Assessing the Correlation between Attitude and Study Techniques with Chemistry achievement among grade 11 Natural students at Beteseb Academy Ayertena branch of 2022/2023 Academic year

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Mr. Daniel (MA)

A research paper submitted to the Department of Research Publication and Communication in partial fulfillment of the course Introduction to Research

June 2023
Addis Ababa

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List of Acronyms

MH…….. Male high achievers

FH…… Female high achievers

MM…….. Male Middle achievers

FM ……... Female middle achievers

ML……. Male low achievers

FL…….. Female low achievers

FGD……Focus Group Discussion

MOE……Ministry of Education

GPA …….Grade Point Average

Abstract

Study skills and attitude for studying chemistry are importance to improve achievement in the subject. Beteseb academy students are struggled by chemistry exams and concepts due to their less study techniques. This was observed at 2022/2023 G.C. entrance exam. Students from Beteseb Academy's 11th grade comprised the subjects of our investigation. The study aimed to assess the correlation between students' attitudes and study skills on their chemistry achievement. 77 students were divided into six distinct groups based on gender and their accomplishments in chemistry. Questionnaires were disseminated among all groups, while FGDs were allocated by selecting middle and low achievers, consequently conducting interviews with a select few students from each group. The findings evinced that high achievers possess commendable study skills and a positive attitude towards chemistry, whereas middle and low achievers exhibit subpar study skills and a negative attitude towards the subject. This fact leads us to the conclusion that students' study skills and attitudes bear a significant correlation with their chemistry achievement. The findings recommended that to improve achievement on chemistry students and the school must correct their study technique for studying chemistry.

Key words: *Attitude, Study skills, Achievement, and Chemistry*

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Chemistry is an essential basis for everyday lives, and has many unforeseen potential benefits for our future. An understanding of Chemistry allows us the opportunity to explain the world around us; and to make informed decisions concerning our actions as individuals. Understanding of Chemistry is necessary for working in almost all the other sciences such as Material sciences, engineering, environmental sciences, and medicine. Students opting for any of these career fields need good knowledge in Chemistry.(Ingo Eilks and Avi Hofstein; 2013).

One of the key metrics used to assess the quality of education in schools is student academic achievement. Academic achievement is difficult process that depends on a variety of element, including study habits. Study habits are a combination of, study skills and different individual behaviors in regard to studying. In other words, good study habits contain behaviors and abilities that can boost drive and transform learning into an efficient procedure with high throughput, which ultimately raises achievement. This talent is also described as any action that expedites the process of learning about a subject, resolving issues, or memorization of some of or all of the content offered. Study habits, which vary from person to person, are the key to success. (All good et al., 2000)

According to previous studies, good study habits include studying in quite place , turning off devices that interfere with study (such as TV and mobile phones) , taking notes of important content, having regular rests and breaks, listening soft music, studying based on learning style, and prioritizing the difficult contents by using social media. Some of the worst study skills include procrastination, evading the study, studying in inappropriate conditions, and loud sound of music and television during studying. (Bauer, 2005)

The attitude of a student is important to the educator since it could affect how engaged they are with challenging content, how connected they are to their peers, and perhaps even how far along in a high school program they move academically. There are numerous factors that can affect attitudes, either directly or indirectly. These include conservative or trivial methods, a dis connect between students' and teachers' intellectual philosophies, lengthy chemistry syllables with pre-determined time limits, inexperienced chemistry teachers, and a lack of focus during activities (Azubukie, 2011).

Students who exposed to a variety of study techniques in chemistry and are skilled at choosing and applying them appropriately to their academic assignments often perform better than those who use unsuitable techniques (Meneghetti et al., 2007). Due to their lack of study abilities, high school students struggle become successful in the subject of chemistry. The majority of students view studying chemistry negatively.

This caught our attention, and we set out to solve the issues in order to support those who are working to raise the quality of students' chemistry study skills as well as those who take full responsibility for advancing the educational sector, like MOE. This study can also be used by Beteseb Academy to increase the effectiveness and potential of its students.

Beteseb Academy High School has been start teaching the first month of 2005 G.C. It is located at Ethiopia, Addis Ababa, Ayertena (Miskir, 2023). It is currently teaching more than 780 students and like any other school, it offers natural science and social science students from grade 11. 107 students in the 11^{th} grade of natural science are given quality lessons in chemistry, biology and physics using different techniques and laboratories. Students uses many study techniques to study those natural science subjects especially chemistry.

1.2. Statement of the problem

Students have trouble studying chemistry this makes their attitude toward the subject negative. Many students now a day seem to struggle to study fundamental chemistry concepts and formulas. This is because most of chemistry concepts need special or variety type of study skills (Jha et al, 2018).

You have to be comfortable with math up through algebra to understand and work chemistry problems. Geometry comes in handy, plus you'll want calculus is you take your study of chemistry far enough. Part of the reason many people find chemistry so daunting is because they are learning math at the same time they are learning chemistry concepts. If you get stuck on unit conversions, for example, it's easy to get behind. One common complaint about chemistry is that it counts for the same credit hours as any other class, but requires a lot more from you both in class and outside it. You've got a full lecture schedule, plus a lab, problems, and a lab write-up to do outside of class, and maybe a pre-lab or study session to attend. That's a big time commitment. While that may not make chemistry more difficult, it leads to burn-out a lot earlier than with some studies. You've got less free time to wrap your head around the material on your own terms. You can't understand chemistry until you understand the vocabulary. There are 118 elements to learn, a lot of new words, and the entire system of writing chemical equations, which is its own special language (Lovelace, 2013).

Numerous research reports expressed that the difficulties in Chemistry arise from the abstract, complex and dynamic nature of the concepts covered, bulky course content, teacher Centered teaching, erroneously constructed students` knowledge due to lack of clear vision, And lack of students` and teachers` motivation. Anne O'dwyer, (2012) and Millar (1991) Categorized the factors which contribute to difficulty of Organic Chemistry as the extrinsic Difficulties (factors referring to issues that are beyond the control of learners); and intrinsic Difficulties (factors referring to difficulties faced by individual learns and supposed to be Within their control).

The problems mentioned above are also manifested for Beteseb Academy students. This problem affects students' achievement in chemistry than other subjects. This was seen from the comparison made on 2015 E.C grade 11 students' Natural subjects' results. The results were less for chemistry and physics than others. Also, according to what we saw 2022 G.C 12^{th} grade

exam; the results were lower than natural subjects. This performance shows that their difference of achievement from subject to subject like chemistry and other subjects.

1.3. Research question

- What are the current study skills and tools of Beteseb Academy grade 11 students' for chemistry that affect their chemistry subject result?
- How many hours per a week do the 11th grade students of Beteseb academy study chemistry subject?
- To which level of statically significance some factors such as teachers, parents and stress affect students' attitude to study chemistry?

1.4. Objective

1.4.1. General objective

The main objective of the study is to assess about the correlation between grade 11 students' attitude and study skill on achievement of chemistry subject.

1.4.2. Specific objective

- To find out what different study skills and the attitude of grade 11 students' affect their chemistry result.
- To find out how many hour per a week do the 11th grade students of Beteseb academy study chemistry subject?
- To find out to which level of statically significance some factors such as teachers, parents and stress affect students' attitude to study chemistry.

1.5. Hypothesis

- **H1**: Students who use all study skills of chemistry they will have a high or better achievement.
- **H2**: Middle achievers will study more hours than high achievers but they will not be effective due to their methodology.
- **H3**: Low achievers' attitude will be affected indirectly by teachers, parents and stress to study chemistry.

1.6. Significance of the study

Study habits have been the most important predictor of academic performance in chemistry and play a special role in the academic achievement of students. The study aimed to determine the relationship of basic study skills and attitude toward chemistry with achievement of grade 11 students. Numerous studies are required to look into and determine which type of study skill is appropriate in order to increase our current study skills, attitudes on chemistry, and level of achievement. Students, particularly low achievers and middle achievers, are the first to benefit from this research, providing of course that the students will employ the study's conclusions. Students will gain from it by acquiring improved chemistry study techniques that motivate them to learn and study the subject

1.7. Scope of the study

In this research the researcher has tried to see the effectiveness of the variety study skills versus attitudes. The research conducted in Ethiopia, Addis Ababa at Beteseb Academy Ayertena branch on high school grade 11 Natural Science students.

We chose our population for two major reasons:

- They are facing too much problem toward understanding and studying chemistry.
- Seniors have no much time which did not able us to do our study.

1.8. Limitation

Time: the time given to conduct the research was insufficient not only that but the exams and holidays in between made it hard to finish the research on time. Though, the researcher tried to bridge this problem by preparing methods.

Budget: The research included giving tests and questionnaires; it was hard to collect the money needed to print all these documents in the given time.

Data: we were not able to retrieve results of 2022 – 2023 grade 11 students' chemistry results on time to choose our target population and now this caused a delay in our work.

1.9. Definitions of terms and concepts

Attitude: a settled way of thinking or feeling about something

Study skills*:* are arrays of skills which tackle the process of organizing and taking in new information, retaining information, or dealing with assessments.

Chemistry: the branch of science concerned with the substances of which matter is composed, the investigation of their properties and reactions, and the use of such reactions to form new substances.

Natural science: a branch of science that deals with the physical world.

Cognitive*:* means relating to the mental process involved in knowing, learning and understanding things.

Innovative: featuring new methods; advanced and original.

Perception: the ability to see, hear, or become aware of something through the senses, the way in which something is regarded, understood, or interpreted.

1.10. Organization of the study

In chapter one, the researcher tried to explain the study skills and students attitude towards chemistry. Stated the problem and declared the significance and objective of the research. Then the hypothesis was constructed. The scope and delimitation was included in chapter one too. When the researcher proceeds to chapter two, the researcher has taken part about study skills and

attitude. In chapter three, the researcher confers about the research design and the way the researcher approach to the data. Also converse about how the researcher would collect the data and analyze it. In chapter four, the researcher has calculated the result using Stastical analysis. And the researcher have concluded our overall idea and recommended both the school offices other researches in chapter five.

CHAPTER TWO

Review of the literature

2.1. Introduction

This literature review of the research investigates the effectiveness of teaching chemistry students. Meta cognitive learning skills for better academic achievement which reveals a number of studies that have been conducted in the past. While most of the studies were conducted on college-level students, there have also been studies conducted on high school students. These studies have found that teaching student's Meta cognitive learning skills can lead to better academic achievement, as well as improved study habits, greater self-efficacy, and more confidence in the student's ability to succeed in the course. The studies also suggest that providing students with online learning resources, such as online tutorials, can be beneficial in helping them develop the necessary skills to succeed. Additionally, the studies suggest that providing students with study guides and practice quizzes can help reinforce the skills they've learned as well as improve their understanding of the course material.

2.2. Theoretical Literature Review

The attitude and study skills of students are essential components of their academic success. This is especially true in the field of chemistry, where knowledge and understanding of complex concepts are essential for achieving high grades. A student's attitude towards the subject and their ability to apply the right study skills can have a huge impact on their chemistry achievement. The attitude and study skills of students are essential components of their academic success. This is especially true in the field of chemistry, where knowledge and understanding of complex concepts are essential for achieving high grades. A student's attitude towards the subject and their ability to apply the right study skills can have a huge impact on their chemistry achievement. (Allgood et al., 2000)

2.2.1. Study Skills

Study skills are arrays of skills which tackle the process of organizing and taking in new information, retaining information, or dealing with assessments. It refers to abilities, habits, understandings and attitudes that enable achievement in your studies. Good skills can increase your confidence, competence, and self-esteem. They can also reduce anxiety about tests and deadlines. By developing effective study skills, you may able to cut down on the numbers- of hours spend studying, leaving more time for other things in your life. Good study skills can improve your ability to learn and retain knowledge. Students who use effective study skills may feel their and effort is more worthwhile. (De Bruin et al., 2011)

Chemistry is a branch of natural science that deals principally with the properties of substances, the changes they undergo, and the natural laws that describe these changes. Chemistry is one of those classes you either love or dread. At the high school level chemistry is usually not required course, it is an elective. Chemistry is a challenging subject for most people struggle with chemistry is that they don't approach it the right way. A key to learning and

studying chemistry is practice. Completing practice problems, solving equations, working formulas, etc. should be core feature of your daily study routine.

2.1.2. Attitudes

Attitudes an attitude is a mental disposition with regard to a fact or state. At its core, an attitude appears to be a state of mind concerning an object, fact, or situation. As attitudes are expressed through our behavior, the way we act informs others of our mindset regarding a particular subject. The basic premise underlying any teaching is that the student has the ability to learn, change and desires for these things to occur regardless of past performance. Negative attitudes discourage, limit, and even prevent learning, positive change, and growth. (Elliot et al., 2002)

2.3. Empirical Review

This empirical review focus on the researches about study skill and attitude has done by some different people at different time. Accordingly, the researcher has evaluated the following research titles which were directly related the study under investigated.

(Al & Sartawi, 1997) are performed a research on factor of study skills on achievement. This study reveals that study skills are those skills which are required for understanding and retrieving information; particular they are the link between comprehension and memorization. It has listed specific competencies of study skills including acquiring information, recording information, locating the required information, organizing and managing activities efficiently, synthesizing information to create meaningful patterns of responses, and memorizing and retrieving information on demand. Literature boasts of studies suggesting benefits of utilizing effective study skills. The research report students with improved GPA had adequate study skills, and students who are academically unsuccessful, sparingly use study skills than high achieving students. It indicates that good study skills and habits are the tools that assist students during the learning process in order to acquire and retain new information and are essential for students' successful academic performance.

According to (Elliot et al, 2002) viewed study skills as a compensation for cognitive limitations in the information processing system and reported that there was a significant correlation between GPA and comprehension monitoring activities, which in turn was an indication that students with high GPA practice self-awareness, purposeful planning and self-adjustment activities more than students with low GPA. Studies self-regulated learning examines this process in terms of teachable cognitive skills where students learn to think about the way. While positive study behaviors are important to student achievement, knowledge of the actual study behaviors and techniques utilized is rather limited.

According to (Glasman and Albarracín 2006) Attitudes have determined the power to predict students' achievements in subjects and career preferences of learners and the relationship existing between attitude and academic achievement. In their meta-analysis of attitude related factors that predict students achievements,) concluded that there is a correlation between

attitudes and students achievements; that is, attitudes are a potential for predicting students achievements, especially if there is a direct interaction between participants and the attitude object (i.e. objects that related to attitude like science lessons). Actually, studies that examined the correlation between attitude and academic achievement did not provide consistent results. Schibeci (1984), for instance, found a strong relationship between attitude and achievement. On the other hand, argued that there is only moderate relationship between attitudes toward chemistry and chemistry achievement.

2.4. Conceptual Framework

Identifying the factors that affect students' achievement is crucial. The variables in the right sides that are; students' study skill and students'' Attitude to study chemistry are the independent variable of students' chemistry achievement. The dependent variable in the left side believed to influence the efficiency of the students' total result either directly or indirectly and the arrow showed that the activities and interaction of those variables affect students' Attitude.

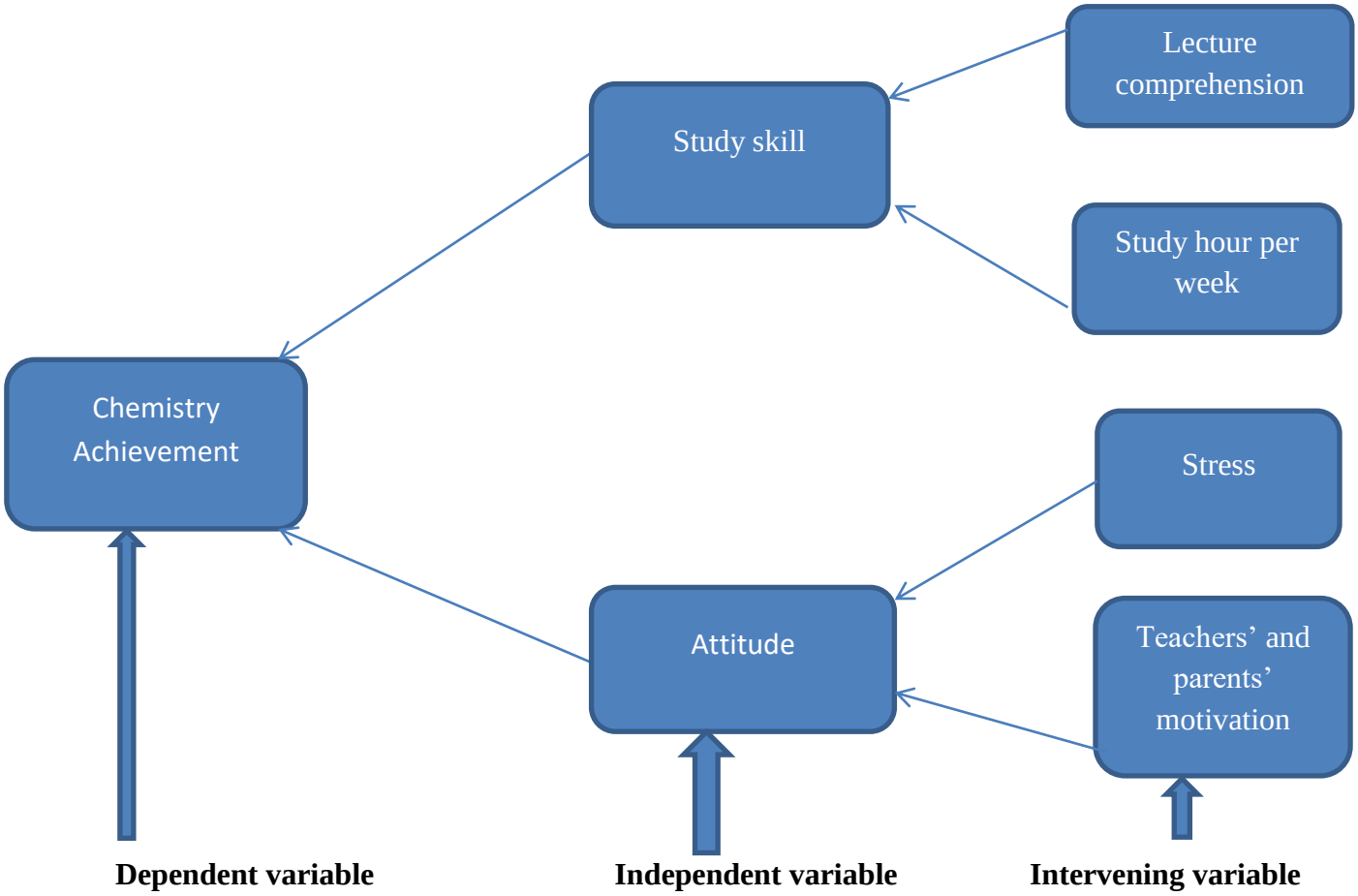


Figure 1: Conceptual model

(The researcher, 2023)

CHAPTER THREE

Methodology

This chapter explains the research design and research methodological consideration of the study. It has been set out under the sub – headings is containing research study area, research design, target population, sample frame, sampling techniques, data gathering tools and procedure, data processing and analysis, and finally ethics consideration.

3.1. Research Design

The objective of this study is to assess the correlation between attitude and study techniques with chemistry achievement. To this end, the study employed an explanatory approach using a descriptive survey method is used to obtain pertinent information concerning the topic of the study. A research design was plan, structure, and strategy conceived in order to obtain answers to research questions and dependent variables. The study is adopting both quantitative and qualitative survey as a major method. Quantitative surveys designed to fit a questionnaire schedule. This is the most commonly used technique in research.

3.2. Population of the study

Population as defined by (Mugenda, A and Mugenda, O, 2003) is an entire group of individual or objects having common observable characteristic. According to (Keller, 2009) a population is the group of all items of interest to a statics practitioner. (Serkan, 2010), refers to population as the entire group of people or things of interest that the researcher aims to asses. The target populations for the study were grade 11 natural science students in Beteseb Academy Ayertena branch. 11^{th} grade students were selected because 11^{th} grade student book is huge than others in size also in quality. There are 174 students in grade 11. We used for the study only the natural students that are population is 108.

3.3. Sampling Frame

To determine the appropriate sample size from the given finite total population, Yamane's (1967) simplified formula is used. In case for the study, the population size is 107 but, the researcher excluded him/herself to decrease bias so, the population is 94; the researcher uses 95% of confidence level. Then, get the following sample size below.

$\frac{N}{1+N(e)^2}$, n= $\frac{94}{1+94(0.05)^2}$ = 76 which is 80% of the total population.

A research should take always odd number sample for research to decrease bias and to get 50%+1 result (Dr. Haylie, 2023). According to the before article the researcher took 77 sample for the research.

3.4. Sampling techniques

Sampling is the process of choosing a small sample of components from a larger target population. Based on the data collected from the small sample, conclusion can be drawn about

the larger groups. The number of students that participated in the research was 77 in total. But since selecting all the students randomly might have caused a different distribution of students with different achievement and sex. Therefore, the researcher used non probability sampling and then the researcher used quota sampling method. Quota sampling is a non-probability sampling method that relies on the non-random selection of a predetermined number or portion of units. The researcher divided into six strata based on Achievement and sex.

- **First semester chemistry result**
  We used the first semester chemistry result of the grade 11^{th} students to divide in to three achievement groups namely HIGH, MIDDLE, and LOW.
- **Sex**
  A study conducted by (prima, 2007) highlights that girls have better study habits. So we divided in to groups based on sex to have valid information.

The researcher divided students in three group based on their first semester chemistry result. The groups were high achievers, middle achievers and low achievers. Then the researcher divided those groups in to two based on sex, there were 38 male and 39 female students at last the researcher had six -groups(male high, male middle, male low, female high, female middle, female low). Then the researcher used 12 samples for the high and low achievers but the researcher used 14 and 15 samples for MM and FM group because the data collected by the researcher shows that middle achievers are more than other.

3.5. Data gathering tools and data source

The researcher gathers data from different tools and the sources are primary source. Primary source is a first hand or contemporary account of an event or topic (Alan DE Lozier, 2006), therefore the researcher used primary source to get first-hand information.

3.5.1. Questionnaire

The researcher used questionnaire as main source of data, containing 15 questions developed by the author assessing student attitudes toward studying chemistry, primary methods of studying, time spent, use of technology, together with demographic information. The full survey is listed in Appendix A.

3.5.2. Focus group discussion

The researcher used FGD to know about students' attitude to study chemistry in group for nice effective achievement in chemistry.

3.5.3. Interview

Interviews are more accurate since it is an interview, subject won't be able to falsify their identities such as lying about their age, gender and achievement (Iterators, 2021). The researcher used interview to gather detailed information from participants.

3.6. Procedure of data collection

The researcher first acquired the chemistry mark list of 2022/2023 Beteseb Academy grade 11^{th} Natural students to use it to select our target population. After the researcher selected its population and divided into six strata (HM, HM, HL, FH, FM, and FL). The process of gathering data was organized into a series of steps. To avoid lack of response, the approach begins first asking the respondent for permission. After that, sample selection was conducted based on the strata as described in the sampling technique before. However, the researcher introduced themselves and asked the respondents for permission to fill the questionnaire and FGD.

3.7. Data Analysis Techniques

Data analysis defined as a way of analyzing information gathered on focusing on various posed in the study (Kothari, 2004). After using the instruments to acquire data, the researcher used descriptive and inferential statistics to analyze the various data in accordance with the information provided. She did this with the use of SPSS version 20 and Microsoft Excel 2010.

3.7.1.QuantitativeAnalysis

After collecting and tabulating the data, the researcher calculated the percentage and central tendency of each student's response. The researcher analyzed the data collected from the research using statics in such way it is easy to understand.

3.7.2. Qualitative Analysis

The qualitative data obtained from open-ended questions were analyzed using thematic analysis techniques. After categorizing the responses and classifying ideas accordingly, the data analysis were done appropriately.

3.8. Ethical consideration

Validity: Before distributing the questionnaires and other tools, the researcher has to discuss with the advisors and experts.

Reliability: our research was based on data and free from personal judgment which makes it more accurate.

Time usage: the questionnaires and other tools were given in their lunch time which will not take their learning hour.

Our honesty and Data handling practice: we make sure there will no data leaks and we won't make up any data that is not collected in the research

CHAPTER FOUR

Results and Discussions

The study represents the empirical and findings and result of the research. The data presented here includes demographic information of the respondents and the presentation of research findings. Descriptive statistics also employed in analyzing the findings.

4.1. Questionnaire Analysis

4.1.1. Respondents' Demographic profile

The study needed to determine the background information of the respondents using the following factors: sex and achievement in chemistry.

Table 1: Demographic information

Item No.			frequency	percentage
1	Sex	Male	38	49%
		Female	39	51%
		Total	77	100%
2	achievement	>85%	24	31.1%
		75%-85%	29	37.8%
		<75%	24	31.1%
		Total	77	100%

Source: Analysis of survey data using SPSS data, 2023

The sex of the respondents who completed the survey is shown in item one of Table 1. There are two possible answers: Male and Female. 38 Male participants made up 49% of the sample, as shown in the table above, while 39 Female participants made up 51% of the sample. Table.1, item two, lists respondents according to their achievement and offers three options: 85%, 75-85%, and >85%. By examining the data, it can be seen that the large quantities of participants (75%–85%) are middle achievers. This shows that medium achievers make up the majority of grade 11 students.

4.1.2. Descriptive Analysis of variables

Table 2 : Lecture comprehensions

	MH	MM	ML	FH	FM	FL
I have difficulty determining important points in lecture	25%	21.2%	66.67%	8.3%	66.67%	50%
Before class starts, I review yesterday's lecture notes	50%	14.27%	16.67%	37.5%	13.3%	33.3%
I waste my time because	16.67%	21.4%	50%	0%	46.7%	16.7%

I am not organized to study lecture note						
In class, generally speaking I take notes on the lecture of chemistry lessons.	83.3%	78.57%	83.3%	100%	100%	83.3%

Source: Analysis of survey data using SPSS data, 2023

The researcher asked about Lecture comprehension and respondents responses their answer above table 2, it presented as follow:

25%, 21%, 66%, 8.5%, 66.7% and 50% of MH, MM, ML, FH, FM and FL respectively have a difficulty to determine important points. This shows that low achievers in both sexes have a difficulty to study by using lecture. 50%, 14.27%, 16.67%, 37.5%, 13.3% and 33.3% of MH, MM, ML, FH, FM and FL review the study lecture notes. This show has high achievers in both sexes study the previous lesson. 12.5%, 21.4%, 50%, 0%, 46.7% and 16.7% of MH, MM, ML, FH, FM and FL respectively waste their time because they are not organized to study chemistry. This shows that male low achievers and female middle achievers waste their time because of organization to study chemistry. 83.3%, 78.5%, 83.3%, 100%, 100% and 83.3% of MH, MM, ML, FH, FM and FL respectively take note of chemistry lessons. This shows that male students have some challenges to take notes when it is compares with female students.

Table 3 : teachers' motivation to students to study chemistry

How much do your teachers motivate you to study chemistry	MH	MM	ML	FH	FM	FL
<50%	0%	0%	0%	8.3%	13.33%	16.67%
50 -70%	16.67%	21.4%	66.7%	16.67%%	13.33%	25%
70 - 90%	33.3%	50%	33.3%	16.67%%	33.3%	16.67%
90 - 100%	50%	28.6%	0%	58.33%	40%	41.67%
Mean	70-90%	70-90%	50-70%	70-90%	70-90%	70-90%
Mode	90-100%	70-90%	50-70%	90-100%	90-100%	90-100%

Source: Analysis of survey data using SPSS data, 2023

The descriptive statistics of the study as shown in the above Table 2, presented as follow:

MH, MM, FH, FM and FL are motivated to study chemistry around 70 - 90% by their teachers. But, ML students are motivated around 50 – 70%. This shows that ML students have deficiency of motivation by their teachers to study chemistry.

Table 4: parents' motivation to students to study chemistry

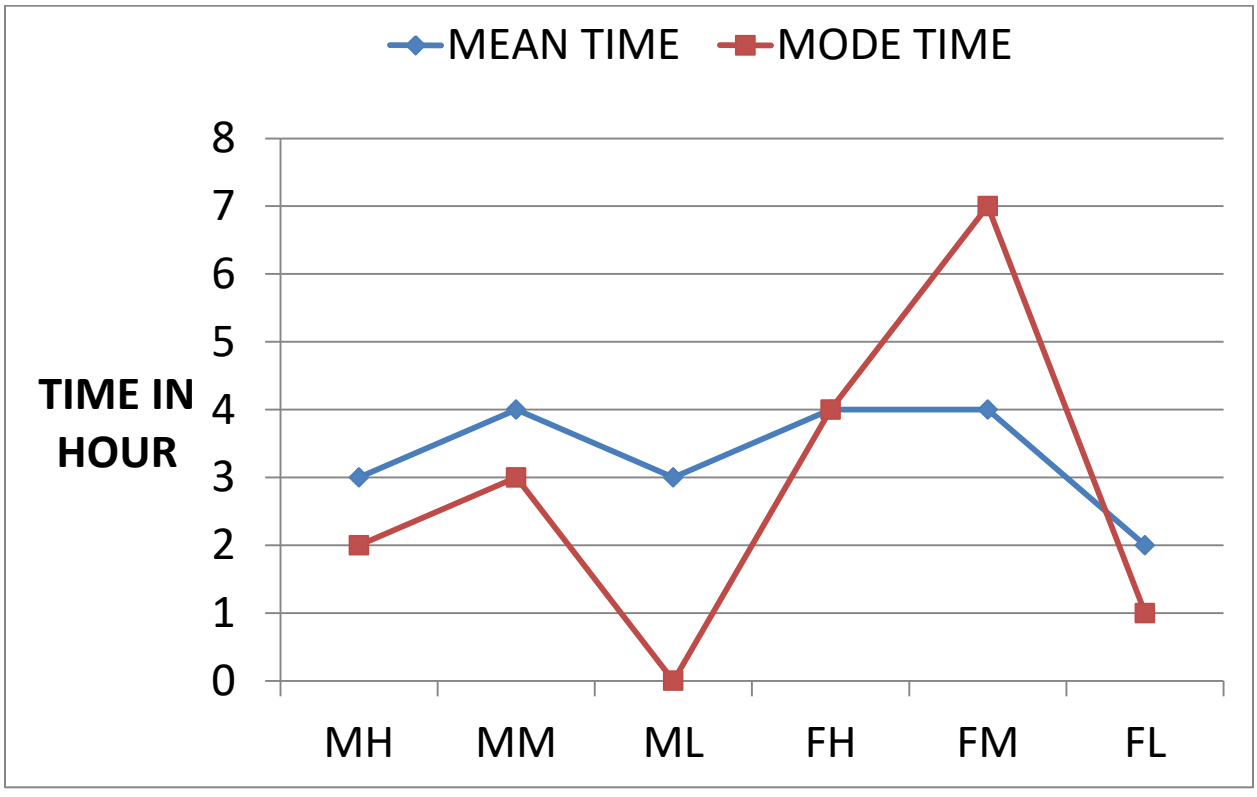
How high do your family motivate to study chemistry	MH	MM	ML	FH	FM	FL
Don't	0%	14.3%	25%	0%	13.33%	0%
Poor	0%	14.3%	50%	25%	0%	25%
Good	58.3%	21.4%	25%	58.33%	26.67%	33.3%
Very good	41.7%	50%	0%	16.67%	60%	41.67%
Mean	Good	Good	Poor	Good	Good	Good
Mode	Good	V.good	Poor	Good	V.good	V.good

Source: Analysis of survey data using SPSS data, 2023

The descriptive statistics of the study as shown in the above Table 3, presented as follow:

0%, 14.3%, 25%, 0%, 13.33%, 0% of MH, MM, ML, FH, FM and FL respectively don't motivated by their families to study chemistry. 0%, 14.3%, 25%, 0%, 13.3% and 0% of MH, MM, ML, FH, FM and FL respectively are motivated poorly by their families to study chemistry. 58.3%, 21.4%, 25%, 58.33%, 26.67% and 33.3% of MH, MM, ML, FH, FM and FL respectively are motivated well to study chemistry. The rest of MH, MM, ML, FH, FM and FL are motivated very good by their families to study chemistry.

Figure 2: Students' chemistry reading time per week



Source: Analysis of survey data using SPSS data, 2023

The descriptive statistics of the study as shown in the above Figure 2, presented as follow:

The data analysis shows that middle achiever students spend more time each week studying chemistry than other learners. When men and women are compared, women study more hours per week.

Table 5: Students rating of study

	MH	MM	ML	FH	FM	FL
Lecture Note	Good	Good	Good	Good	Poor	Good
Guide books	Good	Good	Good	Good	Good	Good
Group studying	Average	Excellent	Average	Good	Good	Good
Laboratory	Excellent	Good	Average	Good	Excellent	Average
Social Media	Average	Good	Good	Average	Excellent	Good

Source: Analysis of survey data using SPSS data, 2023

Table 5 shows that MH and FH have a huge correlation with books than others. In addition the table shows us MM, ML, FM and FL have a relation with cellphones.

Table 6: Study skills used by students to study chemistry

	MH	MM	ML	FH	FM	FL
Lecture notes	50%	14.3%	25%	50%	33.3%	25%
Other handouts	8.3%	21.4%	25%	33.3%	16.67%	25%
Only text book	25%	14.3%	16.67%	0%	0%	16.67%
Videos	8.3%	0%	0%	16.7%	13.3%	8.3%
Websites	0%	35.7%	41.67%	0%	40%	25%
other	8.3%	14.3%	16.67%	0%	0%	0%

Source: Analysis of survey data using SPSS data, 2023

The descriptive statistics of the study as shown in the above Table 6, presented as follow:

50% of MH and FH chosen lecture notes. This shows that the MH and FH have a realtion to notes. 35.7%, 41.67%, 40% and 25% of MM, ML, FM and FL respectively uses websites to study chemistry. This shows that they are tied to cellphones for studying chemistry.

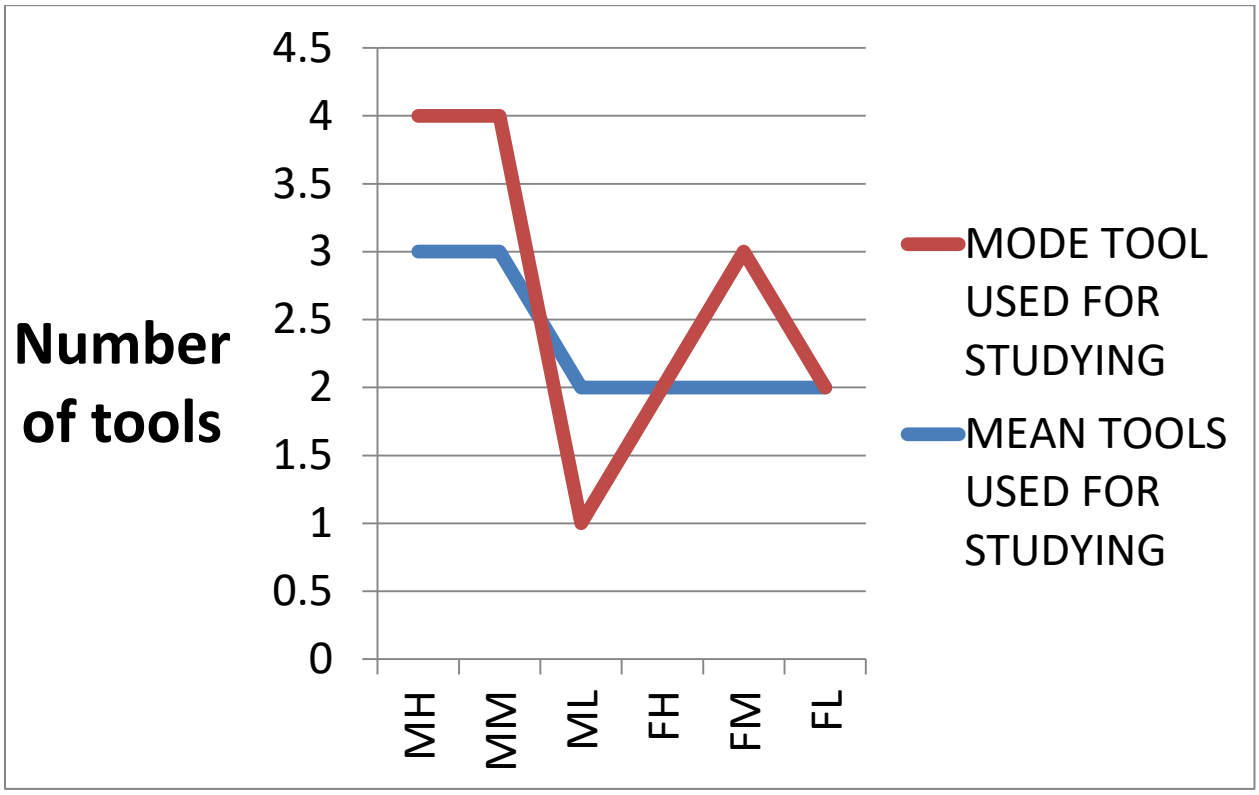


Figure 3: Students' tools used to study

Figure 3 shows that how many study tools respondents' use. According to the data, Male high and male middle achievers use more tools on average.

4.2. FGD Analysis

The FGD was given to a group of middle and low achievers to see how they felt about studying groups and in a laboratory, as well as other study skills related to chemistry. According to the respondents' responses, the school does not permit chemistry to be studied in a laboratory, and high achievers do not want to study chemistry with them unless it is done in some other way. However, since chemistry is difficult to study, studying in a group is recommended because it is more effective.

Table 7: Focus Group Discussion

	Strongly agree	Agree	Strongly disagree	disagree
Chemistry is the hardest subject to study	30%	30%	0%	40%
Studying chemistry in group of three or more is the best way to get nice achievement	30%	40%	0%	30%
Our school permits to give its Laboratory	0%	20%	70%	10%
High achiever students wanted to study with us	0%	40%	30%	30%

Chemistry wants more time than other subjects for studying	30%	30%	0%	40%

Source: Analysis of survey data using SPSS data, 2023

The descriptive statistics of the study as shown in the above Table 7, presented as follow:

30%, 30%, 0%,and 40% of the respondents respond for chemistry is the hardest subject to study was strongly agree, Agree, Strongly disagree and dis agree respectively.

30%,40%,0% and 40% of the respondents respond for studying chemistry in group was strongly agree, Agree, Strongly disagree and dis agree respectively.

0%, 20%,70%, and 10% of the respondents respond for our school permits to give its Laboratory was strongly agree, Agree, Strongly disagree and dis agree respectively.

0%,40%,30%, and 30% of the respondents respond for high achiever students wanted to study with us was strongly agree, Agree, Strongly disagree and dis agree respectively.

30%, 30%, 0%,and 40% of the respondents respond for chemistry wants more time than other subjects for studying was strongly agree, Agree, Strongly disagree and dis agree respectively.

4.3. Interview Analysis

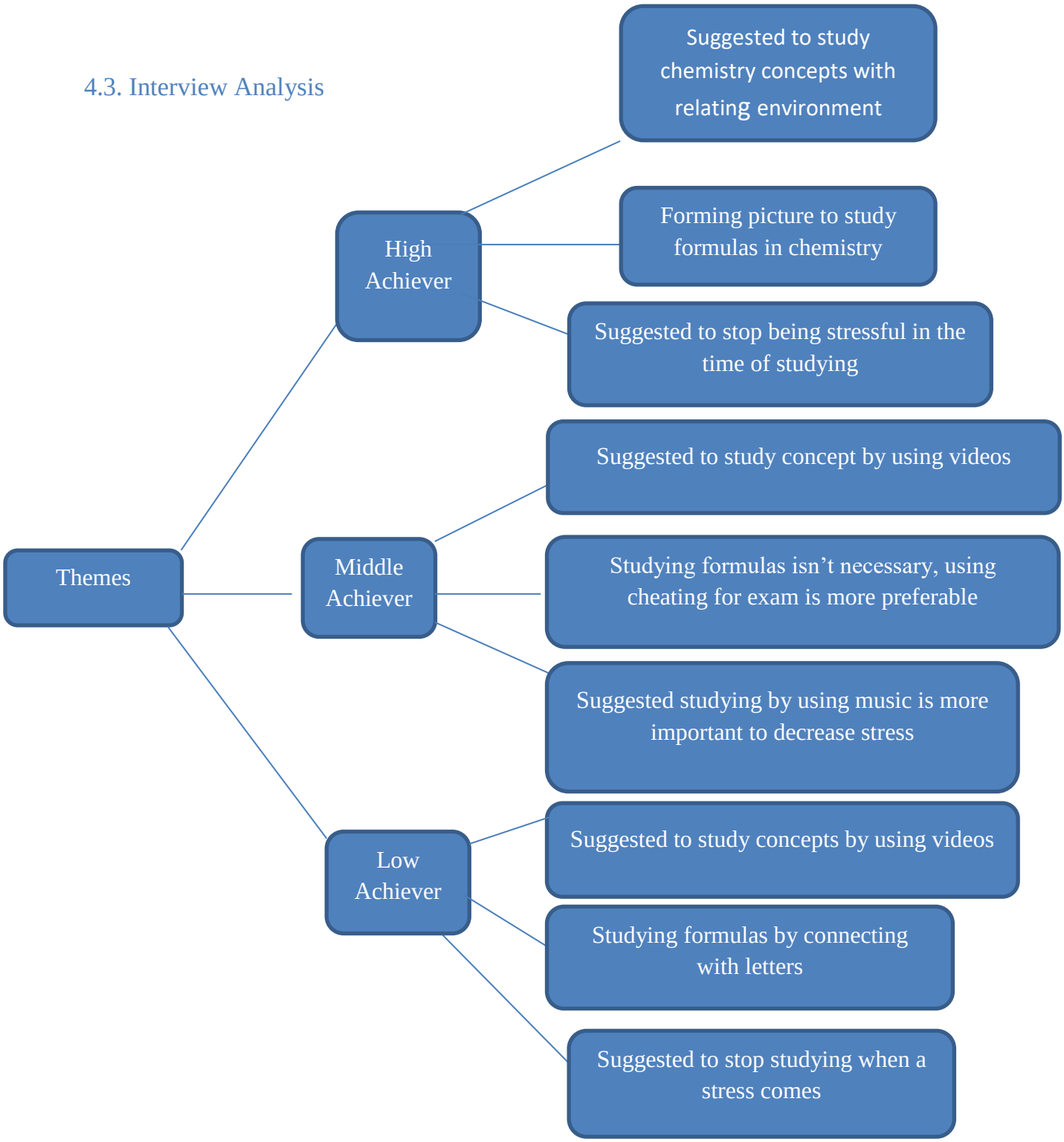


Figure 4: Thematic analysis of the interview

This indicates that high achiever students are able to manage their anxiety while studying, in contrast to middle and low achiever students, whose anxiety can get in the way of their studying. In addition, high achievers study concepts by relating with nature, whereas middle and low achievers dislike studying formula leading them to a level of illegality. This demonstrates that high performers have a successful study strategy.

4.4. Correlation Analysis

The data obtained from the observation for the independent and the dependent variables were fed to the SPSS software version 20.00, to process the correlation analysis. Based on the observed data, the following bivariate correlation analysis was made and presented in table 8 below.

Table 8: Correlation of variables

Correlations

		ST_MEAN	AT_MEAN	AC_MEAN
ST_MEAN	Pearson Correlation	1	.397**	.642**
	Sig. (2-tailed)		.000	.000
	N	77	77	77
AT_MEAN	Pearson Correlation	.397**	1	.345**
	Sig. (2-tailed)	.000		.002
	N	77	77	77
AC_MEAN	Pearson Correlation	**.642****	**.345****	1
	Sig. (2-tailed)	**.000**	**.002**	
	N	77	77	77

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

Source: Analysis of survey data using SPSS data, 2023

Pearson correlation test was conducted to know the degree of relationship between the independent variables (study skill, and attitude) and the dependent variable (chemistry achievement-). In addition, the correlation between independent variable is also made. As the results of the correlation between the independent variables with dependent variable shown in above table 8, display the bivariate correlation results for the data collected on the criterion variable on dependent and independent variables. (Cohen, 1998) cited by (Warokka et al. 2012), interpreted the coefficient of correlation between 0 and 1 as in the following manner. The correlation coefficient (r) ranging from 0.10 to 0.29 may regarded as indicating a low degree of correlation, (r) ranging from 0.30 to 0.49 may considered as a moderate degree of correlation, and (r) ranging from 0.50 to 1.00 may regarded as a high degree of correlation. Considering the relationship of the container terminal efficiency with each of the independent variables as shown none of the independent variables had correlations out of between -1 and +1 .As it is indicated in

the table, there is a high degree of positive relationship between the independent variables and the dependent variable within the range of +0.345** to +0.642**; all are significant at p<0.01); -

- ✓ Study skills and chemistry achievement have positive relationship (r = 0.642**with p <0.01)
- ✓ Attitude and chemistry achievement have positive relationship (r = 0.345** with p <0.01)

4.5. Assumption test of regression Analysis

Regression analysis assumptions must be met in order to verify that the data obtained accurately reflected the sample and that the researcher had the best outcomes (Hair et al., 1998). There are many assumptions to take into account, but the researcher concentrated on the key ones that SPSS makes it simple to examine. Verify the following to see if the independent variables are uncorrelated with one another in order to satisfy the multiple linear regression assumption:

Normality is determined by the Histogram, Kurtosis, and Skewness.

Linearity is determined by the P-P plot.

Hetroscadecity is determined by the scatter plot.

Autocorrelation is determined by the Durbin-Watson test.

4.5.1. Normality of the Error Term Distribution

Screening data for assessing the normalization of variables is a critical step in multivariate analysis (Hair, 2010). Normality refers to the shape of a normal distribution of the matric variable (Robert, 2006). For variables with normal distribution, the values of skewness and kurtosis are zero, and any value other than zero indicated deviation from normality (Hair, 2010).

The skewness value provides an indication of the symmetry of the distribution. The index of skewness takes the value zero for a symmetrical distribution. A positive skewness value indicates right skew while a negative value indicate left skew (Tabachnick and Fidell, 2001). The result of histogram in figure 5- Show a little left skew.

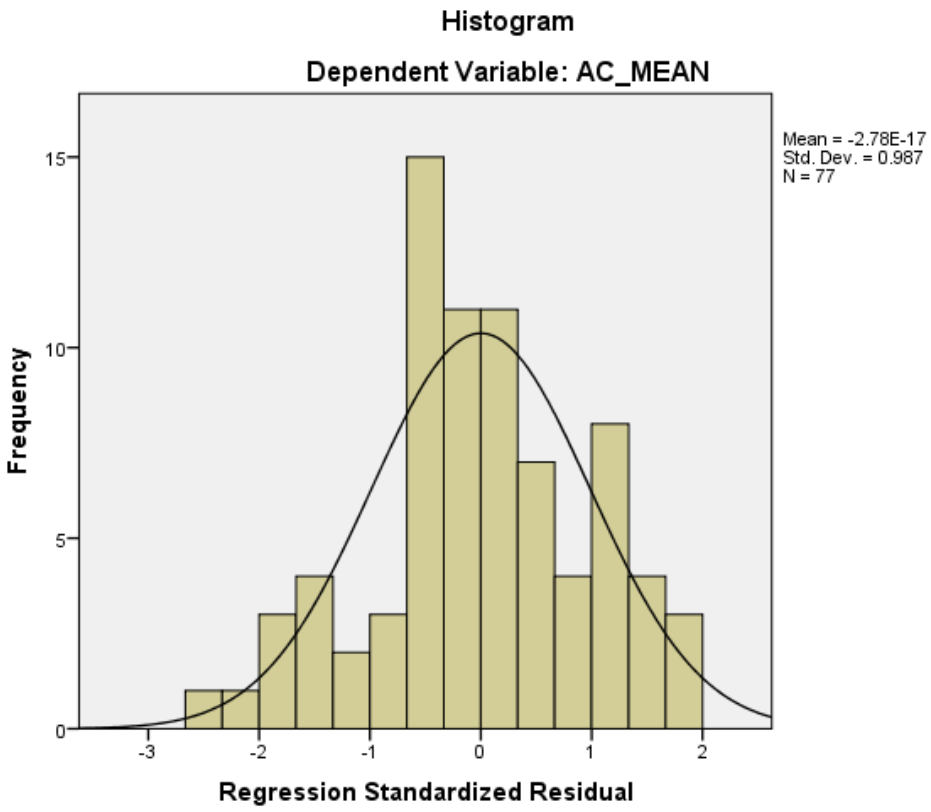


Figure 5: Histogram check for normality

Source: Analysis of survey data using SPSS data, 2023

4.5.2. Linearity

The linearity of the relationship between the dependent and independent variable represent the degree to which the change in the dependent variable is associated with the independent variable (Hair et al., 1998). In a simple sense, linear models predict values falling in a straight line by having a constant unit change (slope) of the dependent variable for a constant unit change of the independent variable (Hair et al., 1998). Linearity is conducted by a visual examination of the normal probability plots of the residuals. The normality probability plots were plotted to assess normality. The P-P plots showed in figure 6,

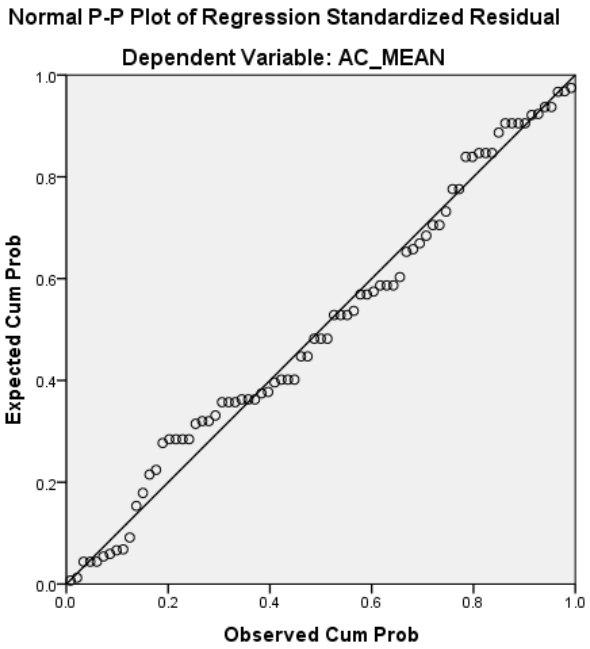


Figure 6: p-p plot

Source: Analysis of survey data using SPSS data, 2023

4.5.3. Hetroscadecity

The Hetroscadecity assumption can easily be checked using scatter-plots or residual plots: plots of the residuals vs. either the predicted values of the dependent variable or against (one of) the independent variable(s) (Hoekstra et al., 2014).The scatter plots of standardized residuals versus the fitted values for the regression models were visually inspected from figure 7.

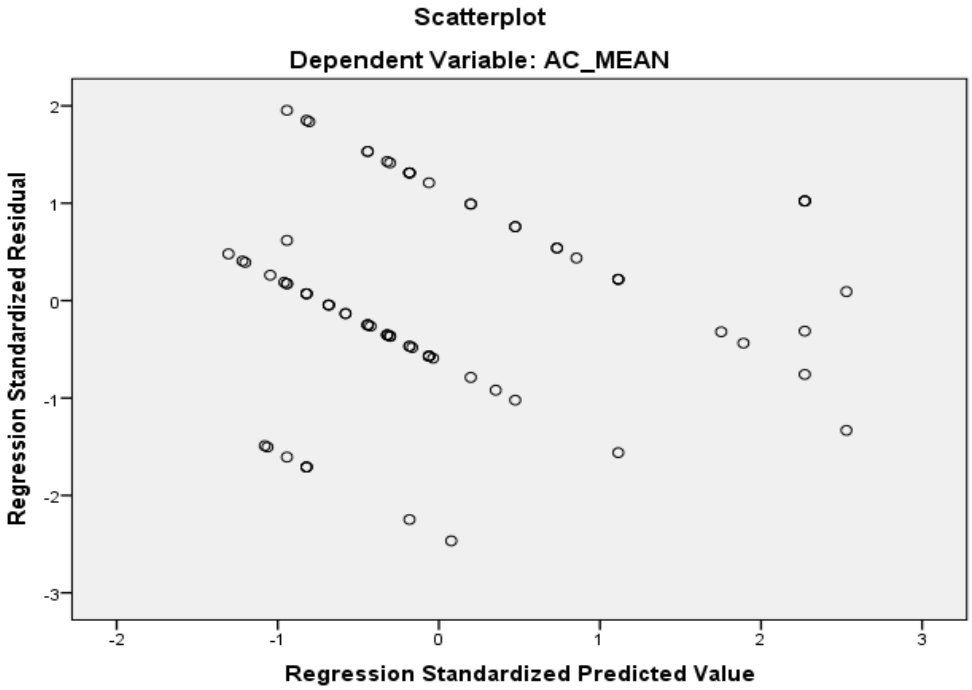


Figure 7: Scatter plot test for Hetroscadecity

Source: Analysis of survey data using SPSS data, 2023

4.5.4. Auto-correlation

Auto-correlation is a characteristic of data which shows the degree of similarity between the values of the same variables over successive time interval. The most common method of test auto-correlation is the Durbin-Watson test.

The Durbin Watson is a statistics that detects the auto-correlation from regression. It can be used to discover whether the value of dependent variable at time t is related to its value at the previous time period, commonly referred to as t − 1. This situation, known as auto-correlation or serial correlation, is important as it means that the results of regression analysis are less likely to be reliable (Saunders *el al*., 2016). The Durbin-Watson always produces a test number range from 0 and 4. A value of 2 means that there is no auto-correlation detected in the sample. Values from 0 to less than 2 indicate positive auto-correlation and values from 2 to 4 indicate negative auto-correlation (Somer, 2021). As a rule of thumb values of **1.5< DW < 2.5** show that there is no auto-correlation in the data. However the Durbin-Watson test only analyzes linear auto-correlation. Based on the above analysis we can say that there is no auto-correlation because the Durbin-Watson value is 1.657, which is found between acceptable range (1.5< 1.657< 2.5).

Table 9: Model summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.650[a]	.422	.407	.56188	.422	27.027	2	74	.000	1.657

a. Predictors: (Constant), AT_MEAN, ST_MEAN

b. Dependent Variable: AC_MEAN

4.6. Multiple Linear Regression Analysis

Regression analysis is a statistical tool used to model the relationship between independent variable and dependent variables. Specifically, regression analysis describes how the typical value of the dependent variable changes when independent variables increases or decreases, while holding the other variables constant (Tseng,Fu,Lu&Shieh,2011).

Table 10: Anova

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.065	2	8.533	27.027	.000[b]
	Residual	23.362	74	.316		
	Total	40.427	76			

a. Dependent Variable: AC_MEAN

b. Predictors: (Constant), AT_MEAN, ST_MEAN

From the above table 10 it's been observed that the value of f = 27.027 and the value of p= 0.000. In this case, the significance value was less than 0.05 indicating that the model shows high significant. The F-statistic is applied to test for tests overall significance. In this case, 5% level of significance will be used. The decision rule is that, if the probability values are ≤ 0.05, we can tell that it is significant. Based on this fact the model is significant and it can tell the relationship of the variables.

4.7. Discussion

As discussed in the above sections, personal study skills today revolve around comprehension of lecture content, with tools and technology assisting the review of this lecture material being most highly rated by students. Studying also remains an activity that is performed alone or in small groups, and one that remains quite separate from increasing trends toward social networking and online connectivity.

Generally, the result show that Middle achievers study more hours in both sexes, but because they are tied to cell phones, they couldn't get nice results, and female low achievers also study well for long time but they are stressed out, so they couldn't get nice results .Male low achievers are not interested in studying chemistry, so they don't get nice results. However, female high achievers have great study skills more than Male achievers.

CHAPTER FIVE

Conclusion and Recommendation

This chapter explains the study's key findings, as well as its conclusions, suggestions, and limitations. It also provides guidance for upcoming researchers. As a result, the main section of this chapter explains the study's findings, including a concise summary and conclusions taken from them. The next section then discusses recommendations, limitations, and key points of the study's intended direction.

5.1. Conclusion

Hypotheses are accepted. High achievers used effective study skills to study chemistry, Middle and low achievers study more hours than high achievers but they are not effective because of cellphone and stress.

As conclusion chemistry has been boring to study when students try only few skills and this will reduces students attitude to study chemistry, but if we control our anxiety and cellphone usage and if students use different skills such as using guide books, using laboratory, studying concepts, they will be more effective than others. In Addition, teachers and parents also contribute to the improvement of their students' study skills and results with chemistry.

This study also found that low achiever students have a negative attitude to study chemistry because their chemistry results are not good. The reason why it is not good is because they are not motivated equally like others to study chemistry.

5.2 Recommendation

5.2.1. For other researchers

This study comes with several recommendations. The research only covered 49 students of 11^{th} grade which was not enough but for the time we were obliged but we would recommend other researchers to use larger population for more accurate result.

Also we recommend other researchers to observe the effect of each study skills and students' attitude with chemistry achievement by taking long period of time to get accurate result.

5.2.1. For our school

We recommend our school to keep the school laboratory open for students to study chemistry. In addition, provide equal incentives to study chemistry for all students.

Generally, we recommend our school, to make talk with students that they shouldn't stay on social media for studying chemistry, but if it is necessary, share this website that was used by most of the respondents so that they don't get in trouble on social media. WWW.brainly.com

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APPENDICES

Appendix one: students' Questionnaires

Remedy Research Group's Questionnaire

Questionnaire on association of Grade 11 student's attitude and study skill with chemistry Achievement at Beteseb academy

Part one: demographic information

1. Are you a male or female?

Male ☐ Female ☐

2. What was your chemistry grade result in the first semester?

<75% ☐ 75% - 85% ☐ >85% ☐

Part two: Lecture comprehension information

3. I have difficultly determining important points in lectures.

Yes ☐ No ☐

4. Before class starts, I review yesterday's lecture notes.

Yes ☐ No ☐

5. I waste my time because I am not organized/don't desire in reading chemistry subject.

Yes ☐ No ☐

6. In class, generally speaking I take notes on the lecture of chemistry lessons.

Yes ☐ No ☐

Part three: factor that affects attitude to study chemistry

7. How much do your teachers motivate you to study chemistry?

<50% ☐ 50% - 70% ☐ 70% - 90% ☐ 90% - 100% ☐

8. How high do your families motivate you to study chemistry?

They don't ☐ Poor ☐ Good ☐ Very good ☐

Part three: chemistry study hour

9. On average, outside the class room how many hours do you study chemistry in a week?

0 – 3 ☐ 3 – 6 ☐ 6 - 8 ☐

10. I use social media and another guide books for studying chemistry, if your answer is "yes" what is your usual social media or guide book you use?

Yes ☐ No ☐ _____

Part four: students' study technique question

11. How much time do you spend to read your chemistry subject (compare with other subjects)?

<50% ☐ 50% - 70% ☐ 70% - 90% ☐ 90% - 100% ☐

12. What do you consider to be your primary source for studying chemistry? Mark one of the following:

☐ Writing notes from the chalk board while you're in lecture

☐ Using handouts and Power points that is given by the teacher

☐ Using only text book

☐ Using case videos with discussion

☐ I prefer to use social media to help me study

☐ Other

13. Please rate each of these studying styles (Poor, Average, Good or Excellent)

i. Only reading lectures note and text book _____
ii. Use additional guide books _____
iii. Studying with friends _____
iv. Using laboratories to study chemistry _____
v. Using social media _____

14. In your own words, what is you r preferred style to study chemistry?

_____

_____

15. In your words, what instrument or tools most help to study chemistry and achievement better results ?

_____

Appendix Two: students' Focus Group Discussion

FGD Guide

1. Chemistry is the hardest subject to study.

Strongly agree ☐ Agree ☐ Strongly disagree ☐ Disagree ☐

2. Studying Chemistry in group of three or more is the best way to get a nice Achievement.

Strongly agree ☐ Agree ☐ Strongly disagree ☐ Disagree ☐

3. Our school permits to give it's laboratory to studying by using it.

Strongly agree ☐ Agree ☐ Strongly disagree ☐ Disagree ☐

4. High achiever wanted to study chemistry with us.

Strongly agree ☐ Agree ☐ Strongly disagree ☐ Disagree ☐

5. Chemistry wants a more time than others for studying.

Strongly agree ☐ Agree ☐ Strongly ☐ Disagree ☐

Appendix three : Students'Interview Guide

Remedy Research Group's Interview Guide

Interview on association of Grade 11 student's attitude and study skill with chemistry Achievement at Beteseb academy

Interviewee _____Date _____

Class _____

Achievement in Chemistry_____

Here are some essential interview questions about study skills and attitudes towards chemistry include:

- How do you typically approach studying for chemistry exams?
- How do you remain motivated when studying challenging chemistry concepts?
- What strategies do you use to understand and remember complex chemical reactions?
- How do you typically ask for help when you don't understand a chemistry topic?
- What study skills work best for you and the one that doesn't and tell me why?
- Is your chemistry achievement high, middle or low? Answer the following questions. How many hours do our read chemistry in a day? How do you study chemistry? How do you manage a stress in the time of reading? What do advice for the students that read highly but their chemistry achievement is less?