



## A study of the effects of tutorial classes on the academic performance of female students in chemistry

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### Abstract

The purpose of this study is to assess the effectiveness of tutorial classes on grade 7 and 8 female students' academic performance in chemistry at Qilliso primary school. The study employs the survey research design. Data were collected from a total of 85 female students in grades 7 and 8 by using simple random sampling techniques where 10 teachers, 2 vice principals, and 1 principal were selected by purposive sampling techniques. The statistical analysis software was used to analyze the quantitative data of the study. The results reveal that tutorial support has both academic and psychological effects on female students. Academically, tutorial class is effective in improving a student's academic performance. Psychologically, tutorial support is effective in improving their self-confidence, self-concept, decision-making ability, memory, and feeling of happiness. Finally, the study suggested that tutorials are indispensable factors in the achievement of educational goals and objectives. Therefore, students, teachers, and the chiro educational office should give special attention to the implementation of effective tutorial class support for female students.

**Keywords:** Academic performance; chemistry; female students; primary school; tutorial class.

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## 1. Introduction

Education, in its general sense, is a form of learning in which the knowledge, skills, values, beliefs, and habits of a group of people are transferred from one generation to the next generation through discussion, teaching, or research (Yeung *et al.* 2013 cited in Melaku, 2021). From a psychological point of view, education implies that change can be regarded as a 'process' or 'product' (Crow, 2000). As a process, it embodies all those forms of activities that fit individuals for social living and that help to transmit activities, customs, laws, religious beliefs, languages, and social intuitions from one generation to another. As a product, education includes all those changes that have taken place as a result of individuals participating in learning experiences (Crow, 2000; Owston, York & Malhotra, 2019; Marshman, DeVore & Singh, 2020).

The tutorial is an interactive class taught by tutor students at an educational institution individually or in small groups (Moliner & Alegre, 2022). Tutorial is one of the oldest variables in educational theory long before possibly before Plato. Each tutorial activity is unique because it involves the coming together of particular individuals in a particular setting with particular artifacts ( McKeirnan, Bertsch, Arnold & Panther, 2019; Loda *et al.*, 2022).

Due to the student's differences, the tutorial class should be given special attention to female and low-achiever students to increase their academic performance (Coolidge & Segal, 2004). Similarly, tutorial support plays an active role in increasing the academic performance and performance of low achievers and female students. Students in all grade levels require tutorial support for the effectiveness of their teaching-learning system, especially for female students who have academic difficulties. Therefore, teachers are capable of meeting the instructional needs of all students equally according to their differences, because students have unique intellectual capacities in the class to improve their academic performance (Balwant & Doon, 2021; Paul & Graham, 2002, cited in Melaku, 2021). Chemistry has been identified as a very important science subject as it is important in the scientific and technological development of the nation. However, students consider chemistry as a very conceptual and difficult subject to learn. A subject could be regarded as abstract or difficult if it requires on average higher reasoning to understand (Anchor *et al.*, 2011).

### 1.1. Statement of the Problem

In a tutorial class program cooperative learning enhances the knowledge transformation in chemistry from one student to another because there is sharing of ideas. The academic of students is the most important indicator of quality education in the country. So, academic performance or academic performance is the extent to which students, teachers, and institutions have achieved educational goals (Thomas *et al.*, 2007). In different countries and at different times, various studies have been carried out to identify the effect of tutors who significantly influence students' academic performance. The cognitive performance of African students is low compared to the world standards and evidence points out the decline in recent years. Accordingly, the restoration and clarification of standards of academic performance are key to improving the quality of education and producing qualified students who are advantageous for their country's development at all levels .

Generally, tutoring plays a valuable role in helping one to improve the learning environment and navigate a stricter and uncertain regulatory landscape (Linden, Teakel & Van der Ploeg, 2022). Female students attend the classroom with some cultural and gender issues problems. Depending on their cultural background female students lag and show psychological fear to participate in the class discussion as well as to ask any question concerning chemistry problems. Test scores of female students decrease over time until when female students move up in the education arena .

In Ethiopia, there are different levels of primary education, although most of the teachers and students have little awareness of the effectiveness and practice of tutorial delivery for female students. However,

little emphasis seems to have been given to such issues that the problems are continuing and female students to such behaviors are left untreated. Therefore, the researcher tries to assess the effectiveness of the tutorial class for female students' academic performance in Qilliso primary school West Hararghe zone, Oromia regional state of Ethiopia.

### **1.2. Purpose of study**

This study is primarily concerned with the assessment of the effectiveness of the tutorial class for female students' academic performance in Qilliso primary school, chiro Town. To attain the objectives of the study, the following general and specific research questions have been formulated:

1. What are the academic effects of tutorial classes on female students in Qilliso primary school,
2. What is the interest of female students towards tutorial classes in Qilliso primary school,
3. What are the strategies to improve the tutorial given to female students in Qilliso Primary school

### **1.3. Objectives of the Study**

The following objectives are expected to be achieved in this research.

1. To identify the effectiveness of tutorial classes on female students' academic performance in Qilliso primary school
2. To identify the interest of female students towards tutorial classes in Qilliso primary school,
2. To improve the tutorial given to female students to get better academic performance in Qilliso primary school.

## **Materials and Methods**

### **2.1. Research Design**

This study adopts a descriptive survey design to establish the assessment of the effectiveness of the tutorial class for female students' academic performance in Qilliso primary school, chiro Town. The rationale for using descriptive survey design is that it is used in preliminary and exploratory studies to allow the researcher to gather the information, summarize, present, and interpret for clarification. The choice of descriptive survey design is made on the fact that in this study, the researcher was interested in the state of affairs already prevalent in the field and no variable is to be manipulated.

### **2.2. Participants and Sampling**

The study is conducted in Chiro Town from October 2022 to June 2022, West Hararghe zone, Oromia Regional State in Ethiopia. It is located 326 km from the capital city of Ethiopia, Addis Ababa. The city is Located in Ahmara Mountain, it has a latitude and longitude of 9°05'N 40°52'E / 9.083°N40.867°E and an altitude of 1826 meters above sea level. It is the administrative center of the West Hararghe Zone. Based on the population projection value (2018) report, West Hararghe has a population of 1,951,706, an increase of 47.16% over the 1994 census, of whom 989,861 are men and 961,845 women; with an area of 15,065.86 square kilometers, the zone has a population density of 124.23. The majority of the inhabitants were Muslim; with 49.88% of the population reporting, they observed this belief, while 43.34% of the population practiced Ethiopian Orthodox Christianity and 5.33% of the population were Protestant. The topography of West Hararghe is characterized by steep slopes in the highlands and mid-highlands and large plains in the lowland areas. The Zone is characterized by a crop-livestock mixed farming system where livestock in general and dairy production, in particular, contribute significantly to farmer livelihoods used for cash income-generating purposes. Khat and Coffee are important cash crops in this Zone. Over 50 square kilometers is planted with this crop of coffee and the climatic condition is conducive to livestock production

In Chiro Town, there are eleven primary schools. Among those Qilliso primary school is purposely selected due to the researcher's familiarity with this school and the problem's relevance to it. In Qilliso Primary there are 85 female students in grades 7<sup>th</sup> and 8<sup>th</sup>; and 32 teachers. Thus, the population for this quantitative study is the whole of Qilliso primary school female students in Chiro town.

The sample size was determined by using Taro Yamane's (1967) cited Assefa G. *et al.* (2017) formula as follows:

$$n = \frac{N}{1 + (Ne^2)}$$

Where n = required sample size N = Population size e = sampling error (5%), with a confidence level of 95%. Using the above formula, the sample size will be calculated.

$$n = \frac{N}{1+(Ne^2)} = \frac{85}{1+(85 \times 0.0025)} = \frac{85}{1.2125} = 70.10 \approx 70$$

(n) = 70 (sample from total female students of Qilliso primary school in Chiro town. From 32 teachers, 10 teachers are selected by a purposive sampling technique. Because to get adequate knowledge about the study. Therefore, to meet this objective, 70 students and 10 teachers were selected as sample participants of the study.

### **2.3. Data collection instruments**

Three main techniques of data collection are used to collect both primary and secondary data on information literacy needs and potentials in primary school. They included a documentary review, interview, and questionnaire. Both quantitative and qualitative data were collected through questionnaires for students and teachers, interviews and checklists for principals and vice principals, and documents for tutorial attendance. Using multiple methods of data collection helps the researcher to combine the strength and amend some of the inadequacies of any one of the sources of data.

#### **2.3.1. Reliability of research instruments**

According to Orodho (2004), reliability in research concerns the degree to which a particular measuring procedure gives similar results over several repeated trials. To test the reliability of the instruments the researcher used the pilot test method. Accordingly, a pilot test is conducted in the Muce Ahmad Muce primary school of students in grades 7<sup>th</sup> and 8<sup>th</sup> that are not included in the actual samples used. The total number of participants are involved 10% of the sample size. The reliability of the instrument is measured by using the Cronbach alpha method. The results obtained will be used to calculate Cronbach's Alpha using the formula;

$\alpha = \frac{K((1-\sum s^2))}{K-1 s^2_{test}}$  Where  $\alpha$  = Cronbach's Alpha, k = several questions,  $\sum s^2$  = sum of variances from each question,  $s^2_{test}$  = total variance of overall scores on the entire test.

Based on the pilot, reliability coefficient (alpha) the average of the reliability result was found to be (0.79) and hence, reliable and hence, was reliable. That is the instrument was found to be reliable as statistical literature recommended a test result of 0.70-0.90 reliable (Muganda & Mugenda, 2003). So, the results showed a very good measure of the intended objective.

### **2.4. Procedures**

After verifying the validity and reliability of the instruments, some sort of orientation shows to administer the research questionnaires was given to the researcher's assistants. The researcher obtained permission to conduct research from the Chiro College of Teachers Education through the Chiro Town educational Office. Upon obtaining consent, the study is undertaken in three phases: Phase one involves

the researcher visiting participating schools to be introduced, familiarize, and seek respondents’ permission to be involved in the study. In phase two, the researcher administered the questionnaires to the students, principals, and teachers. The researcher has assured the respondents of the confidentiality of the given information. The researcher equally interviews the school principals; observes one theory and one practical lesson in progress per school as well as the teaching and learning resources and facilities in the participating schools using the observation checklist. The third and final phase entailed the researcher interviewing the area field officers (CTEO) to obtain factors considered by the field officers to be contributing to the poor performance of the student in Chiro Town. The researcher also sought any intervention measures which the field officers have put in place to remedy the situation

### 2.5. Data Analysis

Depending on the nature of the data gathered through questionnaires and interviews as well as the variables to be treated. After collecting the data, the following steps were followed in analyzing the data. Responses to the questionnaire were entered into SPSS version 20. Then, descriptive and inferential statistics values such as frequency, percentage, mean and standard deviation, were computed to see the relationship of the independent variables with the dependent variable.

### 2.6. Ethical Considerations

According to Mugenda & Mugenda (2003), logistics in research refers to all those processes, activities, or actions that a researcher must address or carry out to ensure the successful completion of a research project. During the pre-field work, the researcher established a work plan, constructed the research instruments, obtained a research permit, carried out sampling, and pre-tested and corrected the instruments. Ethical issues were highly considered in this study. Before data collection permission was sought from the educational officials, principals, teachers, and students. The aim of the study was clearly explained to participants before the interviews. The participants were also informed that their involvement in the study was voluntary and that they were free to withdraw at any time of the interviews if they feel uncomfortable. They were assured of anonymity in the research report.

## 3. Results

### 3.1. Background information of the respondents

**Table 1**

*Background information on female students*

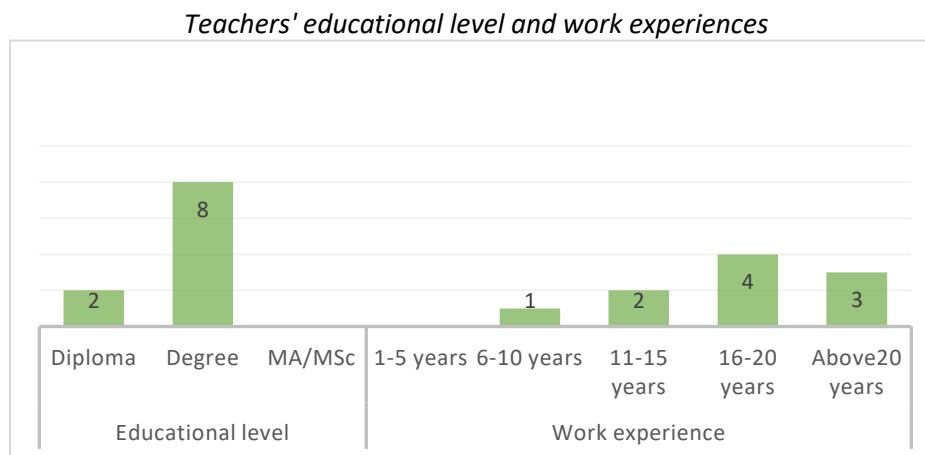
Variable	Categories	F	%
Age	10-15 years old	54	77
	16-20 years old	16	23
	above 20 years old		

*Source: Own survey, 2022*

Table 1 shows that 54 (77%) were in the 10–15 age group and 16 (23%) were in the 16–20 age group. This age group of 16- 20 years is beyond the age range of primary school students. Because some students are not living with their parents. That means some students learn with other people.

Figure 1 indicates that out of the total teachers' educational level (respondents), 8 (80%) were degree holders and 2 (20%) were diploma holders; and 1 (10%) were in the 6–10 have work experiences, 2 (20%) were in the 11–15 have work experiences, 4 (40%) were in the 16–20 have work experiences.

**Figure 1**



Source: Own survey, 2022

During the interview sessions, all of the school principals and vice-principals said that “*Experienced teachers have a richer background of experience to draw from and can contribute insight and ideas to the course of teaching and learning, are open to correction and are less dictatorial in the classroom. Teachers’ experience and student achievement was that students taught by more experienced teachers achieve at a higher level because their teachers have mastered the content and acquired classroom management skills to deal with different types of classroom problems*”

### 3.2. Academic Effects of tutorial class

**Table 2**

*Respondent's response on academic achievement*

S/N	Items	SA	A	N	D	SD	Mean	St. D
1	After I receive the tutorial, my participation is better than before	38	23	10			4.41	0.71
2	I scored poorly before taking tutorial education	35	21	2	12		4.14	1.08
3	I do not think that the tutorial support has contributed to my academic performance	4	16	2	23	25	2.30	1.3
4	Attending tutorials improve my point average	45	12	13			4.45	0.79
5	I think that tutorial support has contributed to my improved performance	56	2	4	8		4.51	1.03

Source: Own survey, 20122

SA-strongly agree, A-Agree, N- Neutral- disagree, SD-strongly disagree

The purpose of the study was to assess the effectiveness of tutorial classes for female students on their academic performance in Qilliso primary school. Table 2 shows that the majority of the respondents with a mean score (4.41) and standard deviation (0.71) after they received tutorial class their class participation was better than before. In the same table 2 out of the total respondents with a mean score of 4.14 and standard deviation (1.08) before taking a tutorial class they were scored poorly. So, the results revealed that most female students scored poorly before taking tutorial classes. For instance, students attending tutorials improve their point average with a mean score (of 4.45) and a standard deviation (0.79). Therefore, the results revealed that attending tutorial classes improved female students’ point average. Previous findings have indicated tutorial support has both academic and psychological effects on female students and tutorial class is effective in improving a student’s point average and academic performance and class Participation (Melaku, 2021).

During the interview sessions, the majority of the teachers said that “students, after receiving tutorial class their participation in class, was better than before and students attending tutorial improve their point average”

### ***Psychological effects of tutorial class***

**Table 3**

*Respondent’s psychological effect of tutorial class*

S/N	Items	SA	A	N	D	SD	Mean	St. D
1	After I receive the tutorial class, my decision-making skill was developed	32	31	7			4.36	0.66
2	When I evaluate my confidence since when I started the tutorial, my confidence changed or improved	23	12	9	26		3.46	1.29
3	After I receive the tutorial class, my concept increases	34	23	10	3		3.45	1.29
4	After I receive the tutorial class, I feel happy	21	34	5	7	3	3.98	0.98
5	After I receive the tutorial, my memory was increased	23	35	4	8		3.98	0.98

Source: Own survey, 2022

SA-strongly agree, A-Agree, N- Neutral- disagree, SD-strongly disagree

The purpose of the study was to assess the psychological effect of tutorial classes on female students in Qilliso primary school. Table 3 shows that the majority of the respondents with a mean score (4.36) and standard deviation (0.66) after they received tutorial class their decision-making skill was developed. So, the results revealed that receiving tutorial classes improves the decision-making skill of female students and they started tutorial classes their self-confidence changed or improved with a mean score of 3.46 and a standard deviation of 1.29. This shows the results revealed that receiving tutorial classes had a positive psychological effect on female students’ self-confidence development. Again, most female students were happy with a mean score of 3.98 and a standard deviation of 0.98. Therefore, the results revealed that most female students were happy after they received tutorial classes. Similarly, the study by Melaku, (2021) at Wachamo University pointed out that psychologically, tutorial support is effective in improving self-confidence, self-concept, decision-making ability, remembering ability, and feeling of happiness.

During the interview sessions, the majority of the teachers said that “students receiving tutorial class improve the decision-making skill and their self-confidence was changed or improved”

**Table 4**

*Respondent’s interest in tutorial class*

S/N	Items	SA	A	N	D	SD	Mean	St. D
1	I receive a tutorial voluntary	25	23	8	14		3.84	1.12
2	I am interested in my tutorial classes	12	35	14	9		3.7	0.90
3	I am punctual in my tutorial class	61	23	24	10	7	3.23	1.06

Source: Own survey, 2022

SA-strongly agree, A-Agree N- Neutral- disagree, SD-strongly disagree

#### **4. Discussion**

The purpose of the study was to assess female students’ interest in tutorial classes at Qilliso primary school. Table 4 shows that the majority of the respondents with a mean score (of 3.84) and standard deviation (of 1.12) students received tutorial classes voluntarily. So, the results revealed that the majority



of the female students received tutorial classes voluntarily. In the same table 5, the majority of the respondents with a mean score (of 3.7) and standard deviation (0.90) female students were interested in their tutorial classes. Therefore, the results revealed that female students were interested in their tutorial classes. Regarding their punctuality in their tutorial classes, the majority of respondents with a mean score (of 3.23) and standard deviation (of 1.06) were punctual in their tutorial. So, the results revealed that female students were punctual or were on time in their tutorial classes. Melaku, (2021) motioned that female students have a positive interest in their tutorial classes and are punctual to receive tutorial classes voluntarily.

One of the objectives of the present study was to assess the strategies to improve tutorials given to female students in Qilliso primary school. To do this, thematic analysis was employed in the form of a focus group discussion. Therefore, the results revealed that there are strategies to improve tutorial delivery for female students. These strategies are the abilities of students, connecting students with their peers, setting tutorial learning goals, preparing supporting materials, acting professionally, motivating, and encouraging females to improve their academic performance. Previous findings indicated that knowing the abilities of students is crucial because students are not homogenous (Melaku, 2021). Recent work on student engagement and belonging is critical to understanding more about the profile of today's students (Thomas, 2017).

## 5. Conclusion

Female students' tutorial program is one of the affirmative action strategies. The aim of this study was to the effects of tutorial classes for female students on their academic performance in Qilliso primary school. Data were collected through questionnaires, observation, and interviews; Then the data were analyzed through mean and standard deviation; and using some descriptive statistics and qualitatively. Depending on the findings of the study, tutorial support has both academic and psychological effects on female students.

Academically, tutorial class is effective in improving a student's point average and academic performance, and class participation. There are so many strategies to improve tutorial delivery for female students. These strategies are the abilities of students, connecting students with their peers, setting tutorial learning goals, preparing supporting materials, and motivating and encouraging females to improve their academic performance.

## 6. Recommendations

The result of this study showed that the tutorial class program has an impact on the academic achievement problems of female students in chemistry. Nowadays to solve their academic achievement problems in chemistry (education) the contemporary school renders a tutorial class program to support female students in education to balance the knowledge gap between female and male students due to different reasons.

Based on the findings of this study the following recommendations were suggested by the researcher

- The tutorial class program should be strengthened and sustainable for female students' academic problems in the contemporary school because of its impact
- Female students should think for their future life through education by learning and paying attention to attend in the school tutorial program to improve their achievement in chemistry
- Teachers should be encouraged and fully committed to providing effective professional support for their female students in tutorial classes by working together with professional schools for further academic improvement (achievement) of female students.
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