



SCIENCE PROFICIENCY OF FRESHMAN STUDENTS OF THE INSTITUTE OF ARTS AND SCIENCES OF KALINGA-APAYAO STATE COLLEGE

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Abstract: *This descriptive study looked into the proficiency in biology and chemistry of the freshman college students of the Institute of Arts and Sciences, Kalinga-Apayao State College for the school year 2008– 2009.*

The study determined that the freshman college students of the Arts and Sciences of KASC were less proficient in Biology and Chemistry. It is further concluded that there were no significant differences in the level of proficiency in Biology and Chemistry along the moderator variables of gender, socio-economic status, type of school graduated from and parents' highest educational attainment.

The study recommends more activities should be planned and initiated by the school and the science teachers to enhance skills development and proficiency of science among students. Likewise, adequate materials for science teaching and learning such as books, references and laboratory equipments should be provided.

Science teachers should also prepare a workbook that covers basic concepts and principles of the four areas of science which will serve as a continuous review for the students in order to uplift their scientific proficiency.

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RATIONALE

Science is the systematic and unbiased study of the world, including everything that can be seen or detected in nature, man and society, together with the knowledge that grows out of such study.

It has enormous influence in our lives. It provides the basis in much of the modern technology – the tools, materials, techniques and sources of power that makes our lives and work easier. Cars, communications, satellites, computers, plastics and televisions are only a few of the scientific and technological inventions that have transformed human life.

Moreover, science has greatly affected the way we view ourselves and the world that happened to them resulted from the actions of gods and spirits. But over the years, scientific findings have increasingly influence philosophical and religious thought about the nature of human beings and their place in the universe. The scientific theories dramatically changed some of the most basic ideas about time, space, mass and motion.

As scientific knowledge has grown and become increasingly complicated, many new fields of study have emerged. At the same time the boundaries between scientific fields have become less and less clear-out. Numerous areas of science overlap and it is often hard to tell where science and another begins.

Scientific study is divided into different disciplines, two of which are Biology and Chemistry. The life sciences also known as Biological Sciences involve the study of living things. It has two main fields: Botany deals with plants and Zoology deals with animals. These two fields are further divided into various branches, each of which can be divided into areas of special study.

Chemistry is another branch of science which studies natural and artificial substances to determine their composition and structure and changes that occur when they combine and form other substances. Chemists take molecules part and put them together in new ways. They try to find out why chemical reactions occur and how they can be controlled.

Science also differs from other types of knowledge in that scientific progress depends on new ideas expanding or replacing old ones. Theories of modern scientists have revised many ideas held by earlier scientists. Repeated observations and experiments lead scientists to update existing theories and to propose new ones. As new discoveries continue to be made,



even many recent scientific theories that can explain more facts. In this way, scientific knowledge is always growing and improving.

One of the goals of science is to help students become scientifically literate. This goal possesses a tremendous challenge to teachers because of the interplay of complex variety of factors such as students' interest, attitudes, abilities and background. These complex factors affect much the declining performance of students both in science and mathematics. Thus, it is expected that teachers should take into consideration various facets of science teaching in order to satisfy the needs of students, stimulate level in science.

It is for these reasons that the researchers deemed necessary to assess the science proficiency of the freshman college students of the Institute of Arts and Sciences, hence, this study.

STATEMENT OF THE PROBLEM

This study looked into the proficiency of the freshman college students of the Institute of Arts and Sciences, Kalinga-Apayao State College. Specifically, sought answers to the following questions.

1. What is the level of proficiency of the freshmen college students in Biology and Chemistry
 - 1.1. Are there significant differences on the level of proficiency of freshmen college students in the different areas along the moderator variables of gender, socio-economic status, type of school graduated from, and parents' educational attainment.

SIGNIFICANCE OF THE STUDY

The results of this study can be significant to the following:

School Administrators. This study encourages administrators to identify and deliberate science problems for more effective science activities. They can utilize it as basis for the formulation of objectives for quality science instruction.

Science Teachers. In the new teaching approach which is learner – oriented or student – centered, the teachers are considered facilitators of learning. This study provides them teaching design and encourages them to prepare instructional materials with continuously uplift science teaching. It also helps the teachers diagnose the learning difficulties of students and help them program the things to be learned to upgrade the quality of teaching and learning process. This study in a way may help teachers to improve scientifically.



Students. The students will be the direct beneficiaries of the study. It is a motivation for them to learn science through continuous feedback of their performance using valid and reliable test. Keeping abreast of their performance will surely develop positive attitudes towards science, thus motivating their interest in learning the subject which is the demand of the present scientific and technological advancement.

Researchers. This study can also help the writers personally as teachers. The findings can be used as basis for the authors to plan and adjust their teaching methods in order to help in the improvement of the science proficiency on the students.

PROCEDURE/METHODOLOGY

Research Design

Descriptive method is used in this study. Descriptive research involves collection of data in order to test the hypotheses or answer questions concerning the current status of the subject of the study. The focus is the prevailing conditions of the level of proficiency of the students in the areas of Biology and Chemistry.

Data Gathering Instruments

This study made use of the questionnaire as the main tool in data gathering.

The proficiency test has two parts. Part I looked into the moderator variables of the respondents in terms of gender, socio-economic status, type of school graduated from, and parents' educational attainment.

Part II looked into the level of proficiency in science of the freshman college students of the Institute of Arts and Sciences. Part II has two subparts. The first subpart consists of questions in Biology adapted from the book of Ditan, Introduction to Biological Science and from, other books of Biology. The second subpart contains questions in Chemistry from the General Chemistry Books by Magno, et. al. and by Keenan.

Each subpart consisted of fifty (50) items, hence; the proficiency test contains one hundred (100) items was answered by the college freshman.

Validity and Reliability of the Instrument

The proposed proficiency test was adapted from different science books and from reviewers of the National Secondary Assessment Test with slight revisions. Hence, there is no need to test for the reliability of this instrument.



Data Gathering Procedure

A written permission to the Institute Dean was sought by the researchers for the conduct at the Institute of Arts and Sciences, Kalinga-Apayao State College, Dagupan Campus.

After permission is granted, the researchers personally floated the questionnaire to the college freshman students in order that they can explain the purpose of the study.

Statistical Tools:

The following tools were used to attain the intervention of data:

- 1. Weighted Mean.** This was used to analyze to response of the students on their profile and level of proficiency.
- 2. Frequency, Percentage and Ranking.** The frequency shows the number of responses for each item; percentage will show the part of the whole in the light of the moderator variables of gender, type of school graduated from, socio-economic status, and educational attainment of parents.
- 3. Chi-Square.** This was used to determine significant correlations of the level of proficiency in Science along identified moderator variables.

DISCUSSION OF RESULTS

Table 1. Level of Students Proficiency in Biology

Level of Proficiency	Frequency	%	Rank
41 - 50 Very Much Proficient	0	0	
31 - 40 Very Proficient	6	8	
21 - 30 Proficient	22	29.33	
11 – 20 Less Proficient	42	56	
0 - 10 Not Proficient	5	6.67	
Total	75	100	

Out of the seventy five (75) freshmen students, forty two (42) students or 56% were less proficient in Biology; twenty two (22) students or 29.33 percent were proficient; six (6) of 8 percent students were very proficient; five (5) students or 6.67 percent were not proficient while no one was very much proficient.

It further conveys that majority of them obtained failing score, 6-10, which means they are less proficient and have fairly satisfactory performance in Biology.



Table 2. Level of Students Proficiency in Biology According to Gender

Gender	VMP 41-25	VP 31-40	P 21-30	LP 11-20	NP 0-10	Total
Male	0	1	9	8	0	18
Female	0	1	14	33	5	57
Total	0	2	23	41	5	75

χ^2 , .05, df = 9.488 $\chi^2 = 3.75$ Decision: Not Significant/ H_0 Accepted

Out of the fifty seven (57) female students, thirty three (33) students were less proficient with 11-20 scores which means failure; fourteen (14) students were proficient with 21-30 scores; five (5) students were not proficient with failing scores of 0-10 while no one was very much proficient.

Of the eighteen (18) male students, nine (9) students who got 11-20 scores were proficient; one (1) student who got 31-40 scores was very proficient while no one was either very much proficient or not proficient.

It further reveals that majority of the female and male students obtained failing scores, 11-20, which implies that they are less proficient and their performance in Biology is fairly satisfactory. It also conveys that the students are less interested in Biology and more interested in general Science. There are more numerous scientific terms and concepts to be learned and memorize in Biology than in General Science.

The computed value, 3.75 is lower than the tabular value, 9.488 at .05 level of significance with four (4) degrees of freedom, this implies that there is no significant correlation between gender and science proficiency level.

This finding affirms Butemeyra's finding that there is no significant relationship of students' achievement in Science and Technology I and their gender.

Table 3. Level of Students Proficiency in Biology According to Socio-Economic Status

Income/Monthly	VMP 41-50	MP 31-40	VMP 21-30	VMP 11-20	VMP 0-20	Total
P 8, 000 – above (upper class)	0	2	6	6	0	14
P 7, 000 – 7, 999 (upper middle class)	0	0	2	1	0	3
P 6, 000 – 6, 999 (lower middle class)	0	2	6	2	0	10
P 5, 000 – 5, 999 (lower class)	0	2	29	15	2	48
Total	0	6	43	24	2	75

χ^2 , .05, 16 df = 26.296 $\chi^2 = 6.95$ Decision: Not Significant/ H_0 Accepted



Out of the forty eight (48) students who belong to the lower class family, twenty nine (29) student with 21-30 scores were proficient; fifteen (15) students with 11-20 were less proficient; two (2) student with 31-40 scores were very proficient; two (2) students were not proficient with failing scores of 0-10, while no one was very much proficient in Biology.

Among the fourteen (14) students who come from the upper class family, six (6) students who obtained 11-20 score s were less proficient; six (6) students with 21-30 score were proficient; two (2) students with 31-40 score were very proficient, while no one was either very much proficient or not proficient.

Of the three (3) students who come from the upper middle class family, two (2) students were proficient with 21-30 score, one (1) student was less proficient with 11-20 scores while no one was very much proficient or not proficient.

It further shows that majority of the college freshman students were proficient in Biology which implies that their performance was fairly satisfactory.

The computed chi-square yielded 6.95 which is very much lower than the tabular value of 26.296 at .05 level of significance with 16 degrees of freedom, hence, the null hypothesis was accepted. There was no significant correlation between the students' level of proficiency in Biology and their socio-economic status.

This finding corroborates with Canay's (1996) finding that the students, socio-economic status affect performance in Science.

Table 4. Level of Students Proficiency in Biology According to Type of School Graduated from

Type of School Graduated From	VMP 41-50	MP 31-40	P 21-30	LP 11-20	VMP 0-10	Total
Public	0	3	11	20	2	36
Private	0	3	11	22	3	39
Total	0	6	22	42	5	75

χ^2 , .05, 4 df = 9.488

$\chi^2 = 2.77$ Decision: Not Significant/ H_0 Accepted

Out of the thirty nine (39) students who graduated from the private schools, twenty two (22) students with 11-20 scores were less proficient; eleven (11) students with 21-30 scores were proficient; three (3) students were very proficient with 31-40 scores; three (3) students were not proficient with 0-10 scores, while no one was very much proficient.



Among the thirty six (36) students who graduated from the public schools, twenty students who got 11-20 score were less proficient; eleven (11) students with 21-30 scores were proficient; three (3) students were very proficient with 31-40 scores; two (2) students who got 0-10 scores were not proficient while no one very much proficient in Biology.

The computed value, 2.77 is lower than the tabular value, 9.488 at .05 alpha level with four (4) degrees of freedom, thus, the null hypothesis was accepted. There were no significant correlations between the level of students, proficiency in Biology and the type of school graduated from. This finding affirms Carag's (1997) finding that the high school graduated from does not significantly affect students' grammar proficiency.

Table 5. Level of Students Proficiency in Biology According to Parents' Highest Educational Attainment

Parents' Highest Educational Attainment	VMP 41-50	VP 41-50	P 41-50	LP 41-50	NP 41-50	Total
Tertiary	0	1	8	13	2	24
Secondary	0	3	8	14	3	28
Elementary	0	1	4	10	0	15
Primary	0	1	2	5	0	8
Total	0	6	22	42	5	75

$$X^2, .05, 12 \text{ df} = 21.026 X^2 = 6.63 \text{ Decision: Not Significant}/H_0 \text{ Accepted}$$

Out of the twenty eight (28) students whose parents have completed secondary education, fourteen (14) students who got 11-20 scores were less proficient; eight (8) students were proficient with 21-30 scores; three (3) students who got 31-40 scores were very proficient; three (3) students who got failing scores, 0-10, were not proficient while no one was very much proficient.

Among the twenty four (24) whose parents have finished tertiary education, thirteen (13) students were less proficient with 11-20 scores; eight (8) students with 21-30 scores were very proficient; three (3) students who obtained failing scores, 0-10, were not proficient; one (1) was very proficient with 31-40 scores while no one was very much proficient.

Of the fifteen (15) students whose parents have completed elementary education, ten (10) students were less proficient with 11-20 scores; four (4) students with 21-30 scores were proficient; one (1) student who got 31-40 scores was very proficient while no one was very much proficient or not proficient.



Of the eight (8) students whose parents have completed primary education, five (5) students with 11-20 scores were very proficient while no one was either very much proficient or not proficient.

It further reveals that majority of the students were less proficient in Biology.

The computed value, 6.63, is very lower than the tabular value, 21.026 at .05 alpha levels with twelve (12) degrees of freedom. This means that there is no correlation between the students' proficiency level and their parents' educational attainment.

Table 6. Level of Students' Proficiency in Chemistry

Level of Proficiency	Frequency	Percentage
41 – 50 Very Much Proficient	0	0
31-40 Very Proficient	4	5.33
21-30 Proficient	16	21.33
11-20 Less Proficient	52	69.33
0-10 Not Proficient	3	4.00
Total	75	100.00

Out of the seventy five (75) students, fifty two (52) students or 69.33 percent with 11-20 scores were less proficient, sixteen students or 21.33 percent with 21-30 scores were proficient; four (4) students or 5.33 percent with 31-40 scores were very proficient; three (3) students or four percent with 0-10 scores were not proficient while no one was very much proficient.

It further reveals that majority of the freshmen college students were less proficient which implies that their performance in Chemistry was fairly satisfactory. This is due to the fact that Chemistry is the most difficult subject area among the four areas covered in Science I. Chemistry deals on various chemical symbols, formulae and balancing equations requiring sharp memory and computational skills. When students fail to master or memorize them they also fail to answer the given problems.

Table 7. Level of Students Proficiency in Chemistry According to Gender

Gender	VMP 41-50	VP 41-50	P 41-50	LP 41-50	NP 41-50	Total
Male	0	0	5	13	0	18
Female	0	4	11	39	3	57
Total	0	4	16	52	3	75

χ^2 , .05, df = 9.488 $\chi^2 = 2.69$ Decision: Not Significant/ H_0 Accepted



The table indicates that among the fifty seven (57) female students, thirty nine (39) students with 11-20 scores were less proficient; eleven (11) students with 21-30 scores were proficient; four (4) students with 31-40 scores were very proficient; three (3) students, were not proficient with 0-10 scores while no one was very proficient.

Of the eighteen (18) male students, thirteen (13) students who obtained 11-20 scores were less proficient; five (5) students with 21-30 scores were proficient while no one was either very much proficient, very proficient and not proficient.

It further shows that majority of male and female students were less proficient in Chemistry. Both male and female students find it difficult to learn the subject because of its nature and scope as mentioned earlier.

The chi-square computation yielded 2.69 which is lower than the tabular value, 9.488 at .05 level with four degrees of freedom. The null hypothesis was therefore accepted.

The finding corroborates with the findings of Bustmeyra (1998) and Gragasin (1995) that gender has no significant relationship with their academic performance or achievement.

Table 8. Level of Students Proficiency in Chemistry According to Socio-Economic Status

Income/Monthly	VMP 41-50	VP 41-50	P 41-50	LP 41-50	NP 41-50	Total
P8,000-above (upper class)	0	3	5	5	1	14
P7,000-7,999-(upper middle class)	0	1	0	2	0	3
P6,000-6,999-(lower middle class)	0	0	1	9	0	10
P5,000-5,999-(lower class)	0	0	10	36	2	48
Total	0	4	16	52	3	75

$\chi^2, .05, 16 \text{ df} = 26.296 \chi^2 = 20.80$ Decision: Not Significant/ H_0 Accepted

The table conveys that out of the forty eight (48) students who come from the lower class family, thirty six (36) students were less proficient with 11-20 scores which implies failure; ten (10) students who got 21-30 scores were proficient; two (2) students were not proficient with 0-10 scores while no was either very much proficient or very proficient.

Of the fourteen (14) students who belong to the upper class family, five (5) students who obtained 21-30 scores were proficient; five (5) students who obtained 11-20 scores were less proficient; three (3) students who obtained 31-40 scores were very proficient; one (1) students was less proficient with failing score of 0-10 while no one was very proficient.



Among the ten (10) students who belong to the lower middle class family, nine (9) students with 11-20 scores were less proficient; one (1) student got 21-30 score was proficient while no one was either very much proficient, very proficient or proficient.

Of the three (3) students who come from the upper middle class family, two (2) students who obtained 11-20 scores were less proficient; one (1) student who got 31-40 score was very proficient while no one was either very much proficient, proficient or not proficient.

It further conveys that majority of the students did not get the passing standard which implies that they were less proficient and had fairly satisfactory performance in Chemistry. .

The computed value, 20.80 is lower than the tabular value, 26.296 at .05 alpha level with sixteen (16) degree of freedom. The null hypothesis was therefore accepted. There was no significant correlation between the level of students' proficiency in Chemistry and their socio-economic status.

This finding affirms Canay's (1996) finding that the socio-economic status profile of the students doesn't significantly affect their academic performance.

Table 9. Level of Students Proficiency in Chemistry According to Type of School

Type of School Graduated From	VMP 41-50	VP 41-50	P 41-50	LP 41-50	NP 41-50	Total
Public	0	0	6	27	3	36
Private	0	4	10	25	0	39
Total	0	4	16	52	3	75

$X^2, .05, 4 \text{ df} = 9.488$ $X^2 = 7.97$ Decision: Not Significant/ H_0 Accepted

As shown in the table, twenty five students out of the thirty nine (39) graduates from the private schools were less proficient with 11-20 scores, ten (10) students got 21-30 scores were proficient; four (4) students were very proficient with 31-40 scores while no one was either very much proficient or not proficient.

From the thirty six (36) graduates of public schools, twenty seven (27) students who obtained 11-20 score were less proficient; six (6) students were proficient with 21-30 scores; three (3) students who got 0-10 scores were not proficient while no one was either very much proficient of very proficient.

If further reveals that majority of the college freshman students did not get the passing standard which means they were less proficient and had fairly satisfactory performance in Chemistry.



The computed chi-square yielded 7.97 which is lower than the tabular value, 9.488 at .05 alpha level with four (4) degrees of freedom. There was no significant difference between the level of students' proficiency in Chemistry and the type of school graduated from.

This finding corroborates with Carag's (1997) finding that high school graduated from does not significantly affect students' grammar proficiency.

Table 10. Level of Students Proficiency in Chemistry According to Parents' Highest Educational Attainment

Parents' Highest Educational Attainment	VMP 41-50	VP 41-50	P 41-50	LP 41-50	NP 41-50	Total
Tertiary	0	3	9	12	0	24
Secondary	0	0	4	22	2	28
Elementary	0	1	1	13	0	15
Primary	0	0	2	5	1	8
Total	0	4	16	52	3	75

$\chi^2, .05, 12 \text{ df} = 21.026$ $\chi^2 = 15.46$ Decision: Not Significant/ H_0 Accepted

Out of the twenty eight (28) students whose parents have completed secondary education, twenty two (22) student with 11-20 scores were less proficient; four (4) students who got 21-30 scores were proficient; two (2) students with 0-10 scores were not proficient while no one was either very much proficient or very proficient.

Of the twenty four (24) students whose parents have completed tertiary education, twelve (12) students were less proficient with 11-20 scores; nine (9) students with 21-20 scores were proficient; three (3) students with 31-40 scores were very proficient while no one was either very much proficient or not proficient.

Out of the fifteen (15) students whose parents have completed elementary education, thirteen (13) students with 11-20 scores were less proficient; one (1) student was proficient with 21-30 scores; one (1) student was very proficient with 31-40 scores; while no one was either very much proficient or very proficient.

It further reveals that majority of the students did not meet the passing standard which means they are proficient and have fairly satisfactory performance in Chemistry.

The computed value, 15.46, is lower than the tabular value, 21.026 at .05 alpha level with twelve (12) degrees of freedom. The null hypothesis was therefore accepted. There were no



significant correlations between the level of students' proficiency in Chemistry and their parents' educational attainment.

SUMMARY OF FINDINGS

Level of Proficiency of the Freshmen College Students in the Following Areas

A) Biology

Majority of the freshman college students, forty two (42) or 56 percent, were less proficient in Biology with 11-20 scores. No significant differences in the level of proficiency in Biology of the respondents as to the moderator variables.

B) Chemistry

Majority of the freshman college students, fifty two (52) or 69.33 percent were less proficient in Chemistry with 11-20 scores. No one among them was very much proficient while three (3) students with 0-10 scores were not proficient.

With respect to the moderator variables of gender, socio-economic status, type of school graduated from and parents' educational attainment, there were no significant correlations on the level of proficiency in Chemistry.

CONCLUSION

The study concludes that the freshman college students of the Arts and Sciences of KASC were less proficient in Biology and Chemistry. It is further concluded that there were no significant differences on the level of proficiency in Biology and Chemistry along the moderator variables of gender, socio-economic status, type of school graduated from and parents' highest educational attainment.

RECOMMENDATIONS

1. Administrators and science teachers must work for higher students' proficiency by continuously studying and enriching the science curriculum.
2. The school and the science teachers should plan and initiate more activities to enhance skills development and proficiency of science among students.
3. The school should provide adequate materials for science teaching and learning such as books, references and laboratory equipments.
4. The science teachers should prepare a workbook that covers basic concepts and principles of the four areas of science which will serve as a continuous review for the students in order to uplift their scientific proficiency.



5. Science teachers should strive to increase teaching competence through attendance to seminars, conferences, and conventions in Science.

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