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Status of Science Laboratories in Secondary Basic Education Public Schools in the Division of Davao Del Sur, Philippines

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ABSTRACT

The science laboratory became a substantial learning environment for science education, especially in realizing the K–12 science curriculum's goals, which focus on applying and demonstrating scientific knowledge. Thus, this study aimed to determine the compliance rate of science laboratories in the division of Davao del Sur, Philippines based on DepEd Order No. 48 series of 2006 which entails the prescribed science laboratories in basic education and DepEd Order No. 118 series of 2009 which stipulates the science laboratory equipment and materials. The research examined six schools in three economic categories to assess their science laboratory compliance rate. This study involved creating four matrices containing the prescribed laboratory facilities, equipment, materials, and required quantities for each equipment and material. Results revealed that the compliance rate of the sampled schools in terms of their facilities is 69.04% (good), the equipment is 65.59% (good), the materials are 43.33% (fair), and the compliance with the required quantity is 50.39% (fair). Based on the result of the study, it can be concluded that some schools in the division of Davao del Sur are lacking with the prescribed science laboratory. Thus, it is recommended that the Department of Education, Davao del Sur division to conduct a general assessment of all secondary schools to determine the status of science laboratories' physical infrastructure, equipment, and materials.

INTRODUCTION

Science laboratories play a significant role in learning scientific concepts effectively. A laboratory is a learning environment where the students engage in groups or learn individually through observation, exercise, and practical experiments using materials and phenomena. It gives them chances to put into practice several theoretical concepts. Since the nineteenth century, the scientific laboratory learning environment has been a substantial component of science education (Nyutu *et al.*, 2021). It was affirmed by de Borja and Marasigan (2020), who considered laboratories the heart of science, wherein learners can perform the science concepts they learned. Even so, numerous public schools around the Philippines are confronted by a shortage of scientific equipment and materials and their laboratory facilities (Hadjiet *et al.*, 2020). Moreover, no systematic study that evaluated the status of Secondary Schools' Science Laboratory under the Davao del Sur Division in the Philippines. Hence, this study presented a picture of the status of this significant learning environment for Science Education.

Globally, several studies revealed the status of laboratories in different international universities. It was emphasized by An *et al.* (2019) that general chemistry laboratories should have the necessary equipment for the students to learn practical laboratory skills since laboratories are part of a science student's identity. But Bogusevski *et al.* (2020) argued that because of the limited budget and high maintenance conditions, public schools are prone to lack materials and equipment in their different laboratories, especially in science. Daba *et al.* (2016) added

that even with the acknowledgment of authors on how integral science laboratories are, inadequate materials and equipment are still observed. Research showed the low status of Wolaita Zones, Ethiopia in terms of science equipment and has indicated that laboratory furniture such as tables, cabinets, shelves, sinks, etc., were absent totally in some schools and are not properly setup in other high schools which do not support authentic teaching and learning in science (Zengele & Alemayehu, 2019). A study conducted by Gudyanga and Jita (2019) revealed that in South Africa, even with the effort to make a stronghold in science laboratories for physical sciences, they are still experiencing finite access to these materials.

Furthermore, in India it was found in the study of Pareek (2019) that science laboratories do not exist in most of their secondary schools. The inadequate and absence of laboratory chemicals, rooms, apparatuses, technicians, and well-organized laboratory manuals in public educational institutions negatively affects the learners' development (Beyessa, 2014). As for the laboratory facilities, Sidik *et al.* (2019) highlight that laboratories should have modern, clean, and high-quality tools to achieve learning satisfaction. Despite the poor condition of public schools in some countries, there are also those institutions that highly require and practice the use of science materials and equipment as stated by Kwok (2019) that Hong Kong and Taiwan have strict maintenance of laboratories as they value learning environment as an important factor of learning. In connection to that, Korshunov and Knyazeva (2020) pointed out the situation in Vietnam that there is a major need to invest not just in the integration of

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technology towards teaching but also in the physical science facilities in order to address learning gaps that the ongoing pandemic has brought.

In the Philippines, several studies showed the current status of science laboratories and the challenges science education faces. Gabunilas (2022) states that in developing countries such as the Philippines availability of adequate science laboratory tools remains a prevalent problem in many schools. HadjiAbas and Marasigan (2020) revealed in their research conducted in the public secondary schools of Lanao del Sur that the schools faced several issues regarding laboratory equipment, including defective tools and the lack of laboratory rooms. Furthermore, Noroña (2021) suggested that the education sector in the Philippines develop a laboratory resource management system for the interventions on common laboratory issues. According to Garcia *et al.* (2022), as they interviewed science major students about their experience in the absence of Science Laboratory Activities during online learning, it was concluded that the experience seemed like “finding light in the dark.” Moreover, Berame (2022) state that one of the challenges of Senior High School Students in doing science-related tasks during online Class is finding Science Laboratories. Students are deprived of the opportunity to be equipped by experience due to the unavailability of sci-lab.

In addition, de Borja and Marasigan (2020) revealed that teachers personally buy laboratory materials to address the common problem, or in some cases, YouTube videos are used for students to visualize the experiments related to their topic and to understand the concept better. In Cotabato City, Guiamalon and Hariraya (2021) highlighted the laboratory status in the Philippines, revealing that services and resources were adequate for the Laboratory High School in State Polytechnic College to maintain its excellent image regarding instructional supervision. The same study by de Borja and Marasigan (2020) revealed that teachers seek help from the government to address issues on the adequacy of laboratory equipment. Moreover, aside from the lack of laboratories for teaching science, there is also insufficiency in other labs, such as the physics lab, that are essential for Math-related strands (Mercado, 2020). Teachers in chemistry subject are facing difficulties as they lack the equipment for interactive teaching and resort to skipping some topics (Orbe *et al.*, 2018), and these actions hinder the cognitive and psychomotor abilities of the students (Noroña, 2021). Thus, educators in the current curriculum are having difficulty integrating specialized subjects in science teaching because of the current science laboratory status in the country.

With the aforementioned discussion, this study was created to assess the science laboratory status of the Department of Education in Davao del Sur, Philippines, specifically in the Division of Davao del Sur. The results of this study will raise awareness of science laboratories’ status and give the government light for their future programs and what they can contribute to the educational sector. Specifically, this would benefit (1) the Department of Education, Davao del Sur Division: the study gave them reports on the status of the science laboratory of the schools under their scope. The results of this study can be the basis for their future programs and reinforcements. (2) The Local Government Unit: this study would give them a bigger picture of the status of the basic education institutions of the province. (3) The school. Data gathered can be used to improve the quality of their school science laboratory. (4) Other researchers: results from this study can be a great source of literature for related studies.

Research Objectives

This study is guided by the following objectives;

1. To determine the status of science laboratory facilities in basic education, the Division of Davao del Sur, in accordance with the stipulated required sci-lab facilities in the DepEd Order No. 48. S. 2006.
2. To determine the status of science laboratories in basic education, the division of Davao del Sur in terms of the availability of the;
 - 2.2. Laboratory equipment.
 - 2.3. Laboratory materials.
3. To determine the availability of the required quantity of science laboratory apparatus in terms of their compliance with the Prescribed laboratory materials and equipment stipulated in DepEd Order no.118, s. 2009.

METHODOLOGY

Data Source

This study was conducted in the province of Davao del Sur, Philippines specifically in the Division of Davao del Sur. The province has nine (9) municipalities and one (1) component city (see Table 1 below). Basic Education public secondary schools within Davao del Sur are the target subject of this study. Department of Education (2022) revealed in their data that fifty-one (51) public secondary schools are in the province. Thirty-eight (38) of which offered Junior High School to Senior High School programs (Grade 7 - Grade 12); meanwhile, the rest thirteen (13) secondary schools only had Junior High School programs (Grade 7- Grade 10) (see table 1 below).

Table 1: Number of Secondary Schools in Davao del Sur Division

	Area	Classification	Number of Secondary Public School/s		
			Grade	Grade	Total
			7 - 10	7-12	
1	Bansalan	1 st Class	2	2	4
2	Digos City	Component City	4	6	10

3	Hagonoy	3 rd Class	-	3	3
4	Kiblawan	2 nd Class	-	7	7
5	Magsaysay	3 rd Class	3	6	9
6	Malalag	2 nd Class	-	1	1
7	Matanao	2 nd Class	1	3	4
8	Padada	3 rd Class	2	1	3
9	Sta. Cruz	1 st Class	1	6	7
10	Sulop	3 rd Class	-	3	3
Total			13	38	51

This study employed a technique known as purposive sampling. According to Obilor (2023), purposive sampling increases the degree of data collection by carefully selecting participants that are best for the study by dividing the population into clusters (schools in every municipality). Furthermore, the criteria for choosing the respondent's school include - (1) it should be a public secondary school in Davao del Sur, (2) It should belong to 1st Class to 3rd Class Municipality of Davao del Sur

- since the Component City falls in a separate division (3) it offers both Junior High School and Senior High School, and (4) it should have a science laboratory in the campus. From the data retrieved from the online database of DepEd, the researchers identified thirty-two (32) schools that passed the first and second inclusion criteria (see Table 1). The researchers choose two (2) schools in each municipality classification (see Table 2)

Table 2: Selected Schools and their Municipalities

Classification	Municipality	Codename of School	Short Description
1 st Class	Bansalan	School 1 (S1)	Composed of a large quantity of students as if they belong to the 1st class schools. Also, it is very organized based on their facilities and school rules and regulations.
	Sta. Cruz	School 2 (S2)	One of the first-class schools is based on its population and popularity among other schools. It highlights the standardization of students' quality learning.
2 nd Class	Malalag	School 3 (S3)	It belongs to the 2nd-class school and is highly competent when it comes to skills and talents that bring out students' confidence.
	Matanao	School 4 (S4)	This school is also in the 2nd class and produces top-notch students. Also, the schools highlight the students' performances.
3 rd Class	Magsaysay	School 5 (S5)	It is a remote school under the 3rd class that has only a small number of students considering its location and facilities.
	Hagonoy	School 6 (S6)	It belongs to a third-class municipality that catered a huge number of students in the province but despite its economic rank the facilities of the school are in good condition providing the students with quality education.

Instruments

This study used a self-made checklist in accordance with the following (1) First, the DepEd Order (D.O) No. 118 series of 2009 or the "Prescribing of the list of science and mathematics equipment (Department of Education, Philippines, 2009), laboratory glassware and consumables for all year levels of elementary and secondary education" (2) and the D.O no 48 s. 2006 (Department Of Education, Philippines, 2006) that contains the required science laboratory facilities in basic education in the Philippines. The mentioned D.O no 118 s. of 2009 contains all the required laboratory apparatus for secondary levels; it explicitly states all the instructional materials (I.M.) that should be found in the science laboratory for every field

of science (physics, chemistry, biology, and integrated science in general). Moreover, since it is a self-made checklist, two experts verified the developed checklist for appropriateness and relevance based on D.O no. 118 series of 2009 and D.O no. 48 s. 2006.

Design and Procedure

This study used a quantitative descriptive survey research design. Koh and Owen (2000) noted that descriptive research focuses on studying status, and education is one of the sectors where it is widely used. This study ought to evaluate the science laboratories to provide a picture of the current status of the public secondary school under the Davao del Sur Division. In addition, Salaria (2012)

added that descriptive research collects information about a specific situation to be used as descriptions and interpretations. In this study, the researchers evaluate the status of the science laboratory, and the best design to anchor our research objectives is through a descriptive survey. Furthermore, according to Story and Tait (2019), survey research provides evidence of practice, attitudes, and knowledge. In the quantitative descriptive study of Rebulanan and Samala (2021), they suggested upgrading the laboratory facilities in terms of quality and numbers as they aim to assess the factors that affect the academic performance of students in Science High School. In addition, a study by Pareek (2019) utilizes a descriptive survey design to explore the availability and utilization of science laboratories for teaching and learning science. Thus, this design was selected based on the literature and the study's objectives.

The data in this study are both from primary and secondary sources. The primary data are the information gathered by the researchers in the survey. On the other hand, secondary data are those references the researchers retrieved from the online database of DepEd (DepEd Orders). Furthermore, this study adhere to the following

steps in data gathering procedure (1) Making of the Checklist: researchers created the checklist as this study's primary tool per the research objectives mentioned above, (2) Validation by Experts: for ethical considerations and consistency (two (2) experts validate the checklist), (3) Asking permission to Conduct the Study: Researchers formally address a letter to the following — approval of the college dean, Research, Publication and Production Center (RPPC) of the University, and the Department of Education (DepEd) Division of Davao del Sur seeking approval to survey school premises, (4) School Visit to the Chosen Respondents: the researchers brought a formal letter addressed to the head of every school, asking for approval to survey as their science laboratory is the subject. (5) Survey Phase: once allowed by the school's head, researchers started to gather data for this study. (6) Retrieval of the research instrument: after the chosen respondents' survey, all the checklists were gathered for data analysis. In analyzing the data, the researchers used the evaluation scale adapted Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU) in their 2006 Edition of the evaluation instrument for accrediting secondary schools.

Table 3: Rating Scale

Percentage of Compliance	Indicators	Description
100%	Excellent	The provisions or conditions are extensive and are functioning excellently.
80-99%	Very Good	The provisions or conditions are moderately extensive and are functioning well.
60-79%	Good	The provisions or conditions are met and functioning adequately.
30-59%	Fair	The provisions or conditions are limited and functioning minimally.
0-29%	Poor	The provisions or conditions are limited and are functioning poorly.

Source: Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU)

Ethical Consideration

In conducting this study, the researchers adhere to the following ethical considerations: Permit to Conduct the Study: since the study is in line with science education, the researchers ensured that there is an approval letter from the Department of Education (DepEd) Davao del Sur Division office. Courtesy call to the Principal's Office: The researchers secured permission from the school head by giving the permission letter before conducting the data gathering. Informed Consent: The researchers explained to the lab-in-charge about the data to be gathered, how it would be gathered, and the study's overall purpose. Anonymity and Confidentiality: the school's identity shall remain anonymous unless otherwise asked by the higher authorities (e.g., DepEd Division Office). The data gathered shall be confidential, and no one shall have access to such but the concerned individuals (e.g., research coordinator, school heads, adviser). Only Assess relevant components: In gathering data, upon entering the science laboratory, the researchers shall avoid any unnecessary conduct of action throughout the stay in the laboratory. Also, the researchers shall observe carefully to

avoid destroying any laboratory apparatus.

RESULTS AND DISCUSSION

Status of Science Laboratory Facilities in Basic Education in the Division of Davao del Sur

Through a systematic and thorough evaluation of the laboratory facilities guided by the checklist, the data reveals that only five (5) among the six (6) responding school laboratories have an existing and functional science laboratory. One responding school hasn't had a functional science laboratory since October 2019 due to the destructive earthquake in Davao del Sur, Philippines. After the analysis, a compliance rate of 69.04% ("Good") among the selected schools was obtained indicating that the selected schools have adequately met the conditions of laboratory facilities based on the Department of Education Order no. 48 series of 2006. Moreover, among the indicators stipulated in D.O no. 48 series of 2006, Space, Ventilation, and Emergency Exit obtained a "Very Good" rating (% = 83.33; n = 5/6 schools), indicating that the average compliance rate of the selected schools has moderately and functioning laboratory facilities. This

is then followed by Storage Room and Availability of First Aid Kit which obtained a “Good” rating (% = 66.67, n = 4/6 schools) indicating that the average compliance of laboratory facilities of selected schools have adequately met the criteria. Lastly are the Provisions and Working Areas which obtained a “Fair” rating (% = 50.00; n = 3/6 schools) indicating that the compliance rate of these indicators are limited and functioning minimally.

It was revealed that the teaching and learning process in science education was directly influenced by the status of the science teaching facilities that includes science

laboratories (Kamba *et al.*, 2019). However, the result of the study supports the study of Mokoro (2020), which revealed that the not well-established science laboratory facilities are a common problem among developing countries. The responding schools only have one science laboratory for all disciplines. Furthermore, in some secondary schools in Calamba City (de Borja & Marasigan, 2020) and India (Pareek, 2019) revealed that in the there is no separate science laboratories for Biology, Physics, and Chemistry.

Table 4: Prescribed Science Laboratory School Facilities as per Department of Education Order no. 48, series of 2006.

Description of The Facilities	Schools						Average	Inter-Pretation
	S1	S2	S3	S4	S5	S6		
1. Space: The Science Laboratory should have a wide space to allow mobility inside the room.	/	/	/	x	/	/	5/6 (83.33%)	Very Good
2. Ventilation: The room should have bilateral fenestration for ventilation and fume extraction.	/	/	/	x	/	/	5/6 (83.33%)	Very Good
3. Emergency Exit: There should be at least 2 entry/exit doors for easy access and egress. The door should swing out to facilitate the exit of students in case of emergency.	/	/	/	x	/	/	5/6 (83.33%)	Very Good
4. Provisions: The sci-lab should have provisions for laboratory counter, control and storage room.	x	/	x	x	/	/	3/6 (50.00%)	Fair
5. Working Area: The laboratory/working tables inside the science laboratory should be fixed on the floor. It should be made of reinforced concrete with mosaic tiles topping. Each working table should be provided with laboratory sink and faucet.	/	/	x	x	x	/	3/6 (50.00%)	Fair
6. Storage Room: The storage room and control room should be equipped with built-in cabinets not higher than 1.90 meters.	x	/	/	x	/	/	4/6 (66.67%)	Good
7. Availability of First Aid Kit: Every science laboratory should be provided with first aid kit.	x	/	/	x	/	/	4/6 (66.67%)	Good
Total	4/7 (57.14%)	7/7 (100.00%)	5/7 (71.42%)	0/7 (0.00%)	6/7 (85.71%)	7/7 (100.00%)	69.04%	Good
	Fair	Excellent	Good	Poor	Very Good	Excellent		

Status of Science Laboratory in Basic Education in the Division of Davao del Sur in Terms of the Availability of Science Laboratory Equipment

Guided by the Collins dictionary definition, equipment is defined as a set of necessary tools in a building needed for scientific research (Collins, n.d). In addition, these are often reusable and designed for long-term use. Laboratory

equipment is categorized into four (4) following the Deped Order no. 118, series of 2009, these include equipment needed in Biology, Physics, and Chemistry classes, as well as those Integrated Science Equipment. Figure 2 shows the status of laboratory equipment in the secondary basic education of the province of Davao del Sur, Philippines. Results of the analysis revealed that as

for the compliant status of the selected schools in the prescribed laboratory equipment, the selected schools obtained a compliant status of 65.59% in all indicators. Meaning that the selected schools have adequate laboratory equipment. However, school 4 indicates a zero percentage in all indicators primarily because of a lack of a functioning laboratory due to the damage brought by an earthquake. On the other hand, schools 3 (90.73%), 5 (90.67%), and 6 (94.48%) obtained a “Very Good” laboratory equipment in all indicators, meaning that these schools have moderately extensive science laboratory equipment. Analysis revealed that some sampled schools don’t have the prescribed science laboratory equipment, and compliant status varies among schools in the Division of Davao del Sur. The findings of the study were supported by Hadji Abas and Marasigan (2020) that there is a lack of laboratory equipment in Lanao del Sur, Philippines indicating that this problem is not isolated to

the division of Davao del Sur alone.

Moreover, biology equipment received the highest compliant status as per D. O 118, s. of 2009, with an average of 74.31%, while physics equipment received the lowest compliant status, with an average of 61.39%. The study by de Borja and Marasigan (2020) revealed that in some public junior high schools in Calamba City, there is a shortage of laboratory equipment, especially in Physical Science, and Biological Science equipment was used for demonstration purposes only. Furthermore, the same study by Hadji Abas and Marasigan (2020) added that in Lanao del Sur, there is one school that does not have any basic biological science equipment and that the overall status of its laboratory equipment was not adequate for the number of students in each school. The study conducted by Bogusevski *et al.* (2020) highlights a prevalent challenge schools face: the need for more laboratory equipment.

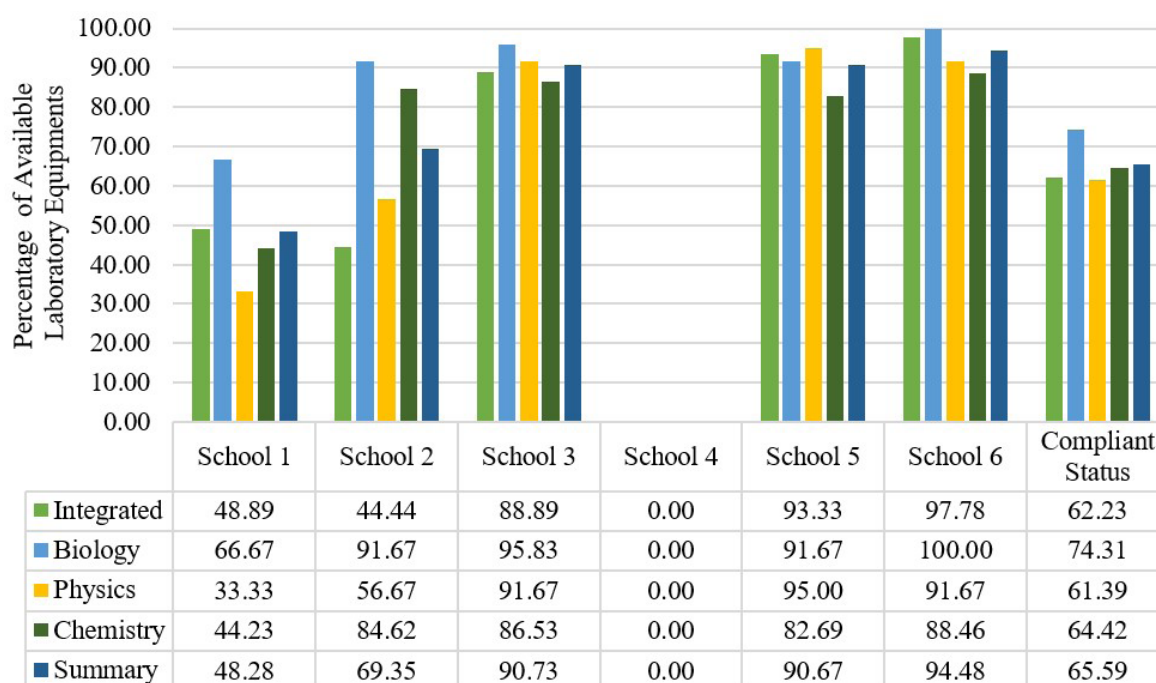


Figure 2: Status of Public Schools' Science Laboratory Equipment in Davao del Sur Division

Status of Science Laboratory in Basic Education in the Davao del Sur Division in Terms of the Availability of Science Laboratory Materials

Laboratory materials are those consumable materials used in the laboratory (Interreg Euro-Med, n.d.). Laboratory materials are categorized into four (4) following the DepEd Order no. 118, series of 2009; these include materials needed in Biology, Physics, and Chemistry classes, as well as those Integrated Science Equipment. Figure 3 shows the status of laboratory materials in the secondary basic education in the province of Davao del Sur, Philippines. Results of the analysis revealed that as for the compliant status of the selected schools in the prescribed laboratory materials, the selected schools obtained a compliant status of 43.33% in all indicators. Meaning that the selected schools have a limited supply of laboratory materials in

all indicators. However, school 4 indicates a zero (0%) percentage in all indicators primarily because this school lacks a functioning laboratory due to the damage brought by the earthquake. Schools 1 (13.48%) and 2 (24.12%) exhibit “Poor” compliance with laboratory materials. On the other hand, schools 3 (72.72%), 5 (73.45%), and 6 (76.18%) obtained a “Good” laboratory material in all indicators, meaning that these schools are somehow compliant with D.O no. 118, s. of 2009. Analysis revealed that some sampled schools don’t have and lack the prescribed science laboratory materials, and compliant status varies among schools in the Division of Davao del Sur.

Montefalcon and QuitanegAbaniel (2023) stated that inadequacy of laboratory materials was a common problem in Integrated Science; it was also revealed that

as a result of insufficient laboratory teaching materials in Amungan National High School, teachers improvised a laboratory material that they used in their experiments. Abidoeye *et al.* (2022) added that in their findings, there were neither basic science laboratories nor the necessary laboratory materials in most secondary schools. Moreover, data revealed that the average compliance rate of all indicators in the laboratory materials among the selected schools falls below 50%, meaning that there

is a very limited supply of laboratory materials in the division of Davao del Sur, Philippines. Materials needed in the field of Biology have the least number of available laboratory materials. According to Fauzi (2019), natural science courses, particularly those covering a wide range of biological sciences, frequently involve lab experiments. With this being said, the shortage of laboratory materials in these secondary schools can cause a gap in experiential learning gap.

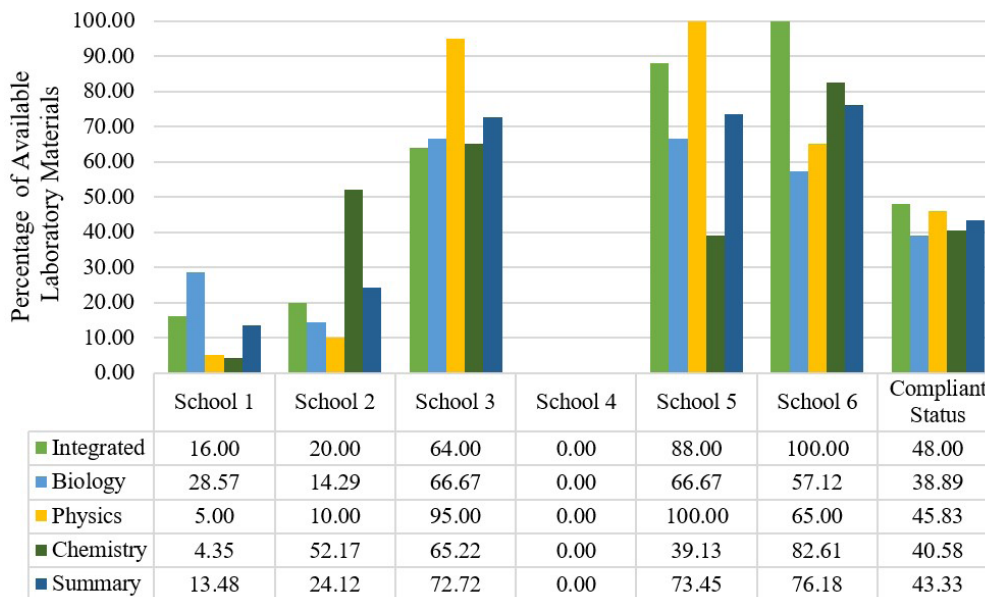


Figure 3: Status of Public Secondary Schools' Science Laboratory Materials in Davao del Sur Division

Status of Science Laboratory in Basic Education in Terms of Their Compliance on the Required Quantity Stipulated in the D. O 118 series of 2009

Figure 4 shows the required laboratory materials and equipment status in the basic education public secondary schools of Davao del Sur, Philippines. As for the quantity of both laboratory equipment and materials as per D.O

118, s. of 2009, data revealed that the average compliance rate of the sampled schools in the division of Davao del Sur is 50.39% meaning that it exhibits a fair supply of equipment and materials. As per analysis, school 4 (0%) don't have the necessary supplies, school 1 (35.71%) and school 2 (55.48%) exhibits a fair quantity, while school 6 (60.89%), 3 (71.87%), and 5 (74.40%) exhibits a good

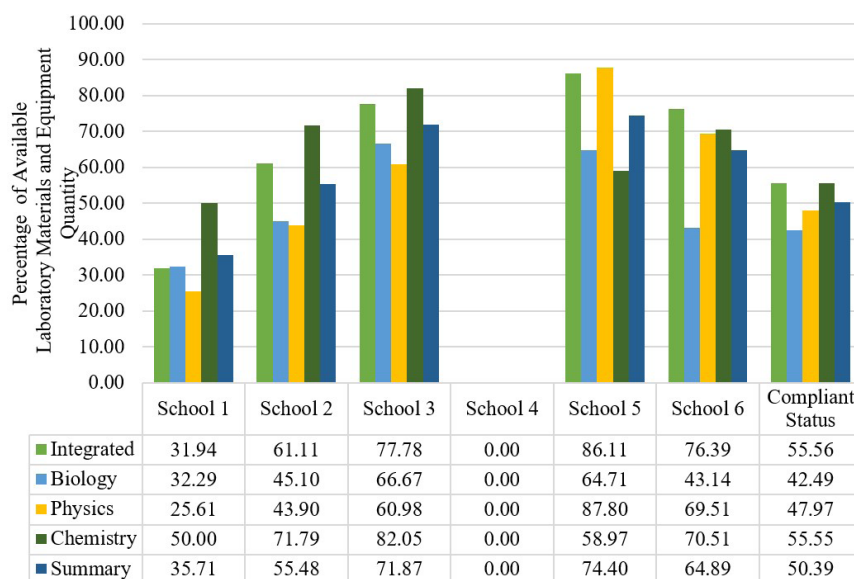


Figure 4: Status of Public School Science Laboratory in Davao del Sur in Terms of their Compliance to the Required Quantity of Each Laboratory Materials and Equipment Stipulated in the DO 118 s. 2009

quantities of equipment and materials. The conclusion drawn aligns with the broader context of financial constraints in public schools, as revealed by Ulla (2018). This shortage in the area of compliance highlights the lack of financial support, particularly in public schools. As for the quantities of laboratory equipment and materials per discipline, integrated (55.56%) and chemistry disciplines (55.55%) obtained the highest percentage compliance rate as per D.O 118 series of 2009, while biology (42.49%) obtained the lowest compliance rate. In addition, the laboratory holdsequal importance to theory; nevertheless, inadequately equipped laboratory facilities, equipment, and materials impact students' ability to learn (Kapilan et al., 2021).

CONCLUSION

The data in this study provided a comprehensive overview of the status of science laboratories among selected public secondary schools under the Davao del Sur Division. Evidently, the unforeseen destructive phenomena that struck the province affected the educational sector, especially the science laboratory building of School 4. The effect of the earthquake is clearly evident since the school doesn't have the necessary science laboratory, equipment, and materials as per D.O no. 48, s. 2006 and D.O. no. 118, s. 2009. As for other schools (schools 1, 2, 3, 5, 6), the physical structure of the science laboratory is evident; however, even though these schools have a functioning science laboratory, some indicators of a good science laboratory are non-compliant. These include noncompliance with provisions (schools 1 & 3), working areas (schools 3 & 5), storage rooms (school 1), and availability of first aid kits (school 1). Data further reveals a variation in the acquisition of laboratory equipment, materials, and quantities among schools in the division of Davao del Sur. Some schools acquired more science laboratory equipment and materials than others, indicating variations in science laboratory properties among schools. As for compliance with laboratory equipment, the biology discipline obtains the highest percentage, while the physics discipline obtains the lowest percentage of compliance. The integrated materials obtain the highest percentage for the available science laboratory materials, while biology materials obtain the lowest percentage of compliance. This is also similar to the compliance rate of science laboratory equipment and materials quantity that integrated obtains the highest percentage along with chemistry while biology discipline obtained the lowest. Thus, based on the result of the study, it can be concluded that the compliance rate of science laboratory equipment, materials, and its quantities per discipline (integrated, biology, chemistry, physics) varies among schools. These variations also vary, with some schools attaining more than 50% compliance rate while other schools attained less than 50%.

RECOMMENDATIONS

In consideration of the study's findings and conclusions,

the following recommendations are presented; (1) The Department of Education - Davao del Sur division must conduct a general assessment to all science laboratories in the secondary basic education; (2) the Department of Education (DepEd) may partner with Higher Education Institutions (HEI's) or other industries to adopt a nearby school program to alleviate the difficulty in building a science laboratory and purchasing laboratory apparatuses and materials; and (3) To alleviate the lacking science laboratory equipment and materials, DepEd teachers and researchers may create or find substitute materials with the same purpose of those lacking equipment and materials provided that it undergoes validation and reliability testing.

REFERENCES

- Abidoye, F., Adebisi, A. M., Rihanat, A. A., & Aliyu, M. Z. (2022). Availability Of Laboratory Facilities On Students' Performance In Upper Basic Schools In Kwara State, Nigeria. *International Journal of Educational Research Review*, 7(4), 262–267. <https://doi.org/10.24331/ijere.1151372>
- An, J., Poly, L. P., & Holme, T. A. (2019). Usability testing and the development of an augmented reality application for laboratory learning. *Journal of Chemical Education*, 97(1), 97-105. <https://doi.org/10.1021/acs.jchemed.9b00453>
- Berame, F. J. V. (2022). Struggles of Senior High School Students in Doing Science-related Tasks. *International Journal of Advanced Multidisciplinary Studies*, 2(5). <https://www.ijams-bbp.net/wp-content/uploads/2022/05/IJAMS-MAY-68-80.pdf>
- Beyessa, F. (2014). Major Factors that Affect Grade 10 Students' Academic Achievement in Science Education at Ilu Ababora General Secondary of Oromia Regional State, Ethiopia. *International Letters of Social and Humanistic Sciences*, 32, 118–134. <https://doi.org/10.18052/www.scipress.com/ILSHS.32.118>
- Bogusevski, D., Muntean, C., & Muntean, G. M. (2020). Teaching and Learning Physics using 3D Virtual Learning Environment: A Case Study of Combined Virtual Reality and Virtual Laboratory in Secondary School. *Journal of Computers in Mathematics and Science Teaching*, 39(1), 5–18. <https://www.learnedtechlib.org/primary/p/210965/>
- Collins. (n.d.). Laboratory Equipment. Retrieved from <https://www.collinsdictionary.com/dictionary/english/laboratory-equipment>
- Daba, T. M., Anbassa, B., Oda, B. K., & Degefa, I. (2016). Status of Biology Laboratory and Practical Activities in Some Selected Secondary and Preparatory Schools of Borena Zone, South Ethiopia. *Educational Research and Reviews*, 11(17), 1709–1718. 10.5897/ERR2016.2946
- De Borja, J. M. A., & Marasigan, A. C. (2020). Status of Science Laboratory in a Public Junior High School. *International Journal of Research Publications*, 46(1). <https://ijrp.org/paper-detail/959>

- Department of Education, Philippines. (2006). Deped Order No. 48, S. 2006: Observance of Safety Measures in Science Laboratories. Retrieved from <https://www.deped.gov.ph/2006/11/30/do-48-s-2006-observance-of-safety-measures-in-science-laboratories/>
- Department of Education, Philippines. (2009). Deped Order No. 118, S. 2009: Prescribing the List of Science and Mathematics Equipment, Laboratory Glassware and Consumables for all Year Levels of Elementary and Secondary Science Subjects. Retrieved from <https://www.deped.gov.ph/2009/12/15/do-118-s-2009-prescribing-the-list-of-science-and-mathematics-equipment-laboratory-glassware-and-consumables-for-all-year-levels-of-elementary-and-secondary-science-subjects/>
- Fauzi, A. (2019). Profile of Junior High School Students' Critical Thinking Skills in Answering Questions Related to Biological Concepts. *Scientiae Educatia*, 8(1), 51. <https://doi.org/10.24235/sc.educatia.v8i1.4081>
- Gabunilas, L. M., Santos, K. J. M., Buar, C. L., Castillo, J. M. L., & Pili, U. B. (2022). Improvising an apparatus for teaching sound waves using smartphones. *Physics Education*, 58(1), 015014. <https://doi.org/10.1088/1361-6552/ac9efb>
- Garcia, J., Uluan, A. Y., Barat, I. J., Lubay, J. N., Macagba, I., & Mahinay, H. (2022). Lived Experiences of Science Major Students in the Absence of Laboratory Activities. *American Journal of Education and Technology*, 1(2), 75–82. <https://doi.org/10.54536/ajet.v1i2.513>
- Gudyanga, R., & Jita, L. C. (2019). Teachers' implementation of laboratory practicals in the South African physical sciences curriculum. *Issues in Educational Research*, 29(3), 715–731. <https://www.iier.org.au/iier29/gudyanga.pdf>
- Guiamalon, T. S., & Hariraya, P. G. (2021). The k-12 senior high school programl: The case of laboratory high school, cotabato city state polytechnic college, south central Mindanao, Philippines. *IJASOS-International E-journal of Advances in Social Sciences*, 7(19), 391-399. <https://doi.org/10.18769/ijasos.820171>
- Hadji Abas, H. T., & Marasigan, A. P. (2020). Readiness of science laboratory facilities of the public junior high school in Lanao Del Sur, Philippines. *IOER International Multidisciplinary Research Journal*, 2(2). <https://ssrn.com/abstract=3606078>
- Interreg Euro-Med. (n.d).FAQ - Project Budget. <https://interreg-euro-med.eu/en/faq-document/in-the-equipment-costs-section-what-is-the-difference-between-laboratory-materials-and-machines-and-instruments-can-laboratory-materials-be-understood-as-current-lab-consumables-e-g-glassw/>
- Kamba, A. H., Libata, I. A., & Usman, A. (2019). Lack of Availability of Science Teaching Facilities on Students Teaching and Learning Science in Some Selected Secondary Schools in Kebbi State. *Journal of Advances in Education and Philosophy*. <https://doi.org/10.21276/jaep.2019.3.7.1>
- Kapilan, N., Vidhya, P., & Gao, X.-Z. (2021). Virtual Laboratory: A Boon to the Mechanical Engineering Education During Covid-19 Pandemic. *Higher Education for the Future*, 8(1), 31–46. <https://doi.org/10.1177/2347631120970757>
- Koh, E. T., & Owen, W. L. (2000). Descriptive Research and Qualitative Research. In *Introduction to Nutrition and Health Research* (pp. 219–248). Springer US. https://doi.org/10.1007/978-1-4615-1401-5_12
- Korshunov, A. V., & Knyazeva, E. M. (2020). Problems of digital transformation of laboratory practicum during teaching of natural science disciplines. *Journal of Physics: Conference Series*, 1691(1), 012109. <https://doi.org/10.1088/1742-6596/1691/1/012109>
- Kwok, P. W. (2019, June). Science laboratory learning environments in junior secondary schools. In *Asia-Pacific Forum on Science Learning & Teaching* (Vol. 16, No. 1). https://www.eduhk.hk/apfslt/download/v16_issue1_files/kwokpw.pdf
- Mercado, J. C. (2020). Development of Laboratory Manual in Physics for Engineers. *International Journal of Science and Research*, 9(10), 200-210. <https://files.eric.ed.gov/fulltext/ED608900.pdf>
- Mokoro, D. K (2020). Adequacy of Laboratory Facilities for Effective Implementation of Competence-Based Curriculum in Public Secondary Schools in Arumeru District, Tanzania. *East African Journal Of Education And Social Sciences*, 1(2), 141–149. <https://doi.org/10.46606/eajess2020v01i02.0029>
- Montefalcon, E. L., & QuitanegAbaniel, A. (2023). Improvised Science Laboratory Materials: Its Effectiveness In Acid-Base Experiment Of Grade 7 Students Of Amungan National High School. *International Journal of Research Publications*, 123(1). <https://doi.org/10.47119/IJRP1001231420234713>
- Noroña, R. V. (2021). A Comparative Analysis on the Status of Laboratory Resources And Science Process Skills of Grade 11 Learners in The Schools Division of Eastern Samar, Philippines. *GNOSI: An Interdisciplinary Journal of Human Theory and Praxis*, 4(3), 137-147. Retrieved from <https://www.gnosijournal.com/index.php/gnosi/article/view/135>
- Nyutu, E. N., Cobern, W. W., & Pleasants, B. A-S. (2021). Correlational study of student perceptions of their undergraduate laboratory environment with respect to gender and major. *International Journal of Education in Mathematics, Science, and Technology (IJEMST)*, 9(1), 83-102. <https://doi.org/10.46328/ijemst.1182>
- Obilor, E. I. (2023). Convenience and purposive sampling techniques: Are they the same. *International Journal of Innovative Social & Science Education Research*, 11(1), 1-7. <https://seahipaj.org/journals-ci/mar-2023/IJISSER/full/IJISSER-M-1-2023.pdf>
- Orbe, J. R., Espinosa, A. A., & Datukan, J. T. (2018). Teaching Chemistry in a Spiral Progression Approach: Lessons from Science Teachers in the Philippines. *Australian Journal of Teacher Education*, 43(4). Retrieved from <http://ro.ecu.edu.au/ajte/vol43/iss4/2>

- Pareek, R. B. (2019). An assessment of availability and utilization of laboratory facilities for teaching science at secondary level. *Science Education International*, 30(1). <https://files.eric.ed.gov/fulltext/EJ1209309.pdf>
- Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU). Evaluation Instrument for Accrediting Secondary Schools. (2006) Edition. Retrieved from <https://paascu.org.ph/wp-content/uploads/2021/02/Evaluation-Instrument-for-High-School.pdf>
- Rebulanan, M., & Samala, H. (2021). Learning Science: Factors and its Relation to Academic Performance. *European Online Journal Of Natural And Social Sciences*, 10(4), pp. 629-638. Retrieved from <https://european-science.com/eojnss/article/view/6278>
- Salaria, N. (2012). Meaning of the term descriptive survey research method. *International Journal of transformations in business management*, 1(6), 1-7. Retrieved from https://ijtbm.com/admin/upload/Apr_2012_NEERU%20SALARIA%202.pdf
- Sidik, W., Sunardi, & Supriyanto. (2019). Importance-Performance Analysis and Student Satisfaction Index on Laboratory Services in the Faculty Mathematics and Natural Sciences, Universitas Jenderal Soedirman. *IOP Conference Series: Earth and Environmental Science*, 255, 012031. <https://doi.org/10.1088/1755-1315/255/1/012031>
- Story, D. A., & Tait, A. R. (2019). Survey research. *Anesthesiology*, 130(2), 192-202. <https://doi.org/10.1097/ALN.0000000000002436>
- Ulla, M. B. (2018). Benefits and challenges of doing research: Experiences from Philippine public school teachers. *Issues in Educational Research*, 28(3), 797-810. <https://eric.ed.gov/?id=EJ1188073>
- Zengele, A. G., & Alemayehu, B. (2019). The Status of Secondary School Science Laboratory Activities for Quality Education in Case of Wolaita Zone, Southern Ethiopia. *Journal of Education and Practice*, 7(31), 1-11. <https://eric.ed.gov/?id=EJ1122534>