

MANAGEMENT OF SCHOOL ENVIRONMENTAL HAZARDS FOR CONDUCTIVE AND SUSTAINABLE LEARNING ATMOSPHERE IN PUBLIC SENIOR SECONDARY SCHOOLS IN RIVERS STATE

¹ADERIYE PRECIOUS CHITURU, PhD & ²HOMAME B. ATATA, PhD

¹Department of Educational Management, Faculty of Education, University of Port Harcourt

²Department of Business Education, Faculty of Education, University of Port Harcourt.

aderiyeprecious31@gmail.com homame.atata@uniport.edu.ng

Abstract

The study examined the management of school environmental hazards for conducive and sustainable learning atmosphere in public secondary schools in Rivers State. Three objectives with corresponding research questions and hypotheses were answered and tested in the study, respectively. The design of the study was descriptive survey with the population of 6,153 academic staff in 320 public senior secondary schools in Rivers State, from which 615 (10%) were selected as sample, using the proportionate stratified random sample sampling technique. Respondents responded to a validated 57 item instrument titled: Management of School Environmental Hazards for Conducive and Sustainable Learning Atmosphere in Public Senior Secondary Questionnaire (MSEHCSLAPSSQ) designed by the researcher after the modified 4-points Likert scale model, with a reliability index of 0.89, obtained using Cronbach Alpha statistics. Mean and standard deviation were used in answering the research questions while z-test was used in testing the hypotheses at 0.05 level of significance. The findings of the study showed that school environmental hazards are managed using combination of administrative and curricular strategies which involves students, teachers, administrators and the community. The study also established that there is a significant difference between the mean ratings of the respondents on the ways chemical, biological and physical hazards are managed for sustainable conducive learning atmosphere in secondary schools in Rivers State. The study concluded appropriate management of school environmental hazards among them chemical, biological, physical, guarantees sustainable conducive learning atmosphere in Secondary School in Rivers State. Consequently, it was recommended among others that stakeholders in school administration should continue to use the identified strategies in managing chemical hazards while also exploring more strategies to ensure the sustainability of school atmosphere for learning.

Keywords: School Environmental Hazards, Conducive, Sustainability Learning Atmosphere

Introduction

The broad aim of education in Nigeria is to prepare the individual for useful living within the society (FRN, 2014). Thus, useful living in this context entails self-reliance. In line with these broad educational aims, one of the specific objectives of education in Nigeria is to provide technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development. However, several years after adoption of this laudable initiative, the need to prepare individuals for useful living within the society prove abortive due to several factors like unsustainable learning atmosphere necessitated by environmental hazards. The possibility of achieving the aforementioned objectives depends on the structure of the learning atmosphere. The learning atmosphere which includes the human and material components of the school contribute significantly to the attainment of the goals and objectives of education. According to Adejumo (2021), there is no doubt that a safe and conducive learning atmosphere is instrumental to the achievement of quality educational goals and objectives. This is because when the atmosphere is conducive, it serves as a motivating factor to all school users and encourages them to pursue their individual and collective educational expectations. In the same manner, an unsafe learning atmosphere can hinder the accomplishment of pre-determined educational goals and objectives.

Consequently, a sustainable learning atmosphere is one in which the learning needs of the present students and other educational stakeholders are met without jeopardizing the educational prospect of future learners

and stakeholders. This can however be achieved when conscious efforts are made to protect the school atmosphere or environment from deterioration and collapse (Adejumo, 2021). Education scholars have adopted different indicators to determine if the sustainability of the learning atmosphere across different levels of education. There is a school of thought that believes that the learning space available to teachers and students goes a long way to determine the sustainability of the learning atmosphere in schools. However, others believe that the school design as well as government expenditure to education is a better indicator for the sustainability of the learning environment. However, Elseragy, Elnokaly and Gabr (2011) summarize all of these positions by pointing out that indicators to sustainable learning atmosphere to include: supporting the widest range of teaching and learning strategies, safeguarding the well-being of children, removing barriers to concentration, communication and information, paving the way to creative, productive and innovative learning, strengthening the communities they serve as well as flexibility and responsiveness to future changes in demand and in learning and teaching. These indicators help in the clarification of the sustainability of learning atmosphere at any level of education.

Nevertheless, despite the importance of education and concerted effort by so many educational stakeholders, it has been observed that there are diverse environmental hazards that are witnessed within the school that threatens the conduciveness of the learning atmosphere of the school for meeting its educational goals and objectives (Larry-Coker, 2024). In the course of human curricular and co-curricular activities in the school, hazardous substances have been discharged in the atmosphere which impends the safety of teachers, students and other school users which can distort the actualization of educational goals in the school if not properly checked. These threats are sometimes referred to as school environmental hazards. Secondary schools in Nigeria are experiencing change and innovations from time to time which are brought about by different educational practices that teachers and students may not be so familiar with (Adejumo, 2021). Therefore, in the process of navigating through all of these activities, teachers and students expose themselves to different forms of environmental hazards which makes it impossible to maintain quality and sustainable learning atmosphere established for meeting secondary educational goals and objectives.

Environmental hazards are events or occurrences arising from interactions between natural, social and technological systems of the environment which are harmful to people and their possessions (Cutter, 2017). They are elements of the physical environment such as the school which are threats to persons in the school caused by forces extraneous to them. Similarly, they are also regarded as any agent that makes someone or something vulnerable and has the possibility of leading to a loss. Therefore, school environmental hazards can be regarded as any school practice or event that can make any of the school users vulnerable to danger or loss. School environmental hazards can therefore take diverse forms since diverse activities are carried out in the school aside teaching and learning such as discipline and moral development and there are diverse events along the line that can create harm and danger to teachers, students and other school stakeholders alike (Adejumo, 2021).

Environmental hazards are categorized into natural and man-made. Natural hazards result from natural conditions and sometimes products of negative consequences of interactions between man and nature. Man-made hazards are caused by physical, chemical, biological and technological operations of man. They are the usual consequences of high urbanization and industrialization. Some examples of these hazards include earthquakes, hurricanes, floods, tornadoes, tsunamis, land degradation, pollution, desertification, deforestation, wild-land fires, and loss of biodiversity (Daramola & Odunsi, 2016). The effects of environmental hazards at any location are devastating considering the disaster cases experienced in the world. It renders on teachers and students; whipping, fatal injuries causing puncture, broken or complete loss of body parts, burns, eye and hearing impairment, respiratory and gastrointestinal illnesses, fever and headaches from excessive heat in the schools. Such hazards may lead to physical and mental disabilities of teachers, students and other school users, and without the access to basic health, and other social services, a denial of their rights decreases productivity and chances of having conducive atmosphere for teaching and learning.

In Nigeria, school environmental hazards are caused by poor and unhealthy activities of school users such as the students, teachers, principals and many others. These activities include, deforestation, emission of carbon or gases in the air, noisy generator set, open site dumps, unkempt waste disposal facilities, overgrown lawns, open drainages, location and conditions of sanitary facility, and indoor cooking for boarding school and many more. The related risks to such unhealthy activities comprise air quality reduction, offensive odour, food poison, breeding of disease vectors, physical injuries and many more. Therefore, school environmental hazards can be regarded as any school practice or event that can make any of the school users in the school vulnerable to danger or loss. School hazards take place in diverse methods since diverse activities are carried out in and outside the school environment. According to Wallace (2014), school environmental hazards can take different forms among which are chemical, biological and physical.

Chemical hazards are often regarded as health and safety issues because in most cases they can be transmitted by air which makes it difficult to be controlled in the event of a chemical hazard outbreak. It has to do with the release of toxic chemicals in our environment, which if not properly controlled can pose a health threat to all inhabitants of the school resulting to unstable and unhealthy teaching and learning atmosphere. Some of these chemical hazards are methanol, glues, pesticides, disinfectant paints, drugs, degreasers, carbon monoxide, etc.

Biological hazards refer to the introduction of organisms or organic matter produced by these organisms into the school environment wither through direct or indirect contact. Biological hazards occur or are often transmitted through viruses, bacteria or fungi which people come in contact with in the course of carrying out their educational activities. These hazards are often infectious and as such can be contacted either directly or indirectly. When biological hazards are allowed in the school, they make the school learning environment to be a health trap to all school users and this can hinder the execution of important school activities. Some of them include; fungi, viruses, parasites, bacteria, pathogens and many more.

Lastly, physical hazards are agents, factors or circumstances that threaten individual's safety. Physical hazards take place in school as a result of the way and manner in which materials outside and within the school are handled. This type of hazard can be seen and felt and as such are often perceived as hazards that may harm the human body whether or not there is a physical contact. Some examples of this hazard radiation, noise, heat, cold and vibration.

These types of hazards can affect the conduciveness of the school atmosphere for sustainable learning because the disorganization created will continue to pose a threat to school users if not properly managed. Management is often seen as the practice of controlling people and resources in such a way that they contribute to the goals and objectives of an organization such as the school. It involves every activity carried out by the heads of departments in the organization to ensure the smooth administration of the organization as a system. Thus, management of school environmental hazards is the process of creating conducive and proper internal environment in the school. It can be likened to the efforts which are to be made to protect the atmosphere where students learn and teachers teach to ensure it is free from hazards that may put the school at risk (Henry, 2016). According to Netshitahamen and Van (2020), they are the steps taken to secure the learners, educators and other school users from being distracted in the daily routine of the school, both physically and psychologically by the use of various awareness programmes and strategies. Kwa (2017) noted that creating a sustainable conducive learning atmosphere is as important as what is taught and shared. Hence, it is on this premise that this study souht to examine the management of school environmental hazards for sustainable conducive learning atmosphere in public senior secondary schools in Rivers State.

Statement of Problem

In Nigeria, millions of children as students and adults as school staff spend a significant portion of their time and days in school buildings and environment. Many of these buildings are old, in poor condition, and may show environmental conditions that pose increased risks to the health of students and staff. It has been observed by well-meaning individuals in Rivers State that there is a growing level of environmental threat to teachers, students and other school users arising from human activities in the schools. These activities have exposed students and teachers and other school users to life threatening conditions arising

laboratory and agricultural activities, dumping of renewable and non-renewable waste products, land degradation, pollution, desertification, deforestation, wild-land fires, and loss of biodiversity.

This has resulted in rising cases of burns, eye and hearing impairment, respiratory and gastrointestinal illnesses, fever and headaches from excessive heat in the schools, physical and mental disabilities and without the access to basic health, fatigue among teachers and students, absenteeism from school, disease outbreak and spread of communicable and non-communicable diseases and other social services. This salient threat to school activities has been left unattended to over a long period of time. It then appears that the school principals and teachers who mind these schools have no solution to the ways some of these hazards can be managed which has contributed to rising cases of ill health among teachers and students and has led to life threatening conditions since it has been left unchecked. Hence, this situation prompted this study, which focuses on management of school environmental hazards for sustainable conducive learning atmosphere in public senior secondary schools in Rivers State.

Aim and Objectives of the Study

The aim of this study was to examine the management of school environmental hazards for sustainable conducive learning atmosphere in public senior secondary schools in Rivers State. Specifically, the study sought to:

- i. determine the ways chemical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.
- ii. ascertain the ways biological hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.
- iii. identify the ways physical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

Research Questions

The following research questions were raised to guide the study:

- i. In what ways can chemical hazards be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State?
- ii. In what ways can biological hazards be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State?
- iii. In what ways can physical hazards be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State?

Hypotheses

The following corresponding hypotheses will be tested at 0.05 level of significance:

- i. There is no significant difference between the mean ratings of principals and teachers on the ways chemical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.
- ii. There is no significant difference between the mean ratings of principals and teachers on the ways biological hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.
- iii. There is no significant difference between the mean ratings of principals and teachers on the ways physical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

Methodology

This study adopted a descriptive survey design. The population consisted of all 6,153 academic staff (320 principals and 5,833 teachers) in 320 public senior secondary schools in Rivers State. Source: Rivers State Senior Secondary Schools Board, January, 2024. The sample size was 615 respondents representing 10% of the entire population. Nwane in Kpee (2015) considered such percentage appropriate to serve as an acceptable sample for a population running into thousands. Proportionate stratified sampling technique

was used to select schools from 6 Local Government Areas spread across 3 Senatorial District in Rivers State (i.e. Rivers South-East, Rivers West and Rivers East), where respondents were drawn for equal representation. The instrument used for data collection was a questionnaire. The questionnaire was developed by the researcher and it was titled: Management of School Environmental Hazards for Sustainable Conducive Learning Atmosphere in Public Senior Secondary Questionnaire (MSEHSLAPSSQ). It consisted of Sections A and B. Section A deals with demographic information of the respondents while Section B deals with variables from the research questions which were used to elicit information from the respondents. The items are structured after the modified four-point Likert type rating scale of Strongly Agreed (SA) = 4 points, Agreed (A) = 3 points, Disagreed (D) = 2 points and Strongly Disagreed (VLE) = 1 point, respectively. The reliability of the instrument was determined through Cronbach alpha which yielded an index of 0.89. As part of data collection, the researcher designed and distributed 615 copies of questionnaire to the respondents. Five hundred and eighty-four (584) copies were retrieved and found suitable for analysis resulting in 94% return rate. Data collected from the study were analyzed using mean and standard deviation statistics to answer two research questions, while z-test was used to test two null hypotheses at 0.05 level of significance. 2.50 criterion mean served as means of decision. Any mean item that is less than 2.50 was rejected and any mean item greater than the 2.50 was accepted.

Results and Data Analysis

Research Question One: In what ways can chemical hazards be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State?

Table 1: Mean and Standard Deviation Ratings on the Ways Chemical Hazards can be Managed for Sustainable Conducive Learning Atmosphere in Secondary Schools in Rivers State

S/No	Items	Principals N = 78			Teachers N = 506			Mean Set	
		Mean	$\bar{X}_1$	SD	Mean	$\bar{X}_2$	SD	$\bar{X}$	Decision
1	Labeling chemicals using the right symbols reduces the risk of chemical hazard in schools	3.29		0.94	3.17		1.03	3.23	Agreed
2	Labeling chemicals using the right signs reduces the risk of chemical hazard in schools	3.31		0.93	3.19		1.02	3.25	Agreed
3	The storage of chemicals in the right shelf limits the possibility of chemical hazard	3.00		0.94	3.02		0.94	3.01	Agreed
4	The storage of chemicals under the right condition limits the possibility of chemical hazard	2.99		0.97	2.92		0.96	2.96	Agreed
5	Assigning chemical attendants to laboratories can help reduce exposure to chemical hazard	3.11		0.96	1.90		0.88	2.51	Agreed
6	Providing chemical safety data sheets in all chemical laboratories in the school is a way of reducing chemical hazard	3.16		0.95	3.13		1.26	3.15	Agreed
7	Providing first aid equipment in all locations where chemicals are being used reduces the danger of chemical hazard	3.32		0.97	3.02		0.94	3.17	Agreed
8	Disposing waste chemicals at specific designated disposal points protects school members from chemical hazard	1.60		1.13	1.53		0.67	1.57	Disagreed
9	Keeping inflammable substances away from high temperature zone is a way of limiting chemical hazard in schools	3.05		1.01	2.05		1.02	2.55	Agreed
	Average Grand Mean/Standard Deviation	2.85		0.99	2.56		0.94	2.71	Agreed

Data on Table 1 show that item 1, 2, 3, 4, 5, 6, 8 and 10, had weighted mean ratings above the criterion mean ratings above the criterion mean of 2.50 and were agreed on as the ways chemical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State. Differently, item 9 had mean ratings below the criterion mean of 2.50 and were denied agreement as the ways chemical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

In summary, with an aggregate weighted mean of 2.71 above the criterion mean of 2.50, the respondents agreed that the ways chemical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State include: labeling chemicals using the right symbols, labeling chemicals using the right signs, storing chemicals using the right shelf limit, storing chemicals order the right conditions, assigning chemical attendants to laboratories, providing chemical data sheet in all chemical points, providing first aid equipment, disposing waste chemicals at specific points, keeping inflammable chemicals away from high temperature zones.

Research Question Two: In what ways can biological hazards be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State?

Table 2: Mean and Standard Deviation Ratings on the Ways Biological Hazards can be Managed for Sustainable Conducive Learning Atmosphere in Secondary Schools in Rivers State

S/No	Items	Principals N = 78		Teachers N = 506		Mean Set	
		Mean $\bar{X}_1$	SD	Mean $\bar{X}_2$	SD	$\bar{X}$	Decision
10	Compulsory regular hand washing by school members after exposure to biological hazard	2.94	1.01	2.99	0.99	2.97	Agreed
11	Provision of sanitizing agents on regular basis by all school members reduces exposure to biological hazard	2.91	1.00	2.09	1.15	2.50	Agreed
12	The use of sanitizing agents on regular basis by all school members	2.98	1.01	2.96	0.99	2.97	Agreed
13	Sterilizing biological tools makes for easy control of biological hazard	2.96	1.02	2.83	1.35	2.90	Agreed
14	Identification of source of contamination limits exposure of school members to biological hazard	3.27	1.09	2.24	1.09	2.76	Agreed
15	Elimination of source of contamination limits exposure of school members to biological hazard	2.90	1.02	3.01	0.97	2.96	Agreed
16	The use of ultraviolet lamps to help in containing the spread of biological hazard	1.81	0.96	1.62	0.85	1.72	Disagreed
17	Compulsory use personal protective equipment when handling any organism by school members	3.20	1.11	1.92	1.04	2.56	Agreed
18	Provision of biological hazard rubbish bags at all strategic points in the school to control biological hazard	1.81	0.96	3.04	1.07	2.43	Disagreed
Grand Mean and Standard Deviation		2.75	1.02	2.52	1.06	2.64	Agreed

Data on Table 2 show that items 10, 11, 12, 13, 14, 15 and 17 had mean ratings above the criterion mean of 2.50 and were adjudged as the ways biological hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State. Differently, item 16 and 18, had mean ratings below the criterion mean of 2.50 and were disagreed on as the ways biological hazards can be managed in secondary schools in Rivers State.

In summary, with an aggregate weighted mean of 2.64, above the criterion mean of 2.50, the respondents agree that the ways can biological hazards be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State are compulsory hand washing for all members, regular provision of sanitizing agents, the use of sanitizing agents, sterilization of biological tools, identification of source of contamination, elimination of sources of contamination, the use of ultra violet lamps, use of personal protective equipment and provision of biological hazards bags.

Research Question Three: In what ways can physical hazards be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State?

Table 3: Mean and Standard Deviation on the Ways Physical Hazards can be managed for Sustainable Conducive Learning Atmosphere in Secondary Schools in Rivers State.

S/No	Items	Principal N = 78		Teachers N = 506		Mean Set	
		Mean $\bar{X}_1$	SD	Mean $\bar{X}_2$	SD	$\bar{X}$	Decision
19	The provision of exit points around the school compound makes for easy escape from physical hazard	2.81	1.08	2.74	0.96	2.78	Agreed
20	Adequate plant planning in the school reduces exposure to physical hazard	2.14	1.00	1.96	1.31	2.05	Disagreed
21	Regular sensitization of school members make it easy to handle physical hazard around the school	2.94	1.09	2.74	0.96	2.84	Agreed
22	Changing of work processes from time to time reduces the risk of physical hazard among school members	3.09	0.81	1.99	1.25	2.54	Agreed
23	Proper ventilation of the school is a measure for avoiding congestion in school	2.22	1.34	2.10	0.93	2.16	Disagreed
24	Ventilation of the school is a measure for controlling physical hazard in school	2.95	1.09	2.75	0.96	2.85	Agreed
25	Identification of physical hazard sources limits physical harm in schools	2.69	0.86	2.97	0.95	2.83	Agreed
26	Removal of physical hazard prevents physical harm in schools	2.70	0.86	2.98	0.95	2.84	Agreed
27	Insulation of school infrastructures reduces extreme temperature which can cause physical hazard	2.22	1.31	1.89	1.01	2.06	Disagreed
	Grand Mean and Standard Deviation	2.64	1.05	2.46	1.03	2.55	Agreed

Data in Table 3 show that items 19, 21, 22, 24, 25 and 26 had mean ratings above the criterion mean of 2.50 and were on adjudge as the ways physical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State. Differently, item 20, 23 and 27 had mean ratings below the criterion mean of 2.50 and were disagreed on as the ways physical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

In summary, with an aggregate mean of 2.55, above the criterion mean of 2.55, the respondents agreed that the ways for managing physical hazards for sustainable conducive learning atmosphere are provision of exit points, adequate plant planning, regular sensitization of the school members, changing of work processes from time to time, proper ventilation of school buildings, identification of sources of physical hazards, removal of physical hazards and insulation of school infrastructures.

Test of Hypotheses

Hypothesis 1: There is no significant difference between the mean ratings of principals and teachers on the ways chemical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

Table 4: Summary of z-test Analysis of the Significant Difference between the Mean Ratings of Principals and Teachers on the Ways Chemical Hazards can be Managed for Sustainable Conducive Learning Atmosphere in Secondary Schools in Rivers State.

Category	N	Mean	SD	DF	z-Cal.	z-Crit.	Level of Significance	Decision
Principals	78	2.85	0.99	582	2.97	1.96	0.05	Rejected
Teachers	506	2.56	0.94					

The value of z-cal. of 2.97 on Table 4 was more than the value of z-crit. of 1.96 and for this reason, the null hypothesis was rejected, implying that there is a significant difference between the mean ratings of principals and teachers on the ways chemical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

Hypothesis 2: There is no significant difference between the mean ratings of principals and teachers on the ways biological hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

Table 5: Summary of z-test Analysis of the Significant Difference between the Mean Ratings of Principals and Teachers on the Ways Biological Hazards can be Managed for Sustainable Conducive Learning Atmosphere in Secondary Schools in Rivers State

Variable	N	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Principals	78	2.75	1.02	582	1.97	1.96	0.05	Rejected
Teachers	506	2.52	1.06					

On Table 5, the value of z-cal. of 1.97 is greater than the value of z-crit. of 1.96 which was determined at 582 degrees of freedom at 0.05 level of significance and as such, the null hypothesis was rejected suggesting that there is a significant difference between the mean ratings of principals and teachers on the ways biological hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

Hypothesis 3: There is no significant difference between the mean ratings of principals and teachers on the ways physical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

Table 6: Summary of z-test Analysis of the Difference between the Mean Ratings of Principals and Teachers on the Ways Physical Hazards can be Managed for Sustainable Conducive Learning Atmosphere in Secondary Schools in Rivers State

Variable	N	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Principals	78	2.64	1.05	582	2.65	1.96	0.05	Rejected
Teachers	506	2.46	1.03					

Data on Table 6 show the value of z-cal. to be 2.65 while the value of z-crit. was 1.96. Since the value of z-cal. of 2.65 is greater than the values of z-crit. of 1.96, the null hypothesis was rejected and this implied that there is a significant difference between the mean ratings of principals and teachers on the ways physical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State.

Discussion of Findings/Implication

The first finding of the study revealed that the ways chemical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State include: labeling chemicals using the right symbols and signs, storing chemicals using the right self-limit, using chemicals under the right condition, assigning chemical attendants to laboratories, providing chemical data sheets and putting inflammable chemical from hot zones. Also, a corresponding finding from hypothesis testing establishes that there is a significant difference between the mean ratings of principals and teachers on the ways chemical hazards can be managed for sustainable atmosphere in public secondary school in Rivers State.

These findings are in tandem with Mehnjar, Eskandarnia, Pirami and Mardanparvar (2016). Alyammahi (2015), Olugbenga and Thomas (2014) whose comments and research finding present information on the ways chemical hazards can be managed in schools. Explanation for the trend in the findings may be in the fact that the respondent themselves are personnel who are actually involved in the ways chemicals are managed in schools and therefore in a better position to make response, appropriately. These findings imply that effective management of chemical hazards presents sustainable conducive learning atmosphere.

The second findings of the study showed that biological hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State through compulsory hand working for all school members, regular provision of sanitizing agents, sterilization of biological tools, identification of sources of contamination, the use of ultra violet lamps, use of personal protection equipment and provision of biological hazard bags. Also, a corresponding finding from test of hypothesis establishes a significant difference between the mean ratings of principals and teachers on the ways biological hazards can be managed for sustainable conducive learning atmosphere in secondary school in Rivers State. These findings corroborate Osuafor and Ezeobi (2017), Oluch, Njogu and Ndeda (2017) and Adams and Azuibike (2014), who empirical and scholarly contributions to knowledge attest to these strategies. These may further be explained in the fact that school leaders and other members have come to the realization that management of biological environments of their school remains their sole responsibility for sustainable students learning. These imply that appropriate management of the school biological hazards is inevitable for sustainable conducive atmosphere for students learning.

The third finding of this study revealed that physical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State are provision at exit points, adequate plant planning, regular sensitization of the school members, changing at work processes from time to time, proper ventilation of the school buildings, identification of physical hazards, removal of physical hazards and insulation of school infrastructures. Also, a corresponding finding from test of hypothesis establishes a significant difference between the mean ratings of principals and teachers on the ways physical hazards can be managed for sustainable conducive learning atmosphere in secondary schools in Rivers State. These findings are in line with Arop, Owan and Ekpans (2018), Gbadago, Amedone and Honyenugu (2017), Bakir, Babayisit, Tekbas, Ogur, Kilie and Ulus (2014) who found out in their studies that the physical hazards are managed in the ways identified here in this study. A possible explanation for these may be in fact that quite very recently, schools have had to take care of managing physical hazards in schools. These findings imply that schools with sustainable conducive learning atmosphere are those who physical hazards are properly managed.

Conclusion

Based on the findings of the study, the discussions on them and their educational implication, it is concluded that appropriate management of school environmental hazards among them chemical, biological and physical hazards guarantee sustainable conducive learning atmosphere in public secondary school in Rivers State.

Recommendations

In the light of the conclusion of the study, it is recommended as follows:

- i. Stakeholders in school administration should continue to use the identified strategies in managing chemical hazards while also exploring more strategies to ensure the sustainability of school atmosphere for learning.
- ii. School administrators and others involved in school administration should continue to make use of existing ways for managing biological hazards in schools and the same time explore alternative strategies for doing so as society in dynamic in order to ensure continuous sustainability of the school atmosphere for learning.
- iii. School administrators and other school members should continuously use appropriate administrative strategies in managing school physical hazards as they make sustainable conducive learning atmosphere in schools.

References

- Adams, A. & Azubuike, A. S. (2014). Evaluation of safety practices in Biology laboratories in selected secondary schools within Gumel Emirate, Jigawa State, Nigeria: *Creative Education*, 5, 1274-1280.
- Adejumo, G. A. (2021). *Managing school hazards for sustainable learning environment in secondary schools in Rivers State*. Unpublished M.Ed. Dissertation Submitted to the Department of Educational Management, University of Port Harcourt, Rivers State.
- Alyammahi, A. (2015). *The current status of safety in high school chemical laboratories in Kentucky*. <https://encompass.eku.edu/cgi/viewcontent.cgi?article=1329&context=etd>
- Arop, F. O., Owan, V. J. & Ekpang, M. A. (2018). School hazards management and teachers' job effectiveness in secondary schools in Ikom Local Government Area, Cross River State, Nigeria: *International Journal of Education and Evaluation*, 4(9), 38-49.
- Bakır, B., Babayigit, M. A., Tekbaş, O. F., Oğur, R., Kılıç, A. & Ulus, S. (2014). Evaluation of some physical hazards which may affect health in primary schools: *Turkish Archive of Pediatrics*, 49(3), 217-223.
- Cutter, S. L. (2021). *American hazards capes: The regionalization of hazards and disasters*. Joseph Henry Press.
- Daramola, O., & Odunsi, O. (2016). Assessing students' awareness of environmental hazards and risks in public tertiary educational institutions in Oyo State, Nigeria. *Economic and Environmental Studies*, 16(4), 655-672.
- Elseragy, A., Elnokaly, A. & Gabr, M. (2011). *Building sustainable learning environments that are 'fit for the future' with reference to Egypt*. https://www.researchgate.net/publication/303804340_Building_Sustainable_Learning_Environments_that_are_'Fit_for_the_Future'_with_Reference_to_Egypt
- Federal Republic of Nigeria (2014). *National policy on education*. NERDC.
- Gbadago, P., Amedome, S. N. & Honyenuga, B. Q. (2017). The impact of occupational health and safety measures on employee performance at the South Tongu District Hospital: *Global Journal of Medical Research*, 17(5), 13-19.
- Henry, A. (2016). *The organizational climate of schools*. Midwest Administrative Center.
- Kwa, N. A. (2018). Assessment of psychosocial hazards among workers at the University of Port Harcourt: *Clinical Depression*, 4(3), 135.
- [Larry-Coker, N. R. \(2024\). School hazards management as correlate of environmental safety in public senior secondary schools in Rivers State. An Unpublished M.Ed. Dissertation Submitted to the Department of Educational Management, Faculty of Education, University of Port Harcourt.](#)
- Mehrfar, Y., Eskandarnia, A., Pirami, H. & Mardanparvar, H. (2016). Assessment of awareness and comprehension of chemical hazard symbols among chemistry students. *Journal of Occupational Health and Epidemiology*, 5(1), 20-25.
- Netshitahamen, D. & Van, S. (2020). Work task and job satisfaction predicting low back pain among secondary school teachers in Putrajaya: *Iranian Journal of Public Health*, 45(1), 85-92.
- Oluch, I., Njogu, P. & Ndeda, J. O. H. (2017). Effects of occupational safety and health hazards' exposure on work environment in the water service industry within Kisumu County-Kenya. *Journal of Environmental Science, Toxicology and Food Technology*, 11(5), 46-51.
- Olugbenga, A. J. & Thomas, O. O. (2014). Analysis of hazard and safety in science laboratories in Ekiti State, Nigeria: *British Journal of Education, Society and Behavioural Science*, 4(3), 403-414.
- Osuafor, A. M. & Ezeobi, G. O. (2017). Extent of Biology laboratory organization and management in senior secondary schools in Awka South Local Government Area. *UNIZIK Journal of STM Education*, 2(1), 100-111.
- Wallace, S. (2014). *Hazard identification and control*. <https://www.wcbask.com/wp-content/uploads/2014/03/Hazard-Vs.-Risk.pdf>