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# UNFOLDING THE EFFECT OF THE AVAILABILITY AND UTILIZATION OF SCIENCE LABORATORY EQUIPMENT AND SUPPORTIVE INSTRUCTIONS ON STUDENTS' ATTENTIVENESS IN SCIENCE

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## ABSTRACT

This phenomenological study aimed to explore the effect of the availability and utilization of science laboratory for the students' learning in science. To gather more insights on the study a quantitative descriptive research method was deploy using survey-questionnaires as main instruments. The questionnaire has three parts; first, the respondents' profile in terms of their age, sex and civil status; second, identifying the facilities available in the science laboratory and utilized supporting instructions and determining the support instructional materials used in science; and third, establish the impact of students' attentiveness in learning science. A five-point Likert scale was utilized to answer the survey-questionnaire. A total of sixty-seven (67) Science Technology Engineering and Mathematics (STEM) graders from RPMD National High School who were officially enrolled during the school year 2023-2024 was the student-respondents. The data collected was systematically arranged and tabulated using statistical tools such are Weighted Mean and Frequency and Percentage and Standard Deviation. On the demographic profile of the respondents, the results of findings revealed that 71.64% were females while 28.26% males. This implied that female respondents were predominant over male. Moreover, 49.25 % from the respondents aged 18 to 19 years old. This connotes that students were on standard school-age brackets were grades 9 to 12 ages from 14 to 18 years old although it was observed that some students were late starting schooling and returned to a school after stopping or dropped resulted to at least 13.44% from respondents aged 20 years old and above. Moreover, the results further revealed that availability of science laboratory equipment's weighted mean is 2.82, was

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assessed "sometimes", students' attentiveness in science laboratory activities average weighted mean is 3.14, appraised to "neither agree or disagree", while average weighted mean on Students' Attentiveness on Science Support Instructions is 3.65, considered "agree" by the respondents. The overall results implied that the insufficiency of science laboratory equipment brought adverse effects to students' attentiveness in science. The students' expectations on science laboratory activities sometimes were not realized due to scarcity of facilities and equipment and insufficiency hampers the completion of the science lesson. Nevertheless, the respondents dealt with the problem through the preparation of support instructions materials.

**Keywords:** Availability, Utilization, Science Laboratory Equipment, Students' Attentiveness

## INTRODUCTION

It is undeniably that science plays a significant role in everyone's life especially on day-to-day life. From the beginning, when a child starts to attend his schooling he will be taught how to write and read and relate to the environment he had seen in and outside. It has been an open information that the educational institutions have a lot of flaws, starting from the textbooks which are overfilled with materials that often very complicated and can be hard for students to comprehend, it is also the lack of science laboratory's equipment. Laboratory equipment is necessary for the students to bridge the gap because teaching science cannot be done beyond memorization, the quality of learning experience depends on the extent of the adequacy of laboratory facilities and the teacher's effectiveness in the use of laboratory equipment with the aim of facilitating and providing meaningful learning experiences in the students.

According to USA Lab Equipment (2020) Science lab equipment allows students to actually perform experiments rather than just read about them. Instead of taking monotonous notes, they can observe and complete exciting experiments. Such hands-on learning often

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makes it easier to understand challenging theories and concepts. As a result, students can become more engaged in the subject matter they are studying and develop a deeper appreciation for the sciences. The science is taught unlike any other subject in school. In addition, the aforementioned, laboratory tools and equipment allows students to directly take part with the subject matter they are studying. By actively embarking with their curriculum, students often displayed better recollection. While a student may have to read over challenging subject matter several times before they are able to retain the information, completing a single experiment and seeing the results first-hand can allow the information to stick with them much longer. Without proper science equipment for schools, such engagement and information retention would not be possible for many students.

Another reason according to USA Lab Equipment (2020) why laboratory tools and equipment is important in schools is that it allows students to practice performing experiments. You would not expect someone to be able to successfully drive a car if they have only read about vehicles and never actually got in one to practice behind the wheel. The same is true for science. If students choose to go into a science-based profession someday, they will be expected to perform experiments and engage in hands-on processes. Making the switch from reading about the sciences to putting them in action would be very difficult without having completed a few experiments in school. As such, it is important to provide students with the science laboratory equipment they need to get necessary practice performing experiments.

Therefore, science laboratory equipment and supplies make learning easy for some students. It connotes that science is different from any other subject that a student takes up in school. Teaching science also needs supportive instructions, this discipline unlike other subjects affects the lives of each student a number of ways. which according to Gerges (2022), teaching science requires instructional planning that encourages students to engage their curiosity to explore solutions to socio-scientific issues, use evidence-based explanations to justify their reasoning, elaborate on possible effects, evaluate their findings, and predict potential outcomes based on different variables, like inquiry science where 5E instructional model should be applied such engage, explore, explain, elaborate and evaluate. Gerges (2022)

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emphasized that The 5E model is a planning tool for inquiry teaching that provides a structure for students to connect science ideas with their experiences and apply their learning to new contexts.

Moreover, the researcher got interested to conduct a survey on adequacy of Science laboratory equipment for the progress of the students. Particularly the STEM students studying more on sciences. It is also intended to know the effect of availability of Science laboratory equipment on the students' attentiveness in learning science at RPMD National Science High School.

## METHODOLOGY

The study utilized descriptive research design. The design was used to provide a detailed and accurate results on attributions of the particular subject of the study. The researcher used survey-questionnaire as primary tool of the study. The purpose of this instrument is to gather data from the respondents to help gain better understanding on the effect of the availability and utilization of science laboratory equipment and supportive instructions on students' attentiveness in science. and the data can be gather in less time and less chance of any bias since there is standard set of questions been used. A total of sixty-seven (67) Science Technology Engineering and Mathematics (STEM) graders from RPMD National High School who were officially enrolled during the school year 2023-2024 was the student-respondents. The survey-questionnaire used consist of three parts such: Part one, the demographic profile of respondents in terms of: Age, sex and civil status. Part two, identifying the facilities available in the science laboratory and utilized supporting instructions and determining the support instructional materials used in science; and part three, to establish the impact of students' attentiveness in learning science. A five-point Likert scale was utilized to answer the survey-questionnaire were respondents can choose from. The scaling of the indicators utilized ranging 1 through 5, descriptively define as follows: on part two, scale: 4.45-5.00, Always; 3.45-4.44, often; 2.45-3.44, sometimes; 1.45-2.44, rarely; 1.00-1.44, never and scale: 4.45-5.00, strongly agree; 3.45-4.44, agree; 2.45-3.44, neither

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agree or disagree; 1.45-2.44 disagree; 1.00-1.44, strongly disagree was employed for part three. The study employed frequency, percentage, average weighted mean and standard deviation as the statistical tools used on the gathered data to evaluate the outcomes and provide quantitative decisions. The data were treated through Statistical Product and Service Solutions (SPSS) Software using the 0.05 level of significance for the accuracy of the tabulated data and with the help of professional statistician to interpret the results of the instruments accordingly.

## RESULTS AND DISCUSSION

This section presents the results of the gathered data and its interpretation. A total of sixty-seven (67) respondents participated on the study. The results amazingly revealed that on the demographic profile of the respondents, the results revealed that 71.64% were females while 28.26% males. This implied that female respondents were predominant over male. Moreover, 49.25 % from the respondents aged 18 to 19 years old. This connotes that students were on standard school-age brackets were grades 9 to 12 ages from 14 to 18 years old although it was observed that some students were delayed enrolled in school or dropped and return resulted to at least 13.44% from respondents aged 20 and above and all the respondents were single status, the results were clearly understood since respondents were at secondary level yet, then were more focus on studies than being married at an early stage.

On availability of science laboratory equipment, it can be noticed that all of the items enumerated from table 1 were perceived by respondents to "sometimes", with average weighted mean of 2.82. The results implied that students gave less attentions on doing their activities at science laboratory since the equipment were insufficient. This also connotes that the aside from lack of laboratory equipment, some of the respondents conveyed that some of the available equipment was also malfunction and or outdated. In today's prompt advanced world, bringing-up young minds with a well-grounded foundation in science is predominant. The involvement of science equipment in schools goes beyond textbooks, offering students a hands-on and enchanting learning experience. It is believed that science laboratory equipment

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contributes to student success. According to USA Lab Equipment (2020) science laboratory equipment allows students to interact directly with the data gathered. They get a first-hand learning experience by performing various experiments on their own. Students are made to use the models and understand different scientific theories and concepts. Moreover, science laboratory equipment allows students to interact directly with the data gathered and understand the different theories and concepts in science's activities. The students will get a first-hand learning experience by performing the experiments on their own if and only if the laboratory equipment was available. Therefore, it is very necessary to make the upgraded science laboratory equipment available and let the students utilized it.

**Table 1**

**Weighted Mean Rating Value on the Availability of Science Laboratory Equipment**

| | Indicators | Weighted Mean | Interpretation |
|---|---|---|---|
| 1. | Microscope | 2.75 | Sometimes |
| 2. | Test Tube | 2.84 | Sometimes |
| 3. | Magnifying Glass/Watch Glass | 2.75 | Sometimes |
| 4. | Volume Flask | 2.81 | Sometimes |
| 5. | Bunsen burner-heating and sterilize | 2.69 | Sometimes |
| 6. | Dropper | 3.03 | Sometimes |
| 7. | Thermometer | 2.84 | Sometimes |
| 8. | Tongs/Wash Bottles | 2.96 | Sometimes |
| 9. | Weighing machine/spring balance/scale | 2.82 | Sometimes |
| 10. | Analytical Balance | 2.66 | Sometimes |
| | Average | 2.82 | Sometimes |

*Legend: 4.45-5.00, Always; 3.45-4.44, often; 2.45-3.44, sometimes; 1.45-2.44, Rarely; 1.00-1.44, Never*

Likewise, on the Students' attentiveness in science laboratory activities, the results perceived to "neither agree or disagree by the respondents with a general average of 3.14 as

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can be observed from table 2. The highest of which is the perception that *"I like going to my science classes because I learn interesting things with the use of laboratory"* got the highest weighted mean of 3.87 as perceived to agree by the respondents; the second is the perception that *"I am interested in our class when we are doing laboratory"* with the weighted mean of 3.82 as perceived as agree; the third is the perception that "I feel very excited in science classes" with the weighted mean 3.79 as agree; the fourth is the perception that *"I have enough time in the laboratory to think about the chemistry involved in the laboratory experiment"* with weighted mean of 3.37 as perceived to undecided; the fifth is the perception that *"I understand very well the lesson after the laboratory"* with the weighted mean of 3.22 as perceived to agree; the sixth is the perception that "*when I follow the laboratory manual, it gets me confused*" with the weighted mean of 3.15 as undecided; the seventh the perception that "*our laboratory equipment and consumable chemical is shows that laboratory equipment and consumable chemical is used by the teacher and students anytime*" which got the weighted mean of 2.97 as undecided; the eighth is the perception that "*there is enough information in the manual (lab map, etc.) and in the laboratory to help me find the chemical"* with the weighted mean of 2.82 as undecided; and the ninth of which is the perception that *"whenever we are going to the laboratory, we are allowed to use it as long as we sign out it in the laboratory custodian"* with the weighted mean of 2.70 as undecided. The perception which got the lowest is the perception that *"I do not enjoy doing laboratory in my science classes"* as it obtained the weighted mean of 1.72 as disagree.

**Table 2**

**Weighted Mean Rating Value on the Students' Attentiveness in Science Laboratory Activities**

| Indicators | Weighted Mean | Interpretation |
|---|---|---|
| 1. Our laboratory equipment and consumable chemical is often used by the teacher and students anytime. | 2.97 | Undecided |

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|---|---|---|
| 2. Whenever we are going to the laboratory, we are allowed to use it as long as we sign out it in the laboratory custodian. | 2.70 | Undecided |
| 3. I am very interested in our class when we are doing laboratory. | 3.82 | Agree |
| 4. I understand very well the lesson after the laboratory. | 3.22 | Undecided |
| 5. When I follow the laboratory manual, it gets me confused. | 3.15 | Undecided |
| 6. I have enough time in the laboratory to think about the chemistry involved in the laboratory experiment. | 3.37 | Agree |
| 7. There is enough information in the manual (lab map, etc.) and in the laboratory to help me find the chemical. | 2.82 | Undecided |
| 8. I do not enjoy doing laboratory in my science classes. | 1.72 | Disagree |
| 9. I feel very excited in science classes. | 3.79 | Agree |
| 10. I like going to my science classes because I learn interesting things with the use of laboratory | 3.87 | Agree |
| Average | 3.14 | Undecided |

*Legend: 4.45-5.00, Strongly Agree; 3.45-4.44, Agree; 2.45-3.44, Undecided; 1.45-2.44 Disagree; 1.00-1.44, Strongly Disagree*

With an average weighted mean of 3.14, descriptively define as undecided, the results implied that students gave less attention in doing their laboratory activities because of limited resources, such are the equipment and facilities. The Inadequate laboratory equipment affect meaningful learning in science and hindrance to students' peak academic performance. According to USA Lab Equipment (2020) teaching and experiments that are being conducted there help encourage deep understanding in children. Children are able to retain the knowledge for longer when they see the experiments being performed in front of their eyes. To enhanced mastery of subject matter the laboratory experiences may enhance student understanding of specific scientific facts and concepts and of the way in which these facts and concepts are organized in the scientific disciplines.

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Additionally, the table 3 presents several supporting instructions that teachers practiced and strategies used in teaching science. The enumerated indicators, is an examples of teaching strategies from the hands-on activities, inquiry-based learning, applications, collaboration, use of technology, clear communication, assessment for learning, differentiation, scaffolding and relevance were sample of indicators enumerated to evaluated the students' attentiveness on science support instructions. Per observation from the results, the indicators number five and seven were perceived by the respondents to "undecided" with average weighted mean of 3.67 and 3.57 respectively, among all others indicators which are also all perceived to agree. The results implied that in spite of insufficient equipment in the laboratory, the teachers were creating a student-centered learning environment and builds strong relationships with the students that promote a safe and better environment in which students will be self-motivated and responsible.

**Table 3**

**Weighted Mean Rating Value on Students' Attentiveness on Science Support Instructions**

| Indicators | Weighted Mean | Interpretation |
|---|---|---|
| 1. Engage students in experiments and practical activities to enhance understanding of scientific concepts | 3.84 | Agree |
| 2. Encourage questioning, exploration, and critical thinking. Let students discover answers through investigation. | 3.72 | Agree |
| 3. Connect science to everyday life, showing how scientific principles apply to the world around them. | 4.00 | Agree |
| 4. Foster collaboration and group work to encourage discussion and shared problem-solving. | 3.72 | Agree |

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|---|---|---|---|
| 5. | Integrate relevant technology to enhance learning, whether through simulations, data analysis tools, or interactive resources. | 3.67 | *Undecided* |
| 6. | Emphasize clear communication of ideas, both in writing and verbally, to develop strong scientific literacy. | 3.39 | Agree |
| 7. | Use formative assessments to gauge understanding throughout the learning process, adjusting instruction as needed. | 3.57 | *Undecided* |
| 8. | Recognize and address diverse learning styles and abilities within the classroom. | 3.19 | Agree |
| 9. | Provide support and guidance gradually, allowing students to build on prior knowledge and skills. | 3.75 | Agree |
| 10. | Make sure the content is relevant and relatable to students' lives, sparking interest and curiosity. | 3.67 | Agree |
| | Average | 3.65 | Agree |

*Legend: 4.45-5.00, Strongly Agree; 3.45-4.44, Agree; 2.45-3.44, Undecided; 1.45-2.44 Disagree; 1.00-1.44, Strongly Disagree*

The results further suggest that teachers' practices range from structured science activities that target to build specific skills to be more flexible, gives exploratory activities that encourage creativity and critical thinking for the students which helps the students holistic growth. As can be noticed, the indicator number three, "Connect science to everyday life, showing how scientific principles apply to the world around them" ranked one with highest mean of 4.00. This implied that teachers undoubtedly, emphasized classroom management where teachers eliciting and responding to students' ideas, and maintaining high expectations for all students and assuring that at the end of every lesson student will appreciate the importance of science in their lives, whether there is a sufficient laboratory equipment or no.

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## CONCLUSION

The gather data signified that lack of availability of science laboratory facilities it is very difficult for the students to learned the science because it needs practice and not imaginary for them. The main reasons why students get behind on their academic performance in science because they find it boring if they only learned from books without applications. Students difficult to understand the lessons. Therefore, it is significant for the schools to have a science laboratory with updated equipment and make it available to the students. The practical part for the students is significant because it cultivates students' critical thinking to learn new knowledge and skills. The teachers also should continue to prioritize and emphasize the use of laboratory activities in science class by incorporating hands-on experiments and providing sufficient laboratory equipment and time for students to think and reflect on the concepts involved. Teachers can enhance students' understanding and enjoyment of science lessons depends on the teaching strategies that they may apply.

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