IMPACT OF DOING SCIENCE INVESTIGATORY PROJECT (SIP) ON THE INTEREST AND PROCESS SKILLS OF ELEMENTARY STUDENTS

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ABSTRACT

The study looked on the impact of doing science investigatory project on the interest and process skills of elementary students. The study also attempted to find significant difference between the participant's profile and the impact of doing science investigatory project (SIP) to learning science. The study employed the descriptive research design using survey technique through the researcher-made questionnaire as the instrument of the study. The data gathered were analyzed and interpreted using the frequency count and percentage computation, mean, standard deviation, and Analysis of Variance. Based on the findings, it was concluded that elementary students' interest in science and science process skills are developed by doing science investigatory project.

Keywords: Science Investigatory Project (Sip), Science Process Skills, Students' Interest, Impact of Sip.

INTRODUCTION

Science education is concerned with standards that provide expectations for the development of students' understanding through the entire course of study (*http://everything.explained.today/Science_education/*). This includes the development of scientific literacy to enable understanding of the nature of science and its relationship to society, rather than a focus that is heavily weighted in content knowledge. (Office of thePrime Minister's Science Advisory Committee,2011; International Baccalaureate Organization, 2014). In a real classroom, pupils experience a curriculum that requires them to memorize facts without ever being exposed to the big ideas of science. However, pupils could still appreciate the wonder of science as the big idea if they will be exposed in the way they do investigations of their own. Cobern (2011) asserted that for the pupils to actively construct a meaningful science knowledge, they should widely be advocated by science researches particularly doing investigatory projects. Research is truly a life-long skill that is important to be taught as a basic process of conducting investigation to young students (Prouty, 2012). Allowing young learners to be equipped with research skills help them develop early their interest and understanding of scientific concepts and principles that constitute the world.

During primary years, children already build their knowledge on varying backgrounds and experiences. They have a broader range of capabilities than they have been permitted to show in regular classrooms with the traditional text-based focus (Retrieved from: www.edutopia.org/blog/elementary-research). In the Philippines, basic research is taught more particularly in high school whereby students are geared toward conducting Science Investigatory Project or SIP as one of their major achievements in Science. Through science investigatory projects, students develop their scientific investigation and acquire knowledge of the different scientific concepts, theories, principles and laws of nature. They use their higher-order process or thinking skills in conducting research (Retrieved from: https://masmeronproductions.wordpress.com) Science Investigatory Project addresses these differences, because young learners use all modalities in the process of researching and

solving a problem, then communicating the solutions. The problem is that, all these processes seem to be geared only towards high school students and there is very little way to help elementary pupils prepare for this vital skills. Hence, conducting science investigatory projects are usually done in secondary school system, for a reason, that it will give broadly hard time for elementary pupils to achieving the methods involve in doing science investigatory projects. Nevertheless, the effectiveness of carrying out this project could be one of the quality strategies to be used by teachers as a key to improving the quality of education in the elementary level. Moreover, at present, there is really a need for new wave of young educated students who are ready for modern scientific research, teaching and technological development in order to keep the economy growing. Therefore this paper aims to fill the gap by determining the impact of doing Science Investigatory Project (SIP) on the interest and process skills of elementary pupils in Surigao Del Sur. The profile of the participants was considered as relevant variables. These include: sex, family monthly income, parent's highest educational attainment and science materials and resources available at home. Moreover, the study attempted to find significant difference between the participant's profile and the impact of doing science investigatory project (SIP) on the interest and process skills of elementary pupils.

Background of Science Investigatory Project (SIP)

Learning research skills at a young age will give students a skill that will serve them over a lifetime. This skill will not only be useful in school, but in their everyday lives as they attempt to absorb ever increasing amounts of information (Retrieved from: http://education.cu-portland.edu. 2013). A just and sustainable global society is built not on fact-finding but on research and development skills—the skills of critical thinking. To respond to these challenges, a need to train global citizens as early as elementary who can question assumptions, evaluate potential solutions and think creatively (Retrieved from: http://access-socialstudies.cappelendam.no). Science investigatory project (SIP) is an educational activity for students. It involves experiments or construction of models. SIP provides a framework for students to conduct original investigations on compelling questions of interest, collaborate with other students and share their investigation results through public presentation and publication(Science Project, 2008).According to Liza (2003) doing science investigatory project is similarly performing hands-on learning or commonly known as learning by doing. Laboratory and field activities are traditional methods of giving students hands-on experiences but the nature of science investigatory project is a goal in science education (Jarvis, et al, 2001).

Gearing the students towards doing science investigatory project involves investigation, discovery and finding out something which was not known to the students before (Tulasi, 2007). Weld and Funk (2005) together with Kauffan (2002) stated that doing a science investigatory project is an effective way of learning science because it can develop self-perceptions of effectiveness to the learner as well as to the teacher. Jenkins (1996) added that the idea of doing science investigatory project will develop pupil's understanding of the nature of science as problematic and contentious. Conducting science investigatory projects provide another context for learning science; students have an opportunity to go beyond the planned science curriculum to pursue individual interests and talents, and to examine practical problems with hands-on activities that link science with other facets of the curriculum. It further provides students with opportunities to reflect and make sense of their total educational experience. (Poisson, 2000). When children are interested in what they are doing and are able to use their areas of strength, they achieve at a higher level. Learning some

scientific facts or principles is a valuable fringe benefit for students doing projects, but the primary objective for science investigatory project work is to teach students to think (Tant, 1992). The introduction of the science investigatory project (SIP) into elementary school system may significantly improve elementary education.

Impact of Science Investigatory Project (SIP) on Students' interest to Learning Science

Science investigatory project develops the pupils' understanding of the nature of science because pupils are taught of controversies that may arise from different ways of interpreting experimental evidence of their studies. Hidi (1990) analyzed the developmental patterns of individual interest. According to him, individual interest develops slowly and tends to be relatively long lasting. Therefore, as early as elementary, pupils' interest is triggered and persisted over time and may develop into individual interest in consciousness. Long field (2002); Bell (2001) reported on their investigation that when interests were framed within a context of science and pedagogy, pupils' learning's are most meaningful. The pupils feel more confident about their abilities to be teachers of science and use activities in future classrooms successfully. There are two main observations about students' interest in science that cause worry. First, many studies repeatedly indicated that students' interest in science, declines during secondary schools (Haussler, Hoffman, 2002; Osborne, 2003). Second, there are students who have negative attitude toward learning science in school but have positive attitude toward science itself (Osborne, 2003). Ebenezer and Zoller (1993) studied about this contradiction in ten Grade 1564 students in USA. 72 % of the students thought science is valuable and 73 % of the student thought that science in school is important, but 40 % indicated that they found science class boring (quoted from Osborne, 2003).

The two disheartening results-decline of interest during secondary school and the contradictory attitude- would suggest, that schools, were not much helpful for students in terms of stimulating their interest in science. The purpose of learning science is not only to learn contents of science but also to have good attitudes toward science, such as having interest or aesthetic appreciation of science. Therefore, there is a need about how to bring good attitudes toward science in school, as well as how to create students' interest in a classroom. Weld and Funk (2005) found that doing and investigatory project in Science for elementary education, develops a long-lasting interests towards the subject matter command, curriculum development competence, and pedagogical skills.

These findings are supported by Froschauer (2010) who stated, that teaching science investigation and experiment skills are very important aspects of science instructions, that allows the pupils to manipulate, making measurements, observations, analyzing data and following safe procedures on the activity. To increase the learning, the Massachusetts Department of Higher Education (2011) suggested that a need of programs design activities that would "improve student and teacher content knowledge and teacher pedagogical skill." Activities such as conducting science projectsare encouraged to use innovative strategies both in and out of the classroom, including small group settings and the use of hands-on activities and experiments to promote inquiry and curiosity. Finally, recommended connecting learning to the real world through an emphasis on "the application of science and technology subject to everyday life, employment and the surrounding environment."

Impact of Science Investigatory Project (SIP) on Students' Process Skills to Learning Science

The elementary science curriculum is framed that in such a way children should enjoy science through direct engagement in scientific activities, and gain an awareness of what scientists do and should be encouraged to pursue the study of science at an advanced level (Beehive Digital Concepts, 2007). The cognitive ability of creating meaning and structure from new information and experience, are referred as science process skills. These skills are important and necessary means by which the learner engages with the world and gain intellectual control of it through the formation of concepts and development of scientific thinking (Jugar, 2013). Science investigatory project emphasizes the use of the scientific method in performing investigation by experimentation (inquiry-based learning) to develop critical thinking and science process skills of the student. This scientific method allows scientists to collect and analyze data in a strategic and unified manner and this is the same method that students use to design and execute their project where they use the same steps as those of professional researchers to gather new information. The different science process skills can be integrated in the conduct of science investigatory project (Kazeni, 2005). Thus, the science investigatory project gives students an opportunity to undergo the process of conducting an investigation using the scientific method making them gain a considerable understanding of the nature of obtaining solutions to problems or answers to questions in a systematic and scientific ways.

Carin and Sand (1995) sought to determine if integration of science investigatory project in elementary curriculum would be effective more than the usual science curriculum. Primarily, having science investigatory project can develop the student's science process skills. Further, it has features, which are not found in other curriculum. The said features refer to giving predictions to situations or phenomena, observing activities done through their five senses, actual performance/experience and finally explaining results resulted in great mental development for them. Science programs that emphasize hands-on manipulative experiences such as conducting science investigatory project or researches, enhance the development of process skills in young children. The attainment of process skills developed by such science experiences are positively correlated with the development of other skills (Nicodemus, 1968; Ritz, 1969). The study of Shymansky et al. (1983) on hands-on activities revealed that student performance across these activity-based programs, in terms of performance clusters (achievement, perceptions, and so on) and a composite performance measure showed that students in the hands-on programs performed better than their traditional elementary school counterparts by 9 percentile points.

Students' perceptions of these science programs as well as performance on process skill measures were particularly positive, exceeding traditional students by 17 and 19 percentile points respectively. The gains in attitude and process skills make sense, considering the emphasis placed on making science fun through hands-on activity. Dela Cruz (2014) stated that science process skills can be learned if taught formally in the classroom with the use of proven teaching methods. Doing science investigatory project develops students' natural curiosity. They acquire the skills necessary to conduct inquiry and research and show independence in learning. Furthermore, these skills can be retained for future use if lessons are based on science investigations and practiced over a long period of time.

METHODOLOGY

Participants and Procedure

The study employed the descriptive research design using survey technique. It determined the present condition of the participants as to the impact of science investigatory project (SIP) on students' interest and process skills to learning Science. The study was conducted in the three elementary schools of Surigao Del Sur Division. The participants of the study were the Grade VI SPED pupils of Cantilan Pilot School, Barobo Central Elementary School, and Tandag Central Elementary School during the school year 2013-2014. The participants were selected using purposive sampling. They were chosen hence they are identified as three of the most active and competent schools in the making of science investigatory project in Surigao Del Sur Division.

Data Collection and Analysis

The study used a researcher-made questionnaire as the primary tool of research with analysis of results and informal interview as supplementary tools gather pertinent data. The questionnaire contained two parts. Part I includes the participant's profile as to sex, family monthly income, parent's educational attainment and science reading materials available at home. Part II of the questionnaire measures the perception of pupils as to the impact of doing science investigatory project (SIP) on their interest and development of science process skills. A short discussion and clarification on the administration of the questionnaire was done to motivate the perception of the participants of the said study. Data were analyzed and interpreted using frequency count, percentage distribution, mean, standard deviation and Analysis of Variance (ANOVA).

FINDINGS / RESULTS AND DISCUSSION

The study ascertained the impact of doing Science Investigatory Project (SIP) on students' interest and process skills to learning Science.

Impact of Doing Science Investigatory Project (SIP) on Students' Interest and Science Process Skills

Table 1: ***Impact of Science Investigatory Project (SIP) on Students' Interest***

INDICATORS	M	SD	VI
1. Gives me learning in science while experimenting.	3.66	0.48	SA
2. Helps me understand better science concepts involved in making SIP.	3.47	0.54	SA
3. Gives me actual experiences to correct my wrong ideas in science.	3.55	0.50	SA
4. Helps me to be persistent to find ideas and solution to a problem.	3.42	0.55	SA
5. Gives me chance to use laboratory equipment/apparatus.	3.21	0.57	A
6. Helps me handle scientific investigations.	3.54	0.50	SA
7. Develops me to become a young scientist with scientific attitudes and habits.	3.54	0.58	SA
8. Develops me to become cooperative and participative in group work.	3.90	0.30	SA
9. Provides me a chance to analyze results of an experiment.	3.52	0.58	SA
10. Allows me to practice safety in the laboratory.	3.73	0.49	SA
Mean	**3.55**	**0.23**	**SA**

Based on the results of the study (Table 1), the first three indicators that the participants *strongly agree* on the impact of science investigatory project are: *Develops me to become cooperative and participative in group work*. (M=3.90, SD=0.30), a*llows me to practice safety in the laboratory* (M=3.73, SD=0.49) and g*ives me learning in science while experimenting* (M=3.66, SD=0:48). This means that science investigatory project has a positive impact to learning science as to the interest of pupils that helped them develop their awareness on group activities and strengthened their confidence in practicing precautionary measures during laboratory activities. Doing science investigatory project promoted interest of pupils in such a way that they are grouped to work for experimentation in finding solutions to a particular problem. Pupils realized that science investigatory project allows them to learn science in a variety of ways, as they learn in practical manner. An example of this, is giving them the satisfaction of finding out something they wanted to know, like the correct way of handling laboratory apparatus during experiment and perceiving things while experimenting. Through these, pupils are eager to learn anything else because they are being motivated to see the difference it made to them. This is supported by the statement of Jenkins (1996) that pupils believed that science investigatory project offers them a chance to brainstorm ideas in a group and encourage cooperation and participation of each individual to try things out when deciding what to do and choosing what equipment and materials to use in experimenting.

Concerning pupils' experiences on scientific activities with regard to the impact of science investigatory project (SIP), it was revealed that the participants strongly agreed that science investigatory project gives *actual experiences to correct wrong ideas in science* (M=3:55, SD=0.50), *helps handle scientific investigations* (M=3.54, SD=0.50), *and develops a pupil to become young scientist with scientific attitudes and habits* (M=3.54, SD=0.58). The findings imply that many of the participants were confident enough to handle scientific investigations. Science investigatory project enabled pupils to think, act and experience how to become a young scientist with scientific attitudes and habits. Pupils are interested in making their science investigatory projects while learning science because they are given chance to perform experiments with an appropriate materials. The pupils realized the value of science investigatory project not only as part of experimenting, but allows them to appreciate the purpose of understanding scientific ideas. Mintzes (2005) highlighted that pupils become interested in their science lessons when doing science investigatory projects or research projects because they are given opportunities to investigate problems in real-life setting.

In some ways, science investigatory project provide pupils *a chance to analyze the results of an experiment* (M=3.52, SD=0.58), *develops them to be persistent to finding ideas and solution to a problem* (M=3.42, SD=0.45) and *allows them to understanding on better science concepts involved in making SIP (*M=3.47, SD=0.54). The findings imply that pupils strongly agreed that science investigatory project allows them to understand better science concepts, finding solution to a problem and analyzing results of their experiments. Pupils could better understand science laboratory apparatus, visual aids like real objects and other materials which could increase their knowledge about science concepts, since they did experimentations on their own, they have all the chances to enjoy the materials and instrument needed. Thus, science investigatory project allowed them to feel being intelligent, confident, idealistic and young scientist. Pupils also agreed that a *chance to use laboratory equipment/apparatus* (M=3.21, SD=0.57) has an impact on their interest to learning Science. This allows them to recognize the significance of science laboratory apparatus in science investigations by engaging them to use laboratory equipment/apparatus. In fact, this is one of the reasons why pupils are so interested to have science investigatory project because they are expected to have the opportunity of manipulating the equipment/apparatus. Yet, due to the

fact that most public schools have less supply of science laboratory facilities, pupils experienced little disappointment in performing science activities. On the other hand, teachers provide alternative means for pupils not to be discouraged by improvised science laboratory materials. Most importantly, the chance to use science laboratory apparatus/equipment gave an impact to learning Science. As stressed by Welty and Welty (2000), one of the important parts in the making of investigatory project is providing enrichment for the children to work. This includes equipment and materials for experimentation. They emphasized that all materials must be current, organized and easily accessible. The participants strongly agreed that science investigatory project has impact in learning elementary science (presented in Table 2). This implies that the pupils realized that conducting science investigatory project is very significant in the development of their science process skills. This was revealed when they said that science investigatory project enables them *to get information about an object or event by using their 5 senses* (M=3.80, SD=0.40), e*nables them to recognize and read scales, diagrams and graphs* (M=3.79, SD=0.41) and *allow them to identify difference and similarities of objects* (M=3.73, SD=0.47). It could be deduced that engaging pupils to science investigatory project making could widen their observing, measuring and comparing skills which help them to work more productively with the understanding of science concepts and ideas.

Table 2: Impact of Science Investigatory Project (SIP) on Students' Process Skills

INDICATORS	M	SD	VI
1. Enables me to get information about an object or event by using 5 senses. (Observing)	3.80	0.40	SA
2. Allows me to identify difference and similarities of objects. (Comparing)	3.73	0.47	SA
3. Enables me to group objects, events or activities according to their characteristics.(Classifying)	3.56	0.56	SA
4. Enables me to recognize and read scales, diagrams and graphs. (Measuring)	3.79	0.41	SA
5. Develops me to practice note taking, outlining making, recording and writing observations. (Gathering and Organizing Information)	3.53	0.56	SA
6. Enables me to predict solution to a problem. (Predicting)	3.58	0.54	SA
7. Helps me to construct or formulate my own generalization and conclusion of the experiments. (Inferring)	3.57	0.52	SA
8. Enables me to explain the meaning of the results gathered. (Evaluating)	3.53	0.56	SA
9. Enables me to identify the steps to follow in solving a scientific problem. (Synthesizing)	3.62	0.49	SA
10. Enables me to formulate a tentative answer to a problem. (Interpreting Data)	3.60	0.53	SA
Mean	**3.63**	**0.28**	**SA**

In doing science investigatory project, it is important to obtain evidence by the exploration and investigation of a range things, materials and phenomena using the five senses (sense of sight, hearing, smell, touch and taste). Therefore, the pupils can sense at different times the differences of things, then differentiate and compare objects after these observations. The pupils not only describe but able to find similarities and differences of an object or activities. One way of expressing the observed and compared characteristics of things is through the presentation of diagrams and graphs. Recognizing graphs, diagrams and scales develops the measuring scale of pupils. By this, pupils integrate their observing, comparing and measuring

skills. Thus, finding an answer to a problem in their science investigations would become easier for the pupils. The study of Carin and Sand (1995) supports the finding of the study where Science investigatory project plays a role in helping a child to learn better way in science, it has features like giving predictions to situations or phenomena observing activities done through their five senses, actual performance/experience and finally explaining results resulted in great mental development. Furthermore, it was revealed that science investigatory project (SIP) enabled pupils to *identify the steps to follow in solving a scientific problem* (M=3.62, SD=0.49), *formulate a tentative answer to a problem* (M=3.60, SD=0.53), *predict solution to a problem* (M=3.58, SD=0.54), and *helps construct or formulate own generalization and conclusion of the experiments* (M=3.57, SD=0.52). This implies that pupils started to trace patterns as a result of series of experiments and able to extract new ideas through their observations and experimentations. Science investigatory project developed pupils the way real scientist do in solving scientific problems, through SIP, pupils are capable of integrating or formulating rules, principles or theories in describing a phenomena. Thus, their *Synthesizing Skill* is enhanced when they find way for details that indicated an understanding of the characteristics of objects or phenomena.

It also develops their ways of explaining the meaning of the data gathered pupils exercised their feelings and reactions in formulating a tentative answer to a problem in a way they *interpret their gathered data*. Aside from gathering data, science investigatory project allowed pupils to make their own generalization that went beyond the information studied. Their generalization would then be used as a premise to make a step over the information and make inference. *Inferring Skill* was inculcated among pupils while performing science investigatory project because they described facts and situations from the result of their experiments. Identifying the possible result of their experiment was like predicting solution to a problem. Pupils learned not only synthesizing, interpreting and inferring but also they increased their ability to state the probability of occurrences a prediction they made. Thus, predicting skill of the pupils was recognized in doing science investigatory project. It could be gleaned that science investigatory project contributed to learning science.

Pupils profit more ideas in science through doing science investigatory project as reflected on their perceptions that SIP d*evelops them to practice note taking, outlining making, recording and writing observations* (M=3.53, SD=0.56), *explain the meaning of the results gathered* (M=3.53, SD=0.56), and *group objects, events or activities according to their characteristics* (M=3.56, SD=0.56). Competency in using these skills provided children with the ability to apply knowledge not only in science but also in their daily lives' transactions. *Classifying Skill* was one of the most important process skills that were emphasized in doing science investigatory project. This skill enabled pupils to categorize or group objects, events or activities according to their characteristics. Pupil's knowledge and understanding of variation and classification started once they were aware that others were different from them. They are oriented of the things around them, if it could harm or benefit them, like the identification of what are foods, shelters and clothes. Moreover, engaging pupils to make science investigatory project allows them to enhance skills in note taking, outlining, recording and writing observations. *Gathering and Organizing Information* include collecting data about objects, events, activities and phenomena. This may be in oral, written or pictorial form. Taking part in gathering and organizing information in science investigatory project promotes pupils to incorporate the skills of observing, comparing, classifying and measuring. This began when pupil shows demonstration of consistent responses and using discrimination during scientific activity. After experiencing science investigatory project in learning science, pupils became expressive in making judgments based on the results gathered. They were now

capable of applying the correct principles or ideas to the problem encountered during investigations. Once the students learned to use the science process skills to solve problems, it could be an assurance that they would become lifelong learners. If pupils could identify the assumptions, critical and logical thinking, in this way, they would develop actively the science process skills (Abell and Smith, 2005).Science investigation can be used to broaden the current approach to teaching problem solving. Replacing contrived problems with real-world science problems have the potential to enhance the problem-solving abilities of students, while promoting a greater appreciation of the usefulness of problem solving in a multitude of circumstances (Coffia, 1971 and Shann, 1977).

Difference between the Participants' Profile and the Impact of Doing Science Investigatory Project (SIP) on their Interest and Process Skills to Learning Science

The analysis of variance on the impact of science investigatory project (SIP) on students' interest and process skills to learning science with respect to sex was revealed on Table 3. As revealed, the p-value on interest in science (p=0.0554) is equal to 0.05. Thus, the null hypothesis is not rejected. This implies that there is no significant difference between the impact of science investigatory project in terms of interest in science with respect to sex. Therefore, sex does not influence pupils' perception on the impact of science investigatory project to learning Science. The findings imply that male and female pupils would show improvement in their interest toward science when they are expose to doing science investigatory project. This was so because they are inspired and interested in exploring and interacting with the big ideas of science.

Table 3: Analysis of Variance on the Impact of Science Investigatory Project (SIP) on students' interest and process skills to learning science with respect to sex

Variables	MS Effect	MS Error	df	*F*	p	Decision
Interest in Science	0.1961	0.0522	1, 98	3.7582	0.0554	Do not reject Ho
Science Process Skills	0.4698	0.0723	1, 98	6.4994	0.0123	Reject Ho

Marked effects are significant at p < .05000

Learning science by doing science investigatory project gives all pupils (male or female) the opportunity to think, learn and develop the interest and curiosity about the world around them through exploratory and investigative experiences and activities. Both boys and girls are interested in interacting with each other. With some pupils, they thought that communication and strong relation with their classmates developed as they worked together during science investigations. Science investigations and projects require pupils to explore science issues that they are interested in; for example, on the part of male pupils, they are interested to manipulate laboratory materials of their own, explore electrical equipment/items and play or visit to a place or another. On the other hand, female pupils loved to recognize how reactions could be useful, for example, baking powder in cooking; girls developed their culinary art skills. Female pupils loved to classify things such as color and characteristics of materials. They could express to do things for themselves and they could allow time to respond. Thus, all pupils (both male and female) are interested to learn science through conducting research or doing science investigatory project. However, as to science process skills, the p-value of 0.0123 is lesser than 0.05; thus, the null hypothesis is rejected. This means that there is a

significant difference between the impacts of science investigatory project on students' process skills with respect to sex. Usually during experiment in science, teachers help boys do an experiment by explaining how to do it. The teachers oftenly let the girls just watch and observe data rather than do the experimentation. This implies that female pupils become dependent and less capable of exploring on their own; whereas, male pupils are independent and have positive attitude toward science. Girls as compared to boys are more sensitive in terms of handling their emotions, since they often perceived a less sense of possibility to work for best. When pupils (both male and female) are asked to do experiment during the making of science investigatory project, mostly, boys take the lead in a group. Insecurities and low self-esteem may arise among girls, and it would be hard for them to be motivated again. Teachers therefore should find means to encourage the female pupils to do science experiments as what the boys do.

Active participation of all pupils would allow development of science process skills among the pupils. Eccles (1997) cited one explanation in learning science with respect to sex, that science is stereotyped as a male activity, which causes girls to have lower expectations for success. Many reasons have been put forward on the way pupils perceived learning science depending on its gender. Example of this would be that females tend to be slower in understanding the key concepts and procedures in science. Hence, females were more afraid to explore things and divert their interest more on stereotyped feminine roles (Harry, 1999). The analysis of variance on the impact of science investigatory project (SIP) in learning elementary science with respect to family monthly income was reflected on Table 4.

Table 4: Analysis of Variance on the Impact of Science Investigatory Project (SIP) in Learning Elementary Science with respect to Family Monthly Income

Variables	MS Effect	MS Error	df	F	p	Decision
Interest in Science	0.17095	0.04868	4, 95	3.5116	0.0102	Reject Ho
Science Process Skills	0.24026	0.06940	4, 95	3.4621	0.0110	Reject Ho

Marked effects are significant at p < .05000

The results revealed that the p-value on interest in science (0.0102) and science process skills (0.0110) are lesser than 0.05. Thus, there is a significant difference on the impact of science investigatory project on students' interest in science and science process skills with respect to family monthly income. This means that family monthly income influences the impact of science investigatory project in learning Science as to interest and science process skills of children of low family monthly income did less well in making their project particularly science investigatory project because they perceive that their parents would reprimand or complain for money. This reason gave rise to the significant difference in learning science with respect to family monthly income. Pupils who could not afford to buy materials are easily discourage to work for the task given by the teacher because they worry more on the expenses that they are going to spend for a certain project. On the other hand, children with high family monthly income perform well in doing their science project since they could afford to buy the needed materials and even inspired them to work with full support from the parents. This indicates that pupils who are financially better off would tend to become interested in science and working scientific investigations because they were provided enough materials and support by their parents while pupils who lack financial support from parents are less interested to learn science due to incapability of materials to work for the

activities. Science teachers however provide alternative means for pupils who cannot afford to buy materials for SIP through encouraging them to improvised materials and instruments they will need. Mental power, physical work and emotional interaction of pupils included the understanding of his environment and simultaneously the development of his science process skills through exposure with the materials and phenomena. If a child is not properly nourished due to low economic status of the family, his brain or mental capacity might be weaken due to lack of enough oxygen and food to sustain the parts. The psychological factor of a child may be affected to explore and participate the learning in science particularly during the conduct of science investigatory project. Thus, pupils who are well nourished are more active than those pupils who are undernourished. The same thing would happen to their physical aspects. During science investigations, one become easily exhausted to do the experiment if he or she is hungry. They are slow in catching and recognizing stimuli undertaken during the activities. However, children who are physically fit could instantly perceive and recognize things around. Discrimination among children due to economical standing may occur which could lead to insecurities, low of self-esteem, lack of self-confidence and open-mindedness and eventually deteriorate the process skills of a child.

According to Pullos (2003), pupils who had been experiencing the pressure of hard work and poverty may be weak in perceiving science lessons in school. Science process skills of pupils are affected by incapability of their mental power, physical work and emotional interactions for a reason that they have nothing to sustain learning due to financial problems. The findings revealed that family monthly income is one of the most significant factors affecting student's learning in science. The data (Table 5) reveals the analysis of variance on the Impact of doing science investigatory project (SIP) on students' interest and process skills with respect to Parent's Educational Attainment. The p-value of interest in science (0.1885) and science process skills (0.4297) under mother's highest educational attainment are greater than 0.05. Thus the null hypothesis is not rejected.

Table 5: Analysis of Variance on the Impact of Science Investigatory Project (SIP) on students' interest and process skills with respect to Parent's Educational Attainment

Variables	MS Effect	MS Error	df	F	P	Decision
Mother						
Interest in Science	0.0823	0.0524	4, 95	1.5705	0.1885	Do not reject Ho
Science Process Skills	0.0738	0.0764	4, 95	0.9664	0.4297	Do not reject Ho
Father						
Interest in Science	0.1148	0.0510	4, 95	2.2488	0.0695	Do not reject Ho
Science Process Skills	.0575	0.0771	4, 95	0.7459	0.5632	Do not reject Ho

Marked effects are significant at p < .05000

This implies that there is no significant difference on the impact of science investigatory project as to interest in science and science process skills with respect to mother's highest educational attainment. Therefore, mother's educational attainment is not a determinant for the impact of science investigatory project to learning Science; it has nothing to do with pupil's interest in science and science process skills. In doing science investigatory project, group coordination and participation are promoted through working together in a group. The

pupils are already independent to work even in the absence of his mother's assistance. Similarly, the p-value of interest in science (0.0695) and science process skill (0.5632) for the father's highest educational attainment show no significant difference on the impact of science investigatory project in learning science. Pupils realized that doing science investigatory project pushes them to become independent from their parents especially on the father's side in terms of school tasks. The educational attainment of the father did not influence the development of child's capability in perceiving phenomena especially in school. This is because pupils build up already their thinking and understanding of the real world learned from science. Therefore, science investigatory project played a role in the development of pupil's interest and science process skills in learning science because it made them observe, understand and analyze what they wanted to know. Science investigations influenced the pupil's interest, attitude and manner in view of the fact that they are made to discover the reality by themselves. According to the study of Howard (1997), there is also an implication that parent's educational attainment may be applied in raring and guiding a child to his development as a person, yet if it is a choice of a child to do things on his own, then parents cannot do much to impede him or her.

Table 6: Analysis of Variance on the Impact of Science Investigatory Project (SIP) on students' interest and process in terms of science reading materials available at home

Variables	MS Effect	MS Error	df	F	p	Decision
Interest in Science	0.0076	0.0541	1, 98	0.1400	0.7091	Do not reject Ho
Science Process Skills	0.0021	0.0771	1, 98	0.0273	0.8691	Do not reject Ho

Marked effects are significant at p < .05000

The analysis of variance on the impact of doing science investigatory project on students' interest and process in terms of science reading materials available at home and the impact of science investigatory project (SIP) in learning elementary science is presented on Table 6. The p-values of interest in science (0.7091) and science process skills (0.8691) with respect to the reading materials available at home are greater than 0.05. This implies that there is no significant difference on the impact of science investigatory project on students' interest and process skills with respect to science reading materials available at home. Pupils nowadays prefer to work in campus collaborating with groups, instead of utilizing the useful reading resource materials at home. Pupil's interest is always focused on the things and people around him like joining in practical activities that link to ideas, for example working and seeking of explanations and understanding of scientific knowledge in a group of friends made a child feel comfortable and more confident because s/he believes that his/her ideas/opinions are well taken by the group.

By the development of his/her confidence in sharing with the groups, s/he prefers to stick and work outside rather than stay at home. In connection to this, materials at home are neglected and are not used as references. Pupils would develop their interest in science if they are free to express their ideas. Being alone would be boring for pupils. Instead of staying at home to work for their assignments and projects with the help of available science reading materials, they liked to explore outside better because children believe that it could give them freedom to do things for themselves. Pupils are more interested to use reading materials in school also because there are various materials to choose from than reading and using materials at home which are only limited. Thus, the schools should ensure good references available to the

students. In the words of Mamanglu (2009) the government should allocate enough amounts for the instructional materials needed for the schools to upgrade the development and participation of pupils in the conduct of science investigations as well as the teachers. Pupils broadened their communication and science process skills through interaction with other pupils as well as group. Pupils could perform science experiments and investigations better if there is an organization of what is being learned and reflected by others. If there is sharing and collaboration among groups, same instructional or reading materials will be shared and used. This shows the reality that science reading materials available at home were abandoned by most children. Oftentimes, children are more exposed on the materials available at school especially during the conduct of experiments in science like doing science investigatory project, so their attention is focused more on enjoying the resource materials for learning science outside home.

The Study Revealed the Following Findings

As to the profile of the participants, most of the participants were female (67 or 67%), having family monthly income below (P 5, 000.00 or 34%), with mothers who were bachelor's degree holders (66% or 67%), and with father's who were also bachelor's degree holder (68 or 68%), and having journals/periodicals (184 or 48.9%) as science reading materials available at home. In terms of interest in science, the participants strongly agree that science investigatory project has impact in learning Science and Health (M= 3.55, SD=0.23).In terms of science process skills, the participant strongly agree that science investigatory project has impact in learning Science and Health (M= 3.63, SD=0.28).Among the profile variables used as differentiating variables for interest in science, there is no significant difference on the impact of science investigatory project with respect to sex, parent's highest educational attainment and science reading materials available at home. However, there is a significant difference on the impact of science investigatory project with respect to family monthly income. Among the profile variables used as differentiating variables for science process skills, there was no significant difference on the impact of science investigatory project with respect parent's highest educational attainment and science reading materials available at home. However, there was a significant difference on the impact of science.

CONCLUSION

On the basis of the findings of the study, the following conclusions were drawn: Science investigatory project (SIP) develops students' interest and process skills (observing, comparing, classifying, measuring, gathering and organizing, predicting, inferring, evaluating, synthesizing, and interpreting data) in learning science. Pupils who are financially better off would tend to become interested in science and working scientific investigations because they are provided enough materials and support by their parents while pupils who lacked financial support from parents are less interested to learn science due to incapability of materials to work for the activities. Science teachers however provide alternative means for pupils who cannot afford to buy materials for SIP through improvised materials and instruments. Male and female pupils develop science process skills differently while in the conduct of science investigatory projects.

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