsic motivation, and holistic development while reducing stress and fostering lifelong learning. Both teachers and students stand to benefit from this shift in educational focus.
8. Teachers in public senior high schools in Akwapim south district should strive to create an atmosphere that motivates students to actively participate in teaching and learning activities, even in the face of challenges posed by large class sizes. Creating an atmosphere that motivates students to actively

participate in teaching and learning activities, even in large class sizes, has numerous benefits for both students and teachers. It enhances engagement, fosters critical thinking, and promotes lifelong learning skills. It is an essential component of effective education in public senior high schools.

5.4 Suggestions for Further Research

1. The current study had a limited scope, focusing on four public senior high schools in the Akwapim South District. It is recommended to replicate this study on a larger scale, encompassing broader demographic areas.
2. In this study, only a questionnaire was used for data collection. Therefore, future studies could employ additional data collection instruments to enhance the depth and breadth of research findings.



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APPENDICES

APPENDIX A

Questionnaire

**UNIVERSITY OF EDUCATION, WINNEBA
DEPARTMENT OF EDUCATIONAL ADMINISTRATION AND
MANAGEMENT**

The purpose of this questionnaire is to examine the influence of large class size and psychological classroom environment on students' academic performance. All responses are treated with utmost confidentiality, so feel free to provide accurate information that reflects the real situation that exists in your environment

Section A: Background characteristics

- 1) Name of institution:
- 2) Gender: A) Male [] B) Female []
- 3) Age A) 10-14 B) 15-19 C) 20-24 D) 25-29
- 4) Religion: A) Christian B) Muslim C) Traditional
D) Other
- 5) Course of Study:
- 6) How many student are in your class:

SECTION B: Influence of large class size on students' academic performance**INSTRUCTION:** Please tick [] as appropriate as possible. Strongly Agree

(SA), Agree (A), Disagree (D), and Strongly Disagree (SD)

S/N	Statement	SA	A	D	SD
1	Large class size limits my ability to listen daily to my teacher.				
2	Large class size limits my ability to participate in class activities.				
3	Large class size affects my academic performance.				
4	Large class size limits my learning opportunities.				
5	Owing to large class size, teachers do not give class exercise often				

SECTION C: Influence of psychological classroom environment on students' academic performance.**INSTRUCTION:** Please tick [] as appropriate as possible. Strongly Agree

(SA), Agree (A), Disagree (D), and Strongly Disagree (SD)

S/N	Statement	SA	A	D	SD
6	The classroom environment supports cohesiveness.				
7	The classroom environment supports participation.				
8	Our classroom is favourable for forming groups to help learning for academic success.				
9	I feel left alone during lesson period				
10	My classroom environment supports positive involvement students' ideas during classroom activities.				
11	My classroom environment is safe for students to ask questions				
12	Teachers encourage us when we have difficulties during lessons.				
13	Teacher communicates learning goals to us.				
14	Teachers emphasise learning process instead of learning during lessons.				

SECTION D: Influence of class size and psychological classroom environment on teaching and learning

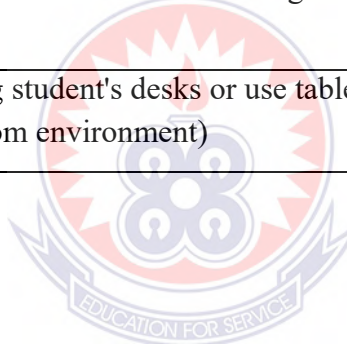
INSTRUCTION: Please tick [] as appropriate as possible. Strongly Agree (SA), Agree (A) Disagree (D), and Strongly Disagree (SD)

S/N	Statement	SA	A	D	SD
15	Your classroom support positive motivation.				
16	Students perceive classroom environment as being socially. Supportive.				
17	Students receive emotional support from teachers.				
18	Students receive encouragement from teachers.				
19	Teachers encourage students to talk and share ideas in class.				
20	Students are given immediate feedback when they need direction to proceed				
21	Class size influences the pace of lessons in class.				
22	Teachers are able to identify students who have difficulties in understanding the main ideas of a lesson.				
23	Large class size increase the time teacher spent on handling non- instructional tasks.				
24	Teachers spend a lot of time controlling students rather than teaching.				
25	Teachers are able to assess the instructional needs of students.				
26	Teachers able to assess to emotional need of students.				

SECTION E: Management of class size and psychological classroom environment to enhance students' academic performance

INSTRUCTION: Please tick [] as appropriate as possible. Strongly Agree (SA), Agree (A) Disagree (D), and Strongly Disagree (SD)

S/N	Statement	SA	A	D	SD
27	By the support teachers give to students.				
28	Through professional development of teachers.				
29	Through the enhancement of reduced class size.				
30	Employing more teachers in the class to reduce the regular teacher.				
31	Enrolling according to the space that can hold the students in the class.				
32	Teachers making it a priority to give students time to together when the teacher is not directing them strategies)				
33	I prefer clustering student's desks or use tables so together (classroom environment)				



APPENDIX B

PRESBY SENIOR HIGH TECHNICAL SCHOOL
P. O. BOX 18
ABURI
10th MAY, 2023.

THE HEADMASTER
ADONTEN SENIOR HIGH SCHOOL
P. O. BOX 48
ABURI

Dear Sir,

**SUBJECT: REQUEST FOR PERMISSION TO GATHER DATA ON
PERCEIVED EFFECTS OF LARGE CLASS SIZE ON STUDENTS'
ACADEMIC PERFORMANCE**

I am writing to seek your permission to conduct a research study on the perceived effects of large class size on students' academic performance. I am deeply committed to exploring factors that affect student learning outcomes and to implementing evidence-based strategies for educational improvement.

The purpose of this study is to investigate the perceived effects of large class size on students' academic performance. By examining this topic, I aim to contribute to the existing body of knowledge in education and provide insights that can inform future pedagogical practices. To accomplish this, I intend to gather data from seventy form three students. I anticipate that the data collection process will require minimal disruption to the regular academic schedule. The participants' anonymity will be strictly maintained, and all data collected will be securely stored and analyzed to ensure the confidentiality and privacy of the students involved.

Should you have any questions or require further information, please do not hesitate to contact me at yahayashamsu@gmail.com or 0558361914. Thank you for your attention to this matter, and I eagerly await your favourable response.

Yours sincerely,

.....

Yahaya Shamsu