Selected Science Process Skills as Correlates of Students' Academic Achievement in Chemistry in Calabar Municipality of Cross River State, Nigeria

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Abstract- ***The study assessed science process skills of observing and problem-solving as correlates of students' academic achievement in Chemistry in Calabar Municipality, Cross River State. Two research questions and two corresponding null hypotheses directed the study. Ex-post facto research design was adopted in this study. A multistage sampling technique were employed in selecting 124 from the population of 1,060 SS2 Chemistry students and used for data collection. Data collection were made using Chemistry Achievement Test (CAT) and Science Process Skills Acquisition Test (SPSAT). Data were analyzed using simple linear regression to test the hypotheses at .05 level of significant. Results of the analyzed data revealed that there is no significant relationship between science process skills of observing and problem-solving on students' academic achievement in Chemistry in Calabar Municipality. Based on the study findings conclusion was drawn and recommendations made; some of which is Teachers of Chemistry should engage students in solving problems as that will help them to have that sense of belongingness during and after learning. By so doing, the students will improve upon their academic achievement in Chemistry.***

Indexed Terms- ***Science Process Skills, Correlates, Achievement and Chemistry.***

I. INTRODUCTION

The Nigerian society has been yearning to promote the quality of life of the citizenry through knowledge acquisition in science and technology. The study of science and technology has been recognized all over the world as a major tool for technological advancement. This is because knowledge and skills in science subjects are very vital in the development of any society (Bena, 2010). Nwankwo (2015) stressed that the development of any nation requires that her citizens should be adequately improved to contribute meaningfully and appropriately as responsible and productive citizens, and that this could only be achieved if science (Chemistry) teaching is done through process approaches. Chemistry is one of the science subjects taught in the Senior Secondary Schools (SSS) and its curriculum content has some abstract concepts central to the learning of other science subjects. Some students view chemistry as being disconnected from the realities of life (Okafor, 2017; Bennett, 2007). Several researchers have suggested the use of innovative pedagogies that can foster secondary school students' acquisition of problem solving and basic science process skills in chemistry (Okafor, 2018; Ojo, 2017). Majekodunmi (2007) and Okafor (2012) explained that knowledge of chemistry should be built on a solid foundation that will involve process skills acquisition for sustainable development. Okafor (2017) suggested linking the teaching of chemistry to learners' immediate environment to benefit its entrepreneurial opportunities. The use of context-based learning (CBL) pedagogy was rated highly as synonymous to the science-technology-society approach which has earned credit by the National Science Teachers Association (Holbrook, 2014). Ojokuku (2012) viewed Chemistry as one of the branches of pure science that deals with the study of matter, its structure, composition, properties and the changes it undergoes. Science Teachers Association of Nigeria (STAN, 2016) broaden the definition of chemistry as a branch of science that studies the properties of matter in terms of compositions, structures, transformations, interactions and energy implications of chemical changes. Chemistry can also be defined as the constitution, properties and uses of matter and the

changes it undergoes as a consequence of alterations in the composition of their molecules. The Federal Ministry of Education (2007) of Nigeria through the Senior Secondary Education Curriculum, stipulated the objectives of chemistry education among others are: develop interest in the subject of chemistry; acquire basic theoretical/practical knowledge and skills in chemistry; apply skills to meet societal needs of creating employment and wealth; and adequately prepared for further studies in chemistry. Achimugu (2016) further pointed out that Chemistry is concerned with identifying common materials around us and then turning them into more useful products, and hence, Chemistry plays an important role in influencing the rate of economic and technological development. Operationally, Chemistry is the science subject that primarily focuses on identifying matter in terms of its physical and chemical properties and its valuability for economic and technological advancement. Perhaps, from these assertions, it is inferable that Chemistry can exert a dominant and decisive influence on the life of individuals in the areas of industry, agriculture, infrastructure as well as in the developmental effort of a nation.

The progress of any nation depends on the achievement in the field of Chemistry. By nurturing a well-educated populace in Chemistry, a continuous pipeline of innovative minds capable of addressing global challenges, contributing to scientific discoveries, and propelling societal progress is ensured. Chemistry education thus becomes not only a gateway to understanding the intricacies of the natural world but also a key driver for fostering a scientifically literate and empowered society. Chemistry education has been identified to be one of the major bedrocks for the transformation of a nation's economy. Igboegwu and Okonkwo (2012) viewed Chemistry education as a necessary ingredient for becoming self-reliant, earning a living and contributing towards building sustainable national development. Samantha (2017) observes that Chemistry education is a pivot through which many individuals could be transformed into entrepreneurship discoveries whose profound impacts could be noticed if carefully utilized for proper everyday learning, being one of the targets of national development. To the researcher, Chemistry education is the study of the teaching and learning of Chemistry in all academic institutions such as schools, colleges and universities. Chemistry Education is considered a key agent of development, either as a way of developing human capacity, increasing the skilled workforce for modernization, or as a matter of personal freedom, developing capability and empowerment.

The National Policy on Education (NPE) in the National Curriculum for Senior Secondary Schools Science stated specific objectives to be achieved by each subject curriculum. For Chemistry, the specific objectives to be achieved in the curriculum include: facilitating a transition to the use of scientific concepts and techniques acquired in Integrated Science with Chemistry, providing the students with basic knowledge of chemical concepts and principles through efficient selection of content and sequencing, show Chemistry in its interrelationship with other subjects, show Chemistry and its link with industry, everyday life, benefits and hazards and provide a course which is complete for pupils not proceeding to higher education while it is at the same time a reasonably adequate foundation for a postsecondary Chemistry course (National Policy on Education, 2014). Therefore, Chemistry education is of paramount importance to the development of any country, especially in the context of Nigeria as a developing nation. It serves as a catalyst for economic growth by contributing to various industries such as pharmaceuticals, agriculture, and manufacturing industries. In spite of the numerous importance of Chemistry toward societal development, factors such as inadequate instructional materials, inability to teach Chemistry for acquisition of scientific skills, and student-teacher relationship which amount to improper implementation of its curriculum.

Anjugam and Chellamani (2024) studied the trend of science process skills was investigated through systematic analysis. A systematics study involves 23 research articles available on Scopus from 2019 to 2024. The trends in science process skills in school are focused at three levels, such as the primary, secondary, and tertiary levels. These three levels are organized in such a way that the science process involves basic and integrated skills, methodologies of teaching, and learning environments. At the primary level, research reveals that new strategies did not make a significant impact on the scientific process. Guided discovery

appeared helpful to most students for improving both basic and integrated science process skills. At the secondary level, the research disclosed that students' attitudes and learning motivations influenced science process skills. At this level, inquiry-based learning, guided inquiry, and digital applications enhance the students' science process skills. Science process skills vary with respect to types of schools and gender. At the tertiary level, the research proved that computer simulations and animations and inquiry-based laboratory activities assist students in learning science process skills. The results showed little difference in science process skills among primary school students, and secondary students showed an increase in science process skills while applying new approaches

Adah and Nsikhe (2020) explored the interaction effect of selected science process skills of drawing, observing, classifying, measurement and problem-solving on students' academic performance in Practical Biology in Calabar Zone of Cross River State, Nigeria. The study employed a quasi-experimental design of pretest-posttest non-equivalent intact class. One Hundred and Ninety Senior Secondary One (SS1) Biology students drawn from a target population of 5218 participated in the study. One research question guided the study and one null hypothesis was tested at 0.05 level of significance. Three secondary schools selected from 81 public secondary schools using simple random sampling of balloting with replacement were used for the study. Two research instruments tagged Science Process Skills Acquisition Test (SPSAT) and Practical Biology Performance Test (PBPT) was sources for data collection. The reliability indices of the instruments established via Cronbach alpha gave 0.812 and 0.815 respectively. Data obtained were analyzed using Analysis of Covariance (ANCOVA). The results showed significant interaction effect of acquired science process skills of classifying, measuring, and problem solving on students' academic performance in Practical Biology. However, the interaction was not significant for science process skills of drawing and observing. On the basis of the results, recommendations were made among which is that biology teachers should imbibe classroom practices that will enhance acquisition of all process skills to bring about improved academic performance in Practical Biology. Sevda and, Münevver (2022) assessed the relationship between scientific process skills and academic achievement in science education, to highlight the relevant gaps in 5838 samples, and to interpret the overall effect size. The bibliographic research was carried out through the ERIC and ProQuest databases, especially in the Science Education Research category. Two hundred thirty-four articles published between 2005 and 2020 were obtained. Following the application of the inclusion criteria, 18 articles were selected according to the random-effects model, resulting in an average effect size of 0.56. Two moderator variables with a significant correlation between science achievement and scientific process skills were analyzed ($Q = 417.082$; $df = 17$; $p < .05$; $I2 = 95.22$). The percentage of the moderator variables explaining the relationship was interpreted by meta regression analysis. Educational inferences have shown a requirement for further research at the high school and university levels on the relationship between science method skills and scientific achievement.

Ogbogu, and Osuafor (2021) determined the relationship between students' level of science process skill acquisition and their academic achievement in biology in Onitsha Education Zone of Anambra State. Three research questions and three null hypotheses guided the study. The design adopted for the study was correlational research design. The population of the study comprised 6,400 senior secondary school year two biology students out of which a sample of 640 SS2 were obtained using a multi-stage sampling procedure. The instruments used for data collection were Test of Science Process Skills Acquisition (TSPSA) and Biology Achievement Test (BAT) validated by experts. The reliability of BAT and TSPS was established using Kuder-Richardson 20 (KR-20) to be 0.87 and 0.82 respectively. Data obtained were analyzed using Pearson correlation to answer the research questions and hypotheses were tested at 0.05 level of significance. The finding from the study was that there exists a significant positive relationship between science process skills acquisition and achievement in biology. Also, male students' science process skills correlated significantly with their biology achievement. The researcher recommended among other things that biology teachers should conduct practical exercise to demonstrate and verify concepts for students as a way of modeling the

requisite science process skills students must acquire for effective study of biology.

Sapna (2020) studied the relationship of science process skills and academic achievement in science of secondary school students. Survey method was adopted for this study. 560 secondary school students studying in class IX were selected by multi stage sampling techniques from 12 schools of Patna district of Bihar (India) for data collection. Co-efficient of correlation by covariance method was used for analysis of data. The findings of the study revealed that there is a positive correlation between science process skills and the achievement in science of male, female, government and private secondary school students.

Okafor (2023) examined the effect of context-based learning (CBL) and gender influence on chemistry students' acquisition of integrated science process skills (ISPS). Two research questions guided the study. This study used a quasi-experimental research design with a sample of 192 participants who had an average age of 15. Three instruments were used in data collection. Data were analyzed using mean and standard deviation. The results showed that CBL had more effect on students' ISPS in chemistry. Students exposed to CBL pedagogy acquired more Experimental Skill (EXPS) than Analyzing and Interpreting Data Skill (ANIDS) with Identifying and Controlling Variables Skill (ICVS) the least. Furthermore, students exposed to Conventional Strategy excelled in ANIDS, more so than ICVS with EXPS the least acquired. The influence of gender on ISPS was observed in favor of females. The study concluded that gender imbalance exists in all spheres of life; therefore, chemistry teachers should help students in acquiring integrated science skills using the two approaches to enhance male and female students' knowledge, values, and skills creatively in secondary school chemistry. The study recommends the teaching of students on everyday activities that foster gender balance in Lagos State secondary schools. Some studies have shown that science students generally exhibit poor knowledge of science process skills. For example, a study carried out by Kamba, Giwa, Libeta and Wakkla (2018) shows the mean levels of students' knowledge of SPS thus; observing x=1.59, measuring, x =1.44, classifying x=1.23, predicting x=1.4, communicating x=1.3 with overall mean average of 1.39. The findings of Ibe and Nwosu (2003) indicated low knowledge level and acquisition of inferring and predicting skills as it relates to senior secondary one (SS1) biology students' performance. The poor knowledge level and acquisition of science process skills, according to Ibe and Nwosu may partly be due to lack integration of theoretical science content with practical activities by science teachers in the course of presenting science instructions. Added to this, the instructional strategies and materials in which students are exposed to may not have been providing opportunity for activity-based learning which has led to deteriorating performance in science examinations over the years. Once students are taught without adequate practical activities which provide knowledge and acquisition of science skills they are most likely to perform poorly in examinations and their relationships maybe negative. The concern of this study therefore is to explore the extent to which selected science process skills of observing, and, measuring, could relate with academic performance in Chemistry in Calabar Municipality of Cross River State, Nigeria.

II. STATEMENT OF THE PROBLEM

Chemistry occupies a strategic place in the educational system of most countries of the world including Nigeria. Currently, Nigeria needs a functional science education to meet the needs of the local industries, citizens as well as satisfy the practical needs of the society. It is one of the branches of pure science that deals with the study of matter, its structure, composition, properties and the changes it undergoes. Chemistry is also a branch of science which deals with the study of matter, the interaction between matter and the study of the interactions. It is one of the key science subjects for senior secondary school curriculum with its relevance across every aspect of human endeavor. This underscores its vital recognition in the advancement of science and technology. The objectives of Chemistry cannot be attained without science process skills, as its wide application in the area of, genetic engineer, biochemistry, food and nutrition is of great benefit to every nation of the world. Despite the relevance of Chemistry to technological, scientific and societal development, evidences abound that students' academic performance in Chemistry is still not encouraging. Research reports showed that poor performance in

Chemistry could be as a result of students and teachers' relationship with Chemistry students, method of teaching concepts in Chemistry, non-acquisition and utilization of science process skills. This has been of great concern to educationist, science educators, government and stakeholders, in education sector and the general public. This has undoubtedly thwarted students' efforts towards offering courses like Medicine, Biochemistry, Pharmacy, and Biotechnology in the universities. In spite of government efforts towards improving academic performance in secondary schools and ensuring adequate acquisition of science process skills, students still perform below expectation mostly in Chemistry. Different strategies adopted by government and teachers have not substantially address the problem. There is therefore the need to further explore other possible innovative approach that may help curb students' poor performance in Chemistry. Therefore, the problem of the present study put in question is, would acquisition of selected science process skills relates with students' academic performance in Chemistry in Calabar Municipality of Cross River State, Nigeria?

Purpose of the Study

The study sought to examine science process skills as correlates of students' academic achievement in Chemistry in Calabar Municipality, Cross River State of Nigeria. Specifically, the study sought to;

1. Assess the relationship between acquisition science process skills of observing and students' achievement in Chemistry
2. Determine the relationship between acquisition of science process skills of measuring and students' achievement in Chemistry

Research Questions

Two research questions guided the study;

1. What is the relationship between the acquisition of SPS of observing and students' academic achievement in Chemistry?
2. How does acquisition of SPS of measuring relates with students' achievement in Chemistry?

Hypotheses

1. There is no significant relationship between the acquisition of SPS of observing on students' academic achievement in Chemistry
2. Acquisition of SPS of problem-solving does not significantly relates with students' achievement in Chemistry.

III. METHODOLOGY

The research design adopted for this study is Ex-post facto research design. An ex-post facto research design is a study in which data are gathered after the event of describing the existing condition of events, identifying standard against which existing conditions can be compared or determining the relationship that exists between specific events (Isangedighi, Joshua, Asim & Ekuri 2004).

IV. POPULATION OF THE STUDY

The population of the study comprised three thousand, two hundred and twenty (1,060) senior secondary two (SS2) Chemistry students in all the public secondary schools in Calabar Municipality.

V. SAMPLING TECHNIQUES / SAMPLE

A multi-stage sampling procedure was adopted in the study. First, a purposive sampling technique was utilized. Purposive sampling was adopted in picking schools used for the study. A sample of one hundred and twenty-four 124 SSII Chemistry students were randomly drawn from the total population of one thousand, and sixty (1,060) respondents and used for data collection. From the 124 sample, 89 were male while 35 were female students respectively.

VI. INSTRUMENTATION

Two instruments were used for data collection namely; Chemistry Achievement Test (CAT) and Science Process Skills Acquisition Test (SPSAT) with 25 and 10 items respectively. The reliability estimates of .70 and .86 was reached via KR20 and Cronbach alpha respectively. CAT was used in measuring students' achievement in Chemistry while SPSAT was meant to assess the extent to which Chemistry students acquire the SPS under study.

VII. PROCEDURE FOR DATA COLLECTION

Data collection for the study was done using 3 public selected schools in the study area. The Chemistry Achievement Test (CAT) was administered simultaneously with the SPSAT assisted by the chemistry teachers of the selected schools. CAT was marked points for any correct option and zero for incorrect responds. More so, the marks for SPSAT is 3 for any correct option. Data collected were subjected to simple linear regression analysis at .05 level of significant.

VIII. RESULTS AND INTERPRETATION

There is no significant relationship between the acquisition of SPS of observing on students' academic achievement in Chemistry. The independent variable is the acquisition of SPS of observing while the dependent variable is students' achievement in Chemistry. To test the hypothesis, simple linear regression was employed at .05 level of significant and results presented in Table 1.

Table 1

Regression Analysis of Science Process Skills Acquisition of Observation on Achievement in Chemistry

1	R	R-square	Adjusted R-square	Std. Error of the Estimate
	0.106	0.011	0.003	6.81463

	Source	Sum of Squares	df	Mean Square	f-cal	p-values
1	Regression	64.838	1	64.838	1.386	.240
	Residual	5665.581	122	46.438		
	Total	5730.419	123			
	Variables	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t-value	p-value
	(Constant)	30.928	2.645		11.693	0.000
	Observing Skill	0.159	0.135	0.106	1.182	0.240

Result not significant at 0.05 level

The results from the analysis show that an R-value of .106 was obtained, giving an R-squared value of .011. This means that about 11% of the total variation in acquisition of observation skill on achievement is accounted for by the influence while the remaining 89% is accounted for by the study. The p-value (.240) associated with the computed f-value (1.386) was greater than the chosen .05. With the results, the null hypothesis which stated no significant relationship acquisition of observing skills on achievement in Chemistry was not rejected. This means that observing skill has no significant relationship with students' academic achievement in Chemistry. To determine the contribution of observing skills to the prediction of students' achievement, t-test was carried out. The results show that the regression constant (30.928) makes a significant contribution in prediction model. Observation skill makes no significant contribution to the prediction of students' academic achievement (t=.1182, p= .240) in Chemistry.

Hypothesis two

Acquisition of SPS of problem-solving does not significantly relates with students' achievement in Chemistry. The independent variable is the acquisition of SPS of problem-solving while the dependent variable is students' achievement in Chemistry. To test the hypothesis, simple linear regression was employed at .05 level of significant and results presented in Table 2.

Table 2
Regression Analysis of Science Process Skills Acquisition of Problem-solving on Students' Achievement in Chemistry

1	R	R-square	Adjusted R-square	Std. Error of the Estimate
	.035	.001	-.007	6.84926

	Source	Sum of Squares	df	Mean Square	f-cal	p-values
1	Regression	7.111	1	7.111	.152	.698
	Residual	5723.309	122	46.912		
	Total	5730.419	123			
	Variables	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t-value	p-value
	(Constant)	28.690	2.153		13.325	.000
	Observing Skill	-.048	.124	-.035	-.389	.698

Result not significant at 0.05 level

The results from the analysis show that an R-value of .035 was obtained, giving an R-squared value of .001. This means that about .001% of the total variation in acquisition of observation skill on achievement is accounted for by the influence while the remaining 99.9% is accounted for by the study. The p-value (.698) associated with the computed f-value (.152) was greater than the chosen .05. With the results, the null hypothesis which stated no significant relationship between the acquisition of problem-solving skills on achievement in Chemistry was not rejected. This means that problem-solving skill has no significant relationship with students' academic achievement in Chemistry. To determine the contribution of problem-solving skills to the prediction of students' achievement, t-test was carried out. The results show that the regression constant (28.690) makes a significant contribution in prediction model. Problem-solving skill makes no significant contribution to the prediction of students' academic achievement (t=-.389, p= .698) in Chemistry.

IX. DISCUSSION OF FINDINGS

The results of hypotheses one and two shows that, acquisition of observing and problem-solving skills have no significant relationship with students' academic achievement in Chemistry. This is because their p-values associated with the computed f-values were greater than the chosen .05. Hence, the null hypotheses which stated no significant relationship between the acquisition of observing and problem-solving skills on achievement in Chemistry was not rejected. The study agrees with the works of Adah and Nsikhe (2020) and Okafor (2023) who reported no significant effect and influence of science process skills acquisition on students' achievement. On the contrary, Sapna (2020), Ogbogu and Osuafor (2021) revealed that there is a positive correlation between science process skills and the achievement in science of male, female, government and private secondary school students. The non-significant results of the present study could be attributed to the fact that most of the study cited were quasi-experimental with smaller sample size. Also, the area of study may have contributed to the non-significant relationship between students achievement and acquisition of science process skills under study.

CONCLUSION

Based on the findings of the study, it was concluded that acquisition of science process skills of observing and problem-solving skills does not significantly relates with students' academic achievement in Chemistry. This is because the p-values were found to be higher than the chosen .05.

RECOMMENDATIONS

Following the study outcome, the following recommendations were made;

1. Students should be encouraged to acquire the skill of observing in order to be active in both Chemistry practical and theoretical classes.
2. Teachers of Chemistry should engage students in solving problems as that will help them to have that sense of belongingness during and after learning. By so doing, the students will improve upon their academic achievement in Chemistry.

REFERENCES

[1] Adah, S. A. and Nsikhe, U. (2020). Interaction Effect of Selected Science Process Skills Acquisition on Students' Academic Performance in Practical Biology in Calabar Education Zone, Cross River State of Nigeria. *Journal of Education and Practice*. 11(9), 46-51.

[2] Anjugam, R.1. and Chellamani, K. (2024). Science Process Skills: A Trend Analysis of Research. *The International Journal of Indian Psychology* 12(1).

[3] Achimugu, M. (2016). Science Process Skills and Motivation. Humanities & Social Sciences Reviews. 7. Pages: 48-56. 10.18510/hssr.2019.756.

[4] Bena, V. K. (2010). Competencies for analysis and application. 5thEdn. prentice-hall, New Jersey.

[5] Bennett, J. (2007). Context-based chemistry: The Salters approach, *International Journal of Science Education*, 28(09), 999-1015.

[6] Giwa, A. H., Libeta, M. & Makkla, R. (2018) Science Process Skills and Attitudes toward Science among Palestinian Secondary School Students. World Journal of Education, 5(1) 13-24.

[7] Holbrook, J. (2014). A context-based approach to science teaching. *Journal of Baltic Science Education*, 13(2), 1648-3898.

[8] Igboegwu, L. and Okonkwo, C. M. (2012). Pre-service teachers' acquisition of scientific knowledge and scientific skills through inquiry-based laboratory activity", Higher Education, Skills and Work-Based Learning, 11(5), 1160-1179.

[9] Majekodunmi, O.F. (2007) Chemistry, a Drive for National Development and Growth. An address delivered at the 30th Annual conference of the Chemical Society of Nigeria at Abuja, September 25th, 2007.

[10] Nwankwo,F. (2015). Making sciences activity based through acquisition and utilization of science process skills. Journal of research and practice, 14(2), 86-90.

[11] Ogbogu, E. & Osuafor, A.M. (2021). Relationship between Students' Science Process Skills Acquisition Scores and Academic Achievement in Biology in Anambra State. *Journal of Research & Method in Education.* 11(3), 34-40.

[12] Ojo, T.O. (2017). Effects of IT-Integrated Teacher Demonstration and Guided Discovery on Chemistry Students' Conceptual Knowledge, Problem Solving Skills, Acquisition of Basic Science Process Skills and 21st Century Skills. A PhD dissertation, University of Lagos, Nigeria.

[13] Okafor, N. P. (2023). Enhancing Science Process Skills Acquisition in Chemistry among Secondary School Students through Context-Based Learning. I*nternational Journal of Science Education.* 52(4).

[14] Okafor, N. (2012). Chemistry Education: A Tool for Nation Building. Guest Lecture delivered at the School of Science Education, Federal College of Education (Technical), Akoka at the National Association of Chemistry Students (NACS) Day, 8th November.

[15] Okafor, N. (2017). Pre-service education chemistry undergraduate awareness of entrepreneurial opportunities in Nigerian senior secondary school chemistry curriculum. *African Journal of Science, Technology and Mathematics*, 3(1), 22-32.

[16] Okafor, N. (2018). Effects of explanations and integration of ideas pedagogy on secondary school chemistry students' acquisition of basic science process skills in Nigeria. *Journal of Research in National Development*, 16(2), 33-42.

[17] Sapna S. (2020). Relationship between science Process skills and achievement in science of

secondary school Students. St. Xavier's College of Education *International Journal of Creative Research Thoughts (IJCRT) www.ijcrt.org*

[18] Sevda D. and Münevver S. (2022). The Relationship between Scientific Process Skills and Science Achievement: A Meta-Analysis Study. *Journal of Science Learning*.6(2), 363-372.