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COMPETENCIES OF ELEMENTARY SCIENCE TEACHERS IN THE UTILIZATION OF SCIENCE PROCESSES

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Abstract : This study assessed competencies of elementary Science teachers in the utilization of Science processes during the School Year 2023-2024. It employed the descriptive method of research with the use of the questionnaire in dealing with its research problems. It used frequencies and average weighted mean to answer its research problems. The study found out that most of the elementary Science teachers are educationally qualified, with moderate number of teaching experience in the teaching of Science, and have a considerable number of Science related seminars. The Science equipment/facilities needed in the teaching of Science as perceived by the elementary Science teachers are available for use by the Science teachers. The teachers are competent in the use of science processes in observing, comparing, measuring, classifying, communicating, predicting, inferring, and experimenting. The Science teachers encountered human and non-human related problems in teaching elementary Science. The study recommended that school administrators should encourage teachers to attend Science seminars regularly to further enhance the competency of the teachers in using the high level science processes. The school should make provisions for Science-oriented rooms for the Science classes to be more conducive to the teaching-learning process. The Science teachers must try to explore all means to wisely make use the available materials to enhance the utilization of Science processes by conducting workshop on the production of the improvised materials during summer vacation. Teachers should be more aware of the learners' abilities and disciplinary problems so that they could adopt measures to motivate he interest of the learners in Science.

Keywords: competency, science processes, utilization

INTRODUCTION

Science and technology are gaining increasing significance in the global competition among nations. People are increasingly expected to be so well educated that they are able to take proactively and innovatively part in scientific and technological development and, on that basis, being economically successful. They are also expected to develop appropriate powers of judgment concerning the fundamental principles and also the effects of technical products. This applies in particular to physics, being considered as the mother of all sciences due to its fundamental character not only in terms of the results and insight it provides but also with regard to its mindsets.

A modern industrial country must therefore aspire, on the one hand, to safeguarding a generally high standard of knowledge pertaining to physics and other sciences in the population at large in order to take up a leading role in the competing technology-related areas of economy. On the other hand, modern society needs cogitative and politically mature citizens with sound powers of judgment based on their education. In order to achieve all these, schools are of pivotal importance here.

A substantial understanding of science and technology across the widest
possible spectrum of society constitutes a resource whose value should not be underestimated in the competition of nations for cultural and economic success. This applies, in particular, to physics with its fundamental character as the "mother" of all sciences in terms of the supplied results and also with regard to its mindsets.

An education in science, and particularly physics, more often than not shapes young people their whole lifetime. It plays a major role in determining their basic knowledge that will accompany them through life and whether they will be motivated to continue learning or even pursue a science or technology degree.

Among school children physics is considered to be one of the least popular subjects. Frequently, those who start school with a natural interest in nature and technology tend to become discouraged or even disinclined to the subject upon finishing their school education.

In the educational context, science processes are mental skills used in handling, dealing with or transforming information and concepts (The Competency Inventory Revision team, 2011). Aside from describing scientific process as essentially processes of thinking, they are also described as perspective, associative, inductive, deductive, creative, imaginative, and critical and problem solving processes (Rivera and Sambrano, 2010).

Science teaching has changed significantly during the past forty years. At one time, much of science teaching is focused on the content of science. But after the launching of the Sputnik Satellite by the Soviet Union in 1957, the US took a new look of science education which eventually changed the whole world view on science teaching. The teaching of science has shifted from content towards process. Process approach in science teaching is a way of working on thinking about, and studying problems. The use of process approach in teaching science helps students develop the following skills: analyzing, classifying, collecting data, communicating, comparing, contrasting, controlling variables demonstrating, describing, drawing conclusions, estimating, evaluating, experimenting, forming theories, generalizing, graphing identifying, inferring, interpreting, measuring, observing, predicting outcomes, questioning, recording data, and verifying.

In the Third International Mathematics and Science Study (2000), the Philippines ranked 39th out of 42 participating nations. The study showed that the science syllabi of the countries with high achievements had fewer topics as compared to that of the Philippines. From the same study, the recommended measures to help raise the achievement level of the Filipino students, there is a need to refine the curriculum with components which had to be clustered into a) fewer learning areas, b) better integration of competencies an topics within and across the learning areas, and c) with more time allotment for the mastery of the essential competencies, for personal analysis and reflection on the major concepts. This would result to a restructured, upgraded, more integrated curriculum where each learning competency is useful.

There have been many studies over the years that examined teachers' science process skills. These studies have ranged from teachers' understanding to attitudes towards science process skills. Many studies have also emphasized the importance of teachers' understanding of the science process skills. These studies have established a strong argument for ensuring such understanding. For example, in the development of a tool to measure science process skill performance, Burns, Okey, and Wise (2005) make a strong argument on the importance of science process skills, claiming "the process skills represent the rational and logical thinking skills used in science". Further, they argue that teachers must exhibit competence in the process skills in order to effectively teach them to children.

Other research supports this claim. Ailello-Nicosia and ve Sperandeo-Mineo Valenza (2004) focused on middle school science teachers' understanding of the science process skills and tested their pupils at the end of the school year to determine the impact teachers' ability in the skills has on their students. Their results were not surprising, as they found that using the processes "is a more valuable teacher characteristic than the understanding of science processes for student outcomes". This is a significant finding, asit indicates that teachers must not only have an understanding of the skills, but must be functionally literate in the skills in order to appropriately and effectively teach them to their students.

Despite a variety of studies that establish the importance of science process skills for teachers, there is evidence that teachers do not have sufficient knowledge and understanding of these skills. Pointing out that even though the science process skills are essential for student learning and beneficial because they are cross curricular, developed early in life, and are transferable thought processes, Sunal and Sunal (2003) contend that both children and adults lack the ability to use them appropriately. Other research that has focused on teachers, support this claim.

Jaus (2005), in particular, provided integrated science process skill instruction to 90 pre-service elementary teachers. Instruction was provided via self-teaching pamphlets, completely accomplished by the learner, including practice activities and self-tests. Objective writing and science process skill achievement were then measured using questionnaires. The findings reveal that these instructional materials significantly improve teachers' integrated process skill achievement. Further, pre-service teachers in this study selected and wrote significantly more objectives aimed at these skills than did un-trained peers. These results suggest, as Jaus points out, that pre-service and in-service teachers attain competence in science process skills if they are provided the training. Likewise, Jaus concludes that "teachers competent in the science process skills design instructional materials that provide for similar process skill acquisition by children". Overall, Jaus reiterates the vital message that teachers must be proficient in the science process skills because they design the activities that teach these skills to children.

The science process skills must be understood by teachers so that they may impart on their students a lasting and valuable comprehension. The science process skills are vital for students and can be started very early in life. Several studies highlight that the basic science process skills can begin prior to Kindergarten (Kirch, 2007; Meador, 2003; Sunal & Sunal, 2003; Martin, Sexton, & Gerlovich, 2001).

Lind (2002) stresses the importance of creating science process skills opportunities for early childhood students. She argues that the natural development and curiosity of children enable them to instinctively do the basic process skills such as observe, classify, collect and organize data, and measure. Although the teacher or parent might need to assist in small ways, such as recording information, the young child explores and experiments the phenomena he or she encounters in a manner that we know as the basic science process skills.

In a similar study, Preece and Brotherton (2007) again found that teaching the science process skills in early secondary can have long-term positive effects on science achievement. Finally, Bilgin (2006) found that hands-on science process skill instruction increased eighth grade students' skills in a positive manner, along with increasing positive attitudes towards science. Other research, such as Molitor and George (2006), has found that students with science process skill training or instruction do markedly better than those with no training. Not only are the science process skills important for science achievement, but are easily transferable to other subject areas as well. Several authors mention the cross-curricular nature of the science process skills (Sunal & Sunal, 2003; Martin et al., 2001; Rillero, 2008). Ostlund (2008) cites a multitude of studies that demonstrate how science process skills are related to reading abilities, reading readiness, and allows students also to better develop language skills. She goes on to discuss the many studies that demonstrate how the science process skills enhance both oral and written communication skill and language development of special needs students. Finally, Ostlund presents how the science process skills are essential to math, particularly helping students move from one cognitive development level to the next, enhance operational abilities, and enhance problem-solving skills. Ostlund points out that the science process skills are also coupled with critical thinking skills, which is likely the reason why the process skills lend themselves so readily to other subjects.

The science process skills are also strongly associated to logical thinking (Padilla, Okey & Dillashaw, 1983) and formal operational abilities (Padilla, 2001) in addition to critical thinking. Settlage and Southerland (2007) justify the purpose for teaching the skills by arguing that they provide students with active learning, sense-making tools, language development, a community of learners, and foster a natural sense of curiosity. Further, the science process skills are essential to scientific creativity and creative thinking. In an article concerning academically gifted elementary students, Meador (2003) links the science process skills to thinking like a scientist, and argues that both are essential for fostering creativity. Thus, she contends that creative thinking and science process skills are intertwined and those who use science process skills are better at scientific creativity.

Creativity and higher mental processes also have a high likelihood of being transferred to other subject areas (Karsli, Sahin, & Ayas, 2009). The benefits of science process skill instruction for students are eminent. The National Science Teachers Association (NSTA, 2002), in their position statement, explicitly states that teachers should create first-hand exploratory investigations that focus on inquiry and the process skills to enhance student learning. Students who have science teachers that are knowledgeable about the science process skills gain with appropriate and effective skill instruction. Likewise, students who are exposed to science process skill instruction demonstrate a higher level of science achievement and enhance their math and language arts abilities. Students provided with the process skill instruction tend to have and be able to use higher mental process and creativity. Therefore, science educators must develop teachers who are competent in the knowledge and teaching of the science process skills, to consequently ensure that students get effective and valuable skill instruction.

The nature of science is an element of the science curriculum that allows students the ability to fully understand how science as a discipline functions. Some of its tenets include that science is a way of understanding our world, science is a tentative and creative enterprise, and science is not a single method (Chiappetta & Koballa, 2010). It is important that we teach science process skills not only because of the aforementioned benefits to teachers and students, but also because of its link to the nature of science. In his chapter for Britton, Glynn, and Yeany's text, Padilla (2001) clearly points out that the process skills should be taught because they "more accurately reflect the nature of science and the typical activity of scientists". He argues that activities based in the process skills provide students an opportunity to view the true nature of science through the perspective of a scientist.

Rowland, Stuessy, and Vick (2007) developed a workshop for in-service teachers to teach them the basic science process skills. In providing reasoning for teaching the process skills, the authors point out that a process approach 1) highlights that science is a way of understanding our world; 2) makes them do science as scientists do and 3) develops scientific attitudes. These factors are important as they emphasize that developing the science process skills in teachers is important if the educational community is to impart a positive attitude towards science on our students and demonstrate the nature of science to their students. Rezba, Sprague, McDonnough, and Matkins (2007) devotes an entire textbook to the science process skills and a sub-section to how the science process skills help teach the nature of science, and Rillero (2008) declares the process skills "promote an understanding of the nature of science", both citing similar reasons to Rowland et al. While several research studies have mentioned how the science process skills are related to particular tenets of the nature of science, very few have explicitly looked at their relationship.

Scharmann (2009) collected data from 135 pre-service teachers regarding three factors: introductory process instruction followed by integrated content and methods courses, process instruction followed separately with content and teaching method instruction, and no process instruction only content and teaching methods. His results indicate that science process skills instruction significantly increase understanding of the nature of science and science content knowledge. Further analysis revealed that content and the process skills should be instructed together, rather than a content versus process model, suggesting that instruction of one should complement the other.

Again, the benefits of the science process skills abound and the information presented should not be taken lightly. This information, compiled together, further strengthens the argument that science process skills are an essential piece of any science curriculum and to obtain maximum benefits from the learning of the skills, teachers must be adequately prepared to teach them.

The development of skills in scientific inquiry requires that students of science be provided with appropriate and adequate guidance in their study of science. This guidance is to be found in the instructional programs provided by schools, colleges and universities. Competent, adequate and appropriate guidance must meet a number of conditions. These include guidance in practical work which enhances the quality of a teacher's learning.

Process skills of science are basic and critical components of the process of conducting study of science under the guidance of a teacher. For many years, now, Bloom's taxonomy of educational objectives has received wide recognition, and it has been used in many curriculum design and development projects. Bloom identified three major realms or domains of intended learning outcomes: the cognitive domain of knowledge, the affective domain or attitudes and the psychomotor domain of manipulative skills. These categories have stood the test of time and acceptance by experts, and they provide an excellent conceptual framework for revision of curriculum so that it incorporates the basic scientific process skills. The sure route to the attainment by school students of mastery of the basic skills of science is through having adequate teachers. The teachers must be experts in two areas. They must be masters of science process skills.

Inquiry has been an integral part of science education for some years now. Like the process skills, inquiry is included in National Science Standards and Reforms (NRC, 2000; AAAS, 2003). The importance of using inquiry of traditional methods holds a strong argument. Likewise, there have been numerous studies over the years on the topic of inquiry regarding its relationship to teachers, students, achievement, learning, understanding, and use. In general, studies report that the use of inquiry increases teacher confidence (Bhattacharyya, Volk, & Lumpe, 2009), understanding of the nature of science, and interest (Sanger, 2008) which lead to a greater chance that inquiry will be used in the classroom.

Studies on inquiry have also focused on its effect on students. For example, in a study examining the use of inquiry and its relationship to underrepresented students, such as minorities in urban areas, Geier et al. (2008) found that science curriculum that emphasized inquiry increased gains in achievement test. Mehalik, Doppelt, and Schunn (2008) found similar results in students for science concept learning, achievement, and retention particularly for minority groups. Wilson, Taylor, Kowalski, and Carlson (2010) also found that science instruction taught with inquiry methods increased achievement levels with lasting effects for students. Minner, Levy, and Century (2010) examined research on inquiry over a nearly twenty year span. Their review of these studies concluded that inquiry increases conceptual understanding, and just over half of the studies showed "positive impacts of some level of inquiry science instruction on student content learning and retention." Further, the examinations of the 'investigation cycle,' or skills that are similar or have roots in the science process skills, are also indicative of better scientific conceptual learning. These studies are important because inquiry and the science process skills are interrelated, one is necessary for the other.

Statement of the Problem

This study assessed competencies of elementary Science teachers in the utilization of Science processes in San Jose East District Schools Division Office of Tarlac Province during the School Year 2023-2024.

Specifically, it sought to answer the following sub-problems:

1. What is the profile of the elementary Science teachers in terms of the following:
    1.1 highest educational attainment;
    1.2 number of years of experience in the teaching of Science; and
    1.3 relevant in-service training in Science attended?
2. What is the level of competency of the elementary Science teachers in the use of the Science processes along the following as perceived by them and their school heads:
    a. Observing;
    b. Comparing;
    c. Classifying;
    d. Measuring;
    e. Communicating;
    f. Predicting;
    g. Inferring; and
    h. Experimenting.

3. Is there a significant relationship between the profile of the elementary Science teachers and their level of competence in the utilization of Science processes?

4. Is there a significant difference between the rating of the elementary Science teachers and and their school heads on the utilization of Science processes?

5. What is the extent of availability of Science equipment/facilities needed in the teaching of Science as perceived by the elementary Science teachers?

6. What are the problems being encountered by the elementary Science teachers relative to the use of Science processes?

7. Based on the findings, what development program can be proposed to enhance the competencies of elementary Science teachers in the utilization of Science processes?

METHODOLOGY

This chapter presents the method and procedure employed to answer the research problems identified in the study. More specifically, it discusses the research design, sources of data, instrumentation and data collection and tools for data analysis.

Research Design

Basically, this study used the descriptive method of research. As defined by Fraenkel & Wallen in their book "How to Design and Evaluate Research in Education", it describes the degree by which two or more quantitative variables are related. It is chosen as an appropriate method for this present study because it provided the description of the profile of the respondent-teachers, the extent of availability of the equipment/facilities needed in the teaching of Science as perceived by the elementary Science teachers, the level of competency of the elementary Science teachers in the use of the Science processes, and the problems being met by the Science teachers relative to the use of the Science processes

Sources of Data

This portion dealt with the locale of the study and population sampling.

This study was conducted in San Jose East District Schools Division Office of Tarlac Province.

Instrumentation and Data Collection

The data gathering instrument of the study was a questionnaire for the science teachers and their school heads. The questionnaire for the teachers focused on the profile of the Science teachers in terms of highest educational attainment, number of years of experience in the teaching of science, and relevant in-service training attended; the extent of availability of science equipment/facilities needed in the teaching of Science as perceived by the elementary Science teachers; the level of competency of the elementary Science teachers in the use of the Science processes along observing, comparing, classifying, measuring, communicating, predicting, inferring, and experimenting as perceived by them and their school head; the problems being encountered by the Science teachers relative to the use of the Science processes.

The researcher-made questionnaire was presented to the members of the Research Panel for initial evaluation. Then the instrument was submitted for final evaluation and validation by experts on questionnaire construction. A validation questionnaire was utilized in this regard. The product of this process was the questionnaire in its final form.

The questionnaire was personally administered by the researcher to the teachers to ensure fast and immediate response and 100% retrieval.

The data that were gathered were subjected to appropriate statistical treatment analysis and interpretation.

RESULTS AND DISCUSSION

This chapter deals in the presentation, analysis and interpretation of the data gathered relative to sub-problems in the study**.**

I. Profile of the Elementary Science Teachers

The profile of the elementary Science Teachers in terms of highest educational attainment, number of years of experience in the teaching of Science; and relevant in-service training in Science attended is presented in Tables 1-3

Table 1

Professional Profile of the Elementary Science Teachers in Terms of Highest Educational Attainment

Highest Educational Attainment	Frequency	Percentage
With MA Units	19	55.88
MAEd/MEd	15	44.12
Total	**34**	**100**

It can be gleaned in Table **1** that a great number of elementary Science teachers have MA units with 19 or 55.88%. Some 15 or 44.12% are MAEd or MEd graduates. It could be observed from the data that there are more elementary teachers who are pursuing graduate studies because of the increase in salary that goes alongside with the promotion as teachers, a good number of them subscribe to the importance of professional growth.

Table 2

Profile of the Elementary Science Teachers in Terms of Number of Years of Experience in the Teaching of Science

Length of Teaching Experience	Frequency	Percentage
0-5 years	10	29.41
6-10 years	20	58.82
11-15 years	4	11.77
Total	**14**	**100**

It is reflected in Table 3 that most of the elementary Science teachers have been teaching Science for 6-10 years with 20 or 58.82%. This is followed by 0-5 with 10 or 29.41% and 11-15 years with 4 or 11.77%. T

Table 3

Professional Profile of the Elementary Science Teachers in Terms of Relevant In-Service Trainings in Science Attended

Level	Frequency	Percentage
Division	34	100
Regional	20	58.82

***Multiple Responses**

It is shown in Table 4 that all elementary Science teachers had attended Division training related to Science. On the other hand, 20 of them had attended Regional training about Science. The results show that Science teachers give importance to training or seminars because of the belief that experience is the best teachers. Through seminars, they can improve their competencies and skills in teaching Science subject.

Table 4

Extent of Availability of Science Equipment/Facilities Needed in the Teaching of Science as Perceived by the Elementary Science Teachers

Science Equipment/Apparatuses	School Heads		Teachers	
	WM	**DE**	**WM**	**DE**
1. Test Tube and Test Tube Rack	4.31	A	3.38	MA
2. Medicine Dropper	4.03	A	3.23	MA
3. Evaporating Dish	4.22	A	3.38	MA
4. Mortar and Pestle	4.12	A	3.23	MA
5. Slides	4.32	A	3.54	A
6. Stirring Rod	4.15	A	3.31	MA
7. Beaker	4.27	A	3.54	A
8. Iron Clamp	3.92	A	3.31	MA
9. Wire Gauze	4.03	A	3.38	MA
10. Alcohol Lamp	4.15	A	3.23	MA
11. Platform Balance	3.83	A	3.38	MA
12. Spring Balance	3.78	A	3.23	MA
13. Micro Glass Cover	3.75	A	3.38	MA
14. Incline Plane	3.71	A	3.23	MA
15. Metal/Wooden Pulley	3.81	A	3.31	MA
16. Stop Watch	3.88	A	3.46	MA
17. Meter Stick	4.31	A	3.38	MA
18. Iron Stand	3.97	A	3.46	MA
19. Thermometer	4.12	A	3.48	MA
20. Microscope	4.31	A	3.46	MA
21. Magnetic Compass	4.34	A	3.54	A
22. Magnets	3.76	A	3.46	MA
23. Graduated Cylinder	4.17	A	3.62	A
24. Pictures of Human Body System	4.41	A	3.62	MA
AWM	**4.07**	**A**	**3.40**	**MA**

Legend:

Scale	**Statistical Limit**	**Descriptive Equivalent**
5	4.50 - 5.00	Highly Available (HA)
4	3.50 – 4.49	Available (A)
3	2.50 – 3.49	Moderately Available (MA)
2	1.50 – 2.49	Slightly Available (SA)
1	1.00 – 1.49	Not Available (NA)

Table 4 shows the extent of availability of science equipment/facilities needed in the teaching of Science.

Overall weighted mean as regards the administrators' evaluation is 4.07 which is described as "available" while those of teachers' evaluation is 3.40 or described as "moderately available".

The difference in the school heads' and teachers' evaluation could be due to the presence of newly hired teachers teaching science subject. This could also imply that some science teachers are not aware of the presence of the other science equipment/facilities which the school had because one reason of which could be due to their non-use of such.

Table 5
Level of Competency of the Elementary Science Teachers in the Use of the Science Processes in Terms of Observing

OBSERVING	School Heads		Teachers	
	WM	DE	WM	DE
1. Tell and show how to use their eyes in identifying the structures of the human system.	4.32	C	3.53	C
2. Tell and show how to use their ears in identifying sounds produced by musical instruments.	4.43	C	3.42	MC
3. Tell and show how to use their nose to identify odor of various chemicals.	3.85	C	3.39	MC
4. Tell and show how to use their tongue to identify different tastes of food.	3.92	C	3.32	MC
5. Use their sense of touch to identify the weather condition.	3.92	C	3.61	C
AWM	**4.09**	**C**	**3.45**	**MC**

Legend

Point Value	Statistical Limit	Descriptive Equivalent
5	4.50 - 5.00	Very Competent (VC)
4	3.50 - 4.49	Competent (C)
3	2.50 - 3.49	Moderately Competent (MC)
2	1.50 - 2.49	Slightly Competent (SC)
1	1.00 - 1.49	Not Competent (NC)

Table 5 shows the data on the teachers' level of competency in the use of the processes along observing in their science classes as perceived by both the school administrators and teachers themselves.

The school heads rated the science teachers and the teachers rated themselves competent in the use of science processes along observing with 4.09 and 3.45, respectively.

The teachers rated themselves moderately competent in using science processes along comparing with 3.25 or moderately competent. It can also be noted in the table that teachers rated all the indicators moderately competent.

Table 6
Level of Competency of the Elementary Science Teachers in the Use of the Science Processes in Terms of Comparing

COMPARING	School Heads		Teachers	
	WM	DE	WM	DE
1. Use comparative and superlative adjectives to compare objects in terms of size, weight, height.	3.77	C	3.41	MC
2. Compare one's predictions with that of classmates.	3.46	MC	3.14	MC
3. Compare by drawing the different stages in the life cycle of animals.	3.69	C	3.17	MC
4. Compare results of tests conducted such as the litmus test.	3.54	C	3.45	MC
5. Compare the result of experiment conducted by own group with the other group.	3.62	C	3.08	MC
AWM	**3.62**	**C**	**3.25**	**MC**

Legend

Point Value	Statistical Limit	Descriptive Equivalent
5	4.50 - 5.00	Very Competent (VC)
4	3.50 - 4.49	Competent (C)
3	2.50 - 3.49	Moderately Competent (MC)
2	1.50 - 2.49	Slightly Competent (SC)
1	1.00 - 1.49	Not Competent (NC)

Table 7 shows that classifying habits/practices as healthy or unhealthy received the highest mean of 3.94. This is followed by two statements with 3.92 or "competent" are differentiate materials according to specific descriptions such as size, color, texture, etc., and group objects/materials according to biodegradable/non-biodegradable materials.

Table 7
Level of Competency of the Elementary Science Teachers in the Use of the Science Processes in Terms of Classifying

CLASSIFYING	School Heads		Teachers	
	WM	DE	WM	DE
1. Classify objects which have similar characteristics such as living or non-living things.	3.85	C	3.39	MC
2. Differentiate materials according to specific descriptions such as size, color, texture, etc.	3.92	C	3.46	MC
3. Group objects/materials according to biodegradable/non-biodegradable materials.	3.92	C	3.31	MC
4. Eliminate objects/ materials which do not belong to a certain type of description/specification such as household materials.	3.85	C	3.08	MC
5. Classify habits/practices as healthy or unhealthy.	3.94	C	3.39	MC
AWM	**3.90**	**C**	**3.33**	**MC**

Legend

Point Value	Statistical Limit	Descriptive Equivalent
5	4.50 - 5.00	Very Competent (VC)
4	3.50 - 4.49	Competent (C)
3	2.50 - 3.49	Moderately Competent (MC)
2	1.50 - 2.49	Slightly Competent (SC)
1	1.00 - 1.49	Not Competent (NC)

Overall, the school heads rated the teachers "competent" in using Science processes in terms of classifying with 3.90.

On the other hand, the teachers rated themselves moderately competent in this area with 3.33 mean. The item "differentiating materials according to specific descriptions such as size, color, texture, etc. received the highest mean from the teachers with 3.46 but still described as moderately competent.

Table 8
Level of Competency of the Elementary Science Teachers in the Use of the Science Processes in Terms of Measuring

MEASURING	School Heads		Teachers	
	WM	DE	WM	DE
1. Use weighing scale, graduated cylinder, measuring stick, balance, in an activity.	3.69	C	3.07	MC
2. Determine exact temperature, weight, height, width, length, of objects/materials.	4.46	C	3.15	MC
3. Use terms such as kilowatt to measure the consumed amount of electricity.	4.46	C	3.86	C
4. Identify distance of traveled by objects/materials in terms of speed and time.	4.38	C	3.21	MC
5. Compute the exact area, volume of objects/materials.	4.46	C	3.17	MC
AWM	**4.29**	**C**	**3.29**	**MC**

Legend

Point Value	Statistical Limit	Descriptive Equivalent
5	4.50 - 5.00	Very Competent (VC)
4	3.50 - 4.49	Competent (C)
3	2.50 - 3.49	Moderately Competent (MC)
2	1.50 - 2.49	Slightly Competent (SC)
1	1.00 - 1.49	Not Competent (NC)

According to the school heads' perception, the teachers are competent in the use of science processes along measuring with 4.29.

The science teachers' own perception on their level of competency in the use of science processes along measuring is moderately competent with 3.29 average weighted mean. Using terms such as kilowatt to measure the consumed amount of electricity got the strongest or the highest mean of 3.86.

Table 9

Level of Competency of the Elementary Science Teachers in the Use of the Science Processes in Terms of Communicating

COMMUNICATING	School Heads		Teachers	
	WM	DE	WM	DE
1. Describe the different objects inside the classroom.	4.77	VC	4.41	C
2. Discuss about what is seen, heard, smelled, tasted and felt.	4.69	VC	4.42	C
3. Explain the steps/procedures to be done in an activity.	4.69	VC	4.25	C
4. Answer specific questions in preparation for a group of activity.	4.62	VC	4.25	C
5. Construct kinds of graphs such as bar, line, pie.	4.62	VC	3.98	C
AWM	**4.68**	**VC**	**4.26**	**C**

Legend

Point Value	Statistical Limit	Descriptive Equivalent
5	4.50 - 5.00	Very Competent (VC)
4	3.50 - 4.49	Competent (C)
3	2.50 - 3.49	Moderately Competent (MC)
2	1.50 - 2.49	Slightly Competent (SC)
1	1.00 - 1.49	Not Competent (NC)

Communicating which is one of the focuses of the science processes in teaching science is also assessed by both the administrators and the science teachers in terms of the teachers' level of competency in using them.

As perceived by the school heads and by the teachers themselves, the teachers' level of competency in the use of the science processes along communicating in their science classes is "very competent" for the school administrators with 4.68 while competent on the part of the teachers with 4.26 mean.

Table 10
Level of Competency of the Elementary Science Teachers in the Use of the Science Processes in Terms of Predicting

PREDICTING	School Heads		Teachers	
	WM	DE	WM	DE
1. Observe, examine the existing data to come up with accurate prediction.	4.15	C	4.15	C
2. Identify what will happen based on the present evidence.	4.15	C	4.05	C
3. Make prediction based on the prevailing pattern or events or facts.	4.31	C	3.93	C
4. Relate past experiences to present situation in order to identify what may occur/happen next.	4.23	C	4.08	C
5. Predict the effect of weather conditions.	4.23	C	3.90	C
AWM	**4.21**	**C**	**4.02**	**C**

Legend

Point Value	Statistical Limit	Descriptive Equivalent
5	4.50 - 5.00	Very Competent (VC)
4	3.50 - 4.49	Competent (C)
3	2.50 - 3.49	Moderately Competent (MC)
2	1.50 - 2.49	Slightly Competent (SC)
1	1.00 - 1.49	Not Competent (NC)

On the other hand, the teachers rated themselves "competent" with 4.02 mean rating. Also, teachers are "competent" in all indicators.

With the data presented in the Table, the administrators' perception obtained an overall mean of 4.56 or "very competent" while that of the teachers' perception obtained an average weighted mean of 4.19 or "competent".

Table 11
Level of Competency of the Elementary Science Teachers in the Use of the Science Processes in Terms of Inferring

INFERRING	School Heads		Teachers	
	WM	DE	WM	DE
1. Use expressions such as "I think", "I believe", "In my opinion" to express thoughts and ideas.	4.62	VC	4.10	C
2. Make wise guess based on past observations, experiments and experiences.	4.62	VC	4.19	C
3. Discuss the important considerations in order to come up with an intelligent guess.	4.62	VC	4.20	C
4. Infer what causes natural occurrences on earth such as tides.	4.38	C	4.10	C

5. Observe objects/materials before giving own opinion about the topic.	4.54	VC	4.36	C
AWM	**4.56**	**VC**	**4.19**	**C**

Legend

Point Value	Statistical Limit	Descriptive Equivalent
5	4.50 - 5.00	Very Competent (VC)
4	3.50 - 4.49	Competent (C)
3	2.50 - 3.49	Moderately Competent (MC)
2	1.50 - 2.49	Slightly Competent (SC)
1	1.00 - 1.49	Not Competent (NC)

The only indicator which received a descriptive equivalent of "competent" as rated by the school administrators is "inferring what causes natural occurrences on earth such as tides" with 4.38.

Table 12

Level of Competency of the Elementary Science Teachers in the Use of the Science Processes in Terms of Experimenting

EXPERIMENTING	School Heads		Teachers	
	WM	DE	WM	DE
1. Identify properly what the problem is all about.	4.47	C	4.23	C
2. Enumerate/steps of the activities to be done.	4.42	C	4.34	C
3. Gather the materials/objects needed for the experiment.	4.36	C	4.23	C
4. Control variables such as time, weight and temperature for accurate results correctly.	4.25	C	4.11	C
5. State the findings, conclusions and generalization.	4.13	C	3.98	C
AWM	4.33	C	4.18	C

Legend

Point Value	Statistical Limit	Descriptive Equivalent
5	4.50 - 5.00	Very Competent (VC)
4	3.50 - 4.49	Competent (C)
3	2.50 - 3.49	Moderately Competent (MC)
2	1.50 - 2.49	Slightly Competent (SC)
1	1.00 - 1.49	Not Competent (NC)

As could be gleaned from Table 132 the school heads' and the teachers' perception are with the descriptive equivalent of "competent" with an overall average weighted mean of 4.33 and 4.18, respectively. It could be observed also that the school administrators' rating was higher than the teachers' rating to their selves.

Problems Being Met by the Science Teachers Relative to the Use of Science Processes

Table 13

Problems Being Met by the Elementary Science Teachers Relative to the Use of Science Processes

Indicators	WM	DE
1. Lack of science materials/equipment	3.24	MS
2. Lack of standard laboratory room, tables, and chairs	3.76	S
3. Rooms not suited for science experimentation	3.45	MS
4. Misbehavior of pupils during the science activities	3.21	MS
5. Lack of time for performing science activities	3.34	MS
6. Inability of teachers to improve science materials.	3.12	MS
7. Class size is too large	3.56	S
8. Lack of pupils' interest during class activities.	3.33	MS
AWM	**3.38**	**MS**

Legend

Rating	Mean Range	Descriptive Equivalent
5	4.21-5.00	Very Serious (VS)
4	3.41-4.20	Serious (S)
3	2.61-3.40	Moderately Serious (MS)
2	1.81-2.40	Slightly Serious (SS)
1	1.00-1.80	Not Serious (NC)

It can be observed in Table 13 that teachers encountered moderately serious problems relative to the use of science processes with 3.38 mean rating.

The problem on "misbehavior of pupils during the science activities" and "lack of pupils' interest" maybe due to the common observations that science subject is not so much of interest among students. Since science related courses require a lot of activities, it is not surprising to know that 'lack of time in the performance of science activities' was also faced by the science teachers. Looking at the same time allotment per subject, it only shows that just like any other courses in high school, science subject is taught for one hour also.

Recommendations

1. School heads should encourage teachers to attend science seminars regularly to further enhance the competency of the teachers in using the high level science processes.

2. The school should make provisions for science-oriented rooms for the science classes to be more conducive to the teaching-learning process.

3. The science teachers must try to explore all means to wisely make use the available materials to enhance the utilization of science processes by conducting workshop on the production of the improvised materials during summer vacation.

4. Teachers should be more aware of the learners' abilities, and disciplinary problems so that they could adopt measures to motivate he interest of the learners in science.

5. Similar study should be conducted in other division to validate the findings of the present study.

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