TEST Engineering & Management

January - February 2020
ISSN: 0193 - 4120 Page No. 4040 - 4043

Linking Attitude and Achievement in Chemistry

Donabel Ariza Dumelod, Ed. D
Isabela State University
Cauayan Campus
Philippines
dondumelod@yahoo.com

Article Info
Volume 82
Page Number: 4040 - 4043
Publication Issue:
January-February 2020

Article History
Article Received: *18 May 2019*
Revised: *14 July 2019*
Accepted: *22 December 2019*
Publication: *21 January 2020*

Abstract:
It is the goal of the Philippines to make students globally competitive. With this goal the country must strengthen its science education system. This study was conducted to determine the profile, attitude and achievement of the 3rd year high school students at Cauayan City National High School-Research Annex. A total of 42 students participated in this study. A standardized questionnaire adapted from International General Certificate of Secondary Education (abbreviated as IGCSE) was used for the achievement of students in Chemistry. Encompassing both descriptive and correlational designs, the results obtained were analyzed using frequency and percentage, t-test and Pearson r. Statistical package aided the computation of the statistical parameter. Analyses of data revealed that:(1) respondents had moderately favorable attitude in Chemistry subject; (2)their Chemistry achievement was fair; (3) attitude and Chemistry achievement had changed when grouped according to sex and age (4) and there was no significant relationship between the attitude and achievement of students in chemistry.

Keywords: *Achievement, Attitude,Cauayan City,Chemistry*

I. INTRODUCTION

Science teaching plays an important role in the attainment of a country's developmental goal toward competition and excellence. Technological innovations in the field of science contribute greatly to the economic growth and security of a country, furthermore, quality science education makes students globally competitive.

The goal of science education in the Philippines is to develop the population's science and technology literacy. If the country's goal is to make students globally competitive, it has to strengthen its science education system.

The implementation of the 2012 K-12 aims to develop a quality and globally competitive Filipino graduates. It equips students with a broader knowledge and understanding of facts and a better insight of life that will make them responsible and upright human beings.

Exploratory research has revealed the reason associated with students' attitude toward chemistry courses and methods of teaching (Craker, 2006; Normah and Salleh. They have highlighted that if students have the knowledge in planning and implementing the strategies of solution to the questions, they will take pleasure in chemistry course. Norma and Salleh (2006) indicated that students' attitude and interest play an essential role among students studying science. Several studies such as Ojzen and Fishbein (2000), Wilson et al (2000), report that student's positive attitude toward science highly correlate with their achievement in science.

To know if there is improvement, the grades they earn in long period of learning, should be manifested or monitored. It is believed that grade is the primary indicator that evaluates student performance in many subjects (Chemistry). For instance, if someone got higher scores, it is concluded that he learned a lot, while low score indicates poor learning, or simply, their grades are directly proportional to their performance in any subject (Chemistry). Academic skills are, and should be, the primary focus of instruction in schools. However, recent research suggests that student achievement also depends on academic enablers such as attitudes and behaviors that allow a student to participate in and ultimately benefit from academic instruction in the classroom (Elliot, DiPerna & Malecki; 2002).He needs for conducting studies, related to attitude, was undertaken for two main reasons; namely the attitudes' feasible power to predict future behaviors like subject and career preferences of students (Osborne, Simon & Collins, 2003), and the correlation existing between attitude and academic achievement (Osborne & Collins, 2000).

According to Bailey and Garratt 2002, learning styles recognize that individuals learn in different ways, and thus that the students in any course will place a variety of different interpretations onto their lessons. Furthermore, it has been reported that teaching is most effective when it caters a range of learning style and manifest the attitude of student in learning chemistry, in part having to learn in a less preferred style helps to broaden students' range of skills (Felder Felder and Dietz 2002).

TEST Engineering & Management

January - February 2020
ISSN: 0193 - 4120 Page No. 4040 - 4043

It is understood that the attitude is one of the important determinants of human behavior. In this manner, students' attitude toward learning chemistry would also be affected on students' academic performance in chemistry.

. The primary aim of this study is to find out or correlate the profile, attitude, and achievement performance of students in learning chemistry. Secondary aim of this study is to reveal the relationship of their profile, attitude, and achievement performance.

This study aimed to determine and correlate the profile, attitude and achievement of 3rd year students of Cauayan City National High School -Research Annex in Chemistry subject.

METHODOLOGY

The study used the descriptive-correlation type of research. The respondents of the study were 42 students (3rd High School) from Cauayan National High School-Research Annex. Questionnaires were used to gather the data on the profile of the respondents as well as their Chemistry attitude and Chemistry achievement.

The questionnaire was adapted from the standardized attitudinal questionnaire inventory containing 20 statements. The Chemistry achievement was also adapted from standardized chemistry achievement test by International General Certificate of Secondary Education (abbreviated as IGCSE).

The questionnaire was designed to consider the attitude of students in Chemistry which was believed to have a great effect on Chemistry achievement of students. On the other hand, the Achievement test involves the general knowledge of students in Chemistry. Each statement was rated using the four-point scale from which the respondents indicate their favorable and unfavorable attitude in Chemistry.

All data were processed through the aid of the statistical package. The frequency and percentage were employed to describe the profile of the respondents; the weighted mean was used to determine the attitude of students in chemistry; for significant difference between the attitude and profile such as sex and age, the t-test was used; for the significant difference between the Achievement and Profile of the respondents and correlating the Attitudes and Achievement of the respondents, the Pearson r was used.

RESULTS AND DISCUSSION

Table1. Profile of the Respondents

Profile of Respondents	Frequency	Percentage
Age		
13-15	36	85.71
16-above	6	14.29
Sex		
Male	15	35.70
Female	27	64.30
Total	42	100

Table 1 shows the frequency distribution of the respondents in terms of their profile such as age and sex.

In terms of age, data revealed that 36 or 85.71% are 13-15 years old while 6 or 14.29% are 16-above.

In terms of sex, female dominate the male respondents with 27 or 64.30% against 15 or 35.70% male respondents. This implies that there are more female students attending the chemistry subject and there are more female than male students enrolled in Cauayan City National High School-Research Annex.

Table 2.Mean and Qualitative Description of the Respondents Attitude towards Chemistry

Attitude in Chemistry		
Statements	**Mean**	**Descriptive Interpretation**
1. I am always under stress in a chemistry class.		Moderately Favorable
2. I like chemistry, and it challenges me to have to take it.	3.67	Favorable
3. I enjoy chemistry courses.	3.60	Favorable
4. Chemistry is fun.	3.48	Moderately Favorable
5. Chemistry is stimulating.	3.05	Moderately Favorable
6. I can think nearly when working on chemistry.	3.50	Favorable
7. I feel a insecurity when attending chemistry.	3.40	Moderately Favorable
8. Chemistry makes me feel uncomfortable, restless, irritable, and impatient.	3.67	Favorable
9. The feeling that I have toward chemistry is a good feeling.	3.57	Favorable
10. Chemistry makes me feel as though can't find my way out.	3.57	Favorable
11. Chemistry is something which I enjoy a great deal.	3.50	Favorable
12. When I hear the word chemistry, I have a feeling of dislike.	3.71	Favorable
13. I approach chemistry with a feeling of hesitation, resulting from a fear of not being able to do chemistry.	3.19	Moderately Favorable
14. I really like chemistry.	3.48	Moderately Favorable
15. Chemistry is a course in school which I have always enjoyed studying.	3.26	Moderately Favorable
16. It makes me nervous to even think about having to do a chemistry problem.	3.0	Moderately Favorable
17. I have never liked chemistry , and it is my most dreaded subject	3.52	Favorable
18. I am happier in a chemistry class than in any other class.	2.90	Moderately Favorable
19. I feel at ease in chemistry, and I like it very much.	3.57	Favorable
20. I feel a definite positive reaction tochemistry; it's enjoyable.	3.40	Moderately Favorable

January - February 2020
ISSN: 0193 - 4120 Page No. 4040 - 4043

Grand Mean	3.41	Moderately Favorable

Table 3. Chemistry Achievement of Respondents

Profile	Mean	Qualitative Description
Age		
13-15	12	Fair
16-above	14.71	Fair
Sex		
Male	11.60	Poor
Female	12.56	Fair

The table revealed that age 13-15 and 16-above have a fair achievement in Chemistry. However, ages 13-15 got a weighted mean of 12 while 16-above got a weighted mean of 14.17. Both age brackets showed fair Chemistry achievement.

The table also revealed that male respondents have poor Chemistry achievement with a mean of 11.60 while female respondents have fair Chemistry achievement with 12.26 as the weighted mean. This implies that female respondents showed higher achievement than male respondents.

This finding conforms with the findings that gender predicts the cumulative grade of secondary school but does not predict the chemistry achievement and chemistry attitudes which seems contradictory with the literature saying males' ability and feelings related with science is more positive than that of females'. Therefore, their preferences and feelings related with chemistry did not show any significant discrepancies regarding gender difference. In addition, according to Bailey and Garratt (2002), learning styles recognize that individuals learn in different ways, and thus that the students in any course will place a variety of different interpretations onto their lessons

Table 4. Difference in Chemistry Achievement of Respondents when grouped according to profile variables

Profile	Mean	t-value	p-value
Age			
13-15 16-above	12.21	-1.49^{ns}	0.186
Sex			
Male Female	12.21	-0.90^{ns}	0.375

Table 4 shows the difference in Chemistry achievement of respondents when grouped according to profile variables. The table reveals that there is no significant difference on the respondent's Chemistry achievement as indicated by the value ($t=1.49^{ns}$; $p>0.05$) and ($t=0.90^{ns}$; $p>0.05$). This implies that both age and sex of respondents have nothing to do with the Chemistry achievement.

This finding conforms with the findings of Kalaivani and Babu (2011) who found out that there is no significant difference between male and female students with respect to their achievement in Chemistry and same with Norman who found out that gender predicts the cumulative grade of secondary school but does not predict the chemistry achievement and chemistry attitudes which seems contradiction with literature saying males' ability and feelings related with science is more positive than that of females'. Therefore, their preferences and feelings related with chemistry did not show any significant discrepancies regarding gender difference.

Table 5. Difference between attitudes of Respondents in Chemistry when grouped according to profile variables

Profile	Mean	SD	t-value	p-value
Age				
13-15 16-above	3.41	0.48	1.084^{ns}	0.386
Sex				
Male Female	3.41	0.48	-0.310^{ns}	0.759

The table 5 presents the difference between attitudes of Respondents in Chemistry when grouped according to profile variables such as age and sex. The t-values reveal that there is no significant difference in the attitude of respondents in Chemistry when grouped according to age (1.084^{ns};$p>0.05$) and sex (-0.310^{ns};$p>0.05$).This only means that age and sex have nothing to do with the attitude of respondents in Chemistry.

It negates the findings of Buehl and Alexander (2001) reported that female students enjoyed learning chemistry more than male students and Banu (2000) showed that male students in general held positive attitude towards chemistry as compared to the females.

Table 6.Correlation between the attitude and achievement of the respondents in Chemistry

Variable	Mean	SD	r-value	p-value
Between Attitude and Achievement	3.41	0.49	0.132^{ns}	0.406
	12.21	3.17		

Table 6 presents the relationship between the attitude and achievement of the respondents in Chemistry. As gleaned in the table that there is no significant relationship between the attitude and achievement of respondents in Chemistry ($0.132^{ns}p>0.05$). It is concluded that attitude of students does not show association with their chemistry achievement. In other words even though students show moderately favourable attitude toward Chemistry, this is not a guarantee that it will show high chemistry achievement.

Hence, students' positive attitudes, thoughts, and perceptions cannot be translated into academic success in the classroom or at the very minimum can help to predict success and achievement in students.

The result opposes the findings of Oltoye (2001) found out that students attitude towards chemistry have significant direct effect on the students chemistry achievement and Njuguna (2002) carried out a study on the relationship between students 'attitude towards science subject and their academic achievement in these subjects. He established that there was a positive significant relationship for the study group in chemistry subject. Furthermore, according to Ojzen and Fishbein (2000), Wilson (2000), report that student's positive attitude toward science highly correlate with their achievement in science.

January - February 2020
ISSN: 0193 - 4120 Page No. 4040 - 4043

CONCLUSION

This study has investigated the profile of students and identified the difference in the attitude and Chemistry achievement between their age and sex and to determine the relationship of the attitude and Chemistry achievement of the students. The total students' attitude in Chemistry is moderately favorable. That respondent's attitude really varies from person to person. Some shows positive attitude and some shows negative attitude in Chemistry. The respondents' mean score in their Chemistry achievement is fair. Both age and sex have no significant difference in their attitude and Chemistry achievement. However, the age of students is insignificant to their Chemistry attitude and achievement. Furthermore, it can be concluded that attitude of students does not really show association with the chemistry achievement of students. In other words even though students show moderately favourable to their attitude in chemistry, this is not a guarantee that they will show high chemistry achievement. In addition, attitude of male students' is slightly lower than that of females but both sexes show moderately favorable in their attitude. This only implies that regardless of sex, the respondents have the same positive attitude in Chemistry subject. Therefore, the profile of the respondents such as age and sex has nothing to do with their Chemistry attitude and Chemistry achievement.

RECOMMENDATION

There is an insignificant link between the profile, attitude and chemistry achievement of the students. Therefore, appropriate measures should be taken consideration to boost students' positive attitude toward Chemistry and to improve Chemistry achievement, hence, it is recommended that Chemistry teachers should promote favorable attitude in learners since they play an important role in students' learning processes. In relation to that, Chemistry achievement of students must be monitored. Counselors and educators should give continuous advice and develop techniques that help students boost positive attitude in Chemistry and reduce stress, to improve Chemistry achievement.

For further research related with the other field in Science such as Physics, and Biology ,it is recommended that they will consider some factors which may influence students' achievement such as educational background, aptitude, motivation, curriculum attended, teacher factors and past academic achievement which were not controlled in this study. Even if there is no significant difference between males and females and age in Chemistry attitude and Chemistry achievement in this research, there is still need to conduct further studies regarding this research. Researchers need to focus on identifying those factors that brought this difference.

REFERENCES

1. J.Bennett, M.Rollnick,et al. (2001). The development and use of an instrument to assess students' attitude to the study of chemistry. *International Journal of Science Education*, *23*(8), 833–845
2. D.Cheung. (2009). Students*'* Attitudes toward Chemistry Lessons: The Interaction Effect between Grade Level and Gender
3. D. Cheung (2009). Developing a Scale to Measure Students Attitude Towards Chemistry GN. Khan1 & A. Ali.(2012). Higher Secondary School Students' Attitude towards Chemistry. URL: http://dx.doi.org/10.5539/ass.v8n6p165
4. PM Kind, K.Jones & P.Barmby (2007). Developing attitudes towards science measures. *International Journal of Science Education, 29* (7), 871-893.
5. E .Lawrence, & A.Abraham (2011). The challenge of effective teaching of chemistry: A case study. Retrieved October 21, 2011
6. L. Ecalona, Attitude Towards Chemistry and Chemistry Performance: A Correlation Study Osborne, J., Simon, S., & Collins, S. (2003).
7. Attitudes towards science: A review of the literature and its implications. *International Journal of Science Education, 25*(9), 1049–1079.
8. S.Oskamp, & PW. Schultz. (2005). *Attitudes and opinions* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
9. R. Reyes. (2013), Academic Performance and Attitude Toward Computer- Aided Instruction in Chemistry.
10. K.Salta & C. Tzougraki (2004). Attitudes toward Chemistry among 11th grade Students in high schools in Greece. *Science Education*, *88*(4), 535–547.
11. K.Spall, D.Dickson, & E. Boyes (2004). Development of school students' constructions of biology and physics. *International Journal of Science Education*, *26*(7), 787-803.
12. Y.Olatunde. (2009). Students attitude towards mathematics and academic achievement in some selected secondary schools in south-western Nigeria. *European Journal of scientific*