

EDUCATIONAL ERGONOMIC HEALTH HAZARDS IN THE ERUDITION MILIEU IN SECONDARY EDUCATION INSTITUTIONS IN CROSS RIVER STATE, NIGERIA

By

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Abstract

This study focused on investigating the Educational ergonomic health hazards in the erudition milieu in Secondary Education Institutions in Cross River State, Nigeria. It adopted a descriptive survey design. Population of study comprised all the public secondary schools in Cross River State which is made up of a total of 5,194 teachers in the two hundred and sixty-two (262) secondary schools in Cross River State, 330 teachers from the Ogoja Educational Zone constituted the sample. Four research questions guided the study. Data was collected using a researcher constructed questionnaire entitled Educational Ergonomics in Secondary Schools Questionnaire (EEISSQ). The instrument was validated by experts and its reliability index was established at .75 index using Pearson Moment correlation coefficient. Mean scores were used to answer the research questions. The findings were that school buildings and other teaching and learning facilities in secondary schools are ergonomically below standard and unsafe. It was recommended amongst others that government and educational planners should ensure that appropriate and pragmatic strategies are adopted in schools to improve the teaching and learning environment, particularly, to see to it that facilities are conformed to ergonomic standards.

Keywords: Physical facilities planning; Ergonomics; Quality assurance

Introduction

Every year millions of naira are spent on the construction and renovation of educational facilities that are often inadequate for students and teachers (instructors). Students and teachers alike frequently complain that classrooms are too hot or too cold, that they have uncomfortable seating, or that the seating location does not permit clear and accurate viewing of the room's display system. Additional complaints relate to difficulty to hearing lectures because of excessive internal noise or because of excessive sound reverberation within the room. Other problems are more subtle and frequently result to complaint like "my eyes seems to hurt after lecture" or "I just can't seem to concentrate for very long in that room" or "I'm just not comfortable in there, I don't like the room"

Ergonomics is that science of making jobs and environment fit the worker or their users. Noe, Hollenbeck, Gerhart and Wright (2004) define ergonomics as the study of the interface between individual's physiology environments. The goal of ergonomics is to minimize physical strain on the worker (or the users of the environment) by structuring the physical work environment around the way the human body works. Ergonomics focuses on outcomes such as

reducing physical fatigue, aches and pains, and health problems. Ergonomics is aimed at engineering products and the environment to meet the comforts and health of the individuals human beings directly involved in its utilization.

In the wake of globalization, every aspect of human life has undergone tremendous transformation. Education and educational institutions are vehicles that propel the rapidly changing world and its new ideas and demands, and therefore must constantly and continuously undergo changes and improvement both in its curriculum and learning environment. With the explosion of information and global competitiveness that is ongoing, the nature of teaching and learning is rapidly changing to remain relevant, competitive and be conformed to the current dispensation. It has become imperative, therefore, for teaching and learning environments to be designed to fit its users (students and teachers), as teaching and learning cannot take place in isolation of an enabling and safe environment (Ali & Tamrin, 2016). Poor environment and unhealthy lifestyle may lead to bad posture, unsuitable movement patterns, and loss of basic physical skills which can lead to an ergonomic problem among the users (Heyman et al. 2019).

Ergonomics is the science of matching humans' interaction with the proximate environment (Jayaratne, 2012). Jayaratne (2012) stated that in an educational set up, ergonomics plays an essential role since it may affect teachers' satisfaction, motivation, and creativity. Ergonomics focuses on the outcomes, such as reducing physical fatigue, aches and pains, and health problems. Ergonomics is aimed, at engineering products and the environment to meet the comforts and health of the individuals who are directly involved in their utilization. Mayer and Jahnke (2016) posits that educational ergonomics requires that the school administrator provides an environment that will suit teaching and learning processes as well as ergonomically consider the health and comfort of the key players and its users (teachers and students). Giving ergonomic consideration to the school environment reduces the number and severity of Cumulative Trauma Disorders (CTD), lost production time, and restricted duty days (Ismail et al., 2015). A classroom with no seats for the teacher, highly placed chalkboards where the teacher will have to constantly strain to write on it, broken ceilings and leaking roofs of buildings, inadequate lighting provisions, unpolished floors with rough and cracked surfaces, poorly ventilated classrooms or that lack toilet facilities, etc. do not conform to ergonomic standards and is not safe for use by students and teachers, as it will affect their physical health conditions. When work environments are ergonomically designed in such a way that the safety and health of the employees or the users are put into consideration, it will become user friendly and enhance the efficiency of work and productivity (Meyer, 2017).

Rostykus (2014) states that teaching-learning environments must be designed in such away that learning may proceed with minimum stress and maximum effectiveness. In the present age of globalization, educational systems all over the world are re-designing and transforming both in content and context and making their education more relevant and competitive to be able to fit into the global environment (Wiker, 2012). Ergonomics works to minimize physical strain on the worker by structuring the physical environment around the way the human body works. The design of chairs and desks to fit posture requirements is very important in teaching and learning places, particularly in the classrooms, offices, laboratories, libraries, etc.

For this work, educational ergonomic which is the science of applying ergonomics to education will be considering only the domain of physical ergonomics of learning environments of secondary schools in Nigeria with a focus on those in the Ogoja Education Zone of cross River State, Nigeria.

Statement of the Problem

If the teaching/learning environment lacks proper planning and ergonomic consideration from the onset, educational goals will not be achieved. Teaching and learning process can only be enjoyable when the available facilities are adequately safe and suitable for the users. It is therefore imperative that ergonomics of teaching and learning facilities consideration and standards are strictly adhered to in planning, implementation and maintenance of the facilities. This study therefore investigated the Educational Ergonomic health hazards in the erudition milieu in Secondary Education Institutions in Cross River State, Nigeria.

Purpose of Study

The main purpose of this study was conducted to investigate:

1. The extent to which Ergonomic Safety consideration of school buildings and teaching-learning facilities affect teacher.
2. The extent to which ergonomic safety provisions are available in the building and teaching-learning facilities of secondary schools.
3. The extent of the maintenance service of buildings and teaching-learning facilities of secondary schools.

Research Questions

1. To what extent does ergonomic safety consideration of school buildings and teaching-learning facilities affect teacher.
2. To what extent does ergonomic safety provisions are available in the building and teaching-learning facilities of secondary schools.
3. To what extent is the maintenance service of buildings and teaching-learning facilities of secondary schools.

Methodology

The design adopted for the study is the descriptive survey. The population of the study is all the total number of teachers in cross river state public secondary schools which is 5,194 teachers in the two hundred and sixty-two (262) secondary schools in Cross River State. Cross River State has 18 local governments areas and three education zones which are Central Zone (Ikom zone) has 6 local governments areas with 96 secondary schools, North Zone (Ogoja zone) has 5 local government areas with 84 schools and South zone (Calabar zone) has 7 local government areas with 82 schools (CRSSEB,2017).

Sample size and sampling technique

A simple random sampling technique was used to select Ogoja Educational Zone, a stratified random sampling technique was then used to select 330 teachers (66 teachers from each local government areas) from the 1,408 teachers in 84 public secondary schools in Ogoja Educational Zone. Taking the overall sample to over 20% of the population.

The instrument for data collection

The instrument for data collection was a structured questionnaire named 'Teachers Ergonomic Health Hazard Questionnaire' (TEHHQ). The instrument was validated by three experts. A test-retest method was used to test the reliability of the instrument. Cronbach Alpha was used to determine the internal consistency of the instrument. A reliability value

of 0.83 was obtained. The instrument was developed on a four (4) point Likert type scale of VHE, HE, LE, and VLE respectively; and the respondents were asked to indicate the degree of their agreement with each item by ticking one of the four options.

Data analysis

Data were analyzed using mean and standard deviation. The response options were assigned values of 4, 3, 2, and 1 respectively. The limit of real numbers was used to decide the answer to the research questions. Due to some limitation 3 questionnaires were adjudged invalid and data was then analyzed with 327 respondent as opposed to the initial 330 respondents.

Results

Results of the study indicated that items 1, 3, 4, 5, 6, 7, 8, 9, 11, and 13 on table 1 were considered ergonomically unsafe for teachers while items 2, 10, and 12 on the same table were considered safe. This result shows that buildings, computer rooms, libraries, toilets, work chairs and tables, machines and equipment rooms, and ICT Centre were ergonomically unsafe for teachers' use while carrying out their teaching duties. This may be due to poor designs of the facilities during construction. The grand mean of the responses of teachers on the safety of buildings and learning facilities were =2.46, SD=0.66

Table1

To what extent does ergonomics safety consideration of school buildings and teaching-learning facilities affect teacher

S/N	Facilities	Mean	SD	Decision
1	School buildings	2.41	0.66	LE
2	Classroom blocks	2.51	0.82	HE
3	Teacher's offices	2.40	0.66	LE
4	Laboratories	2.48	0.72	LE
5	Teacher's common rooms	2.44	0.68	LE
6	Libraries	2.48	0.72	LE
7	Computer rooms	2.30	0.56	LE
8	Toilets (conveniences)	2.26	0.53	LE
9	Work chairs and tables	2.41	0.66	LE
10	Classroom environment	2.65	0.89	HE
11	Machines and Equipment rooms	2.44	0.68	LE
12	Stairways and walkways	2.56	0.85	HE
13	ICT centre	2.46	0.70	LE
	Grand mean	2.46	0.66	LE

KEY:

VHE=Very High Extent, HE=High Extent, LE=Low Extent, and VLE=Very Low Extent

Table 2

To what extent does ergonomic safety provisions are available in the building and teaching-learning facilities of secondary schools?

S/N	Attributes	Mean	SD	Decision
1	Classroom Ergonomics: (space seat and seating arrangement, location, lighting, colour, chalkboard, projector, noise–level, ventilation (etc.))	2.82	.86	HE
2	Laboratory ergonomics: (dark room, furnaces, fume cupboards, windows, work benches, and tabletops, air –condition, fans fire extinguisher, ventilation storage facilities for chemicals, lighting, noise–level, seats, (etc.).	2.48	.72	LE
3	Practical lessons ergonomics: (safety shoes, overalls, gloves, goggles, ear –muffs, ventilation fire fighting equipment, sporting equipment, agricultural tools, etc.)	2.51	.79	HE
4	Library settings and ergonomics: (location, easy access, display settings, noise – level, ventilation, convenience, lighting, colour, seat arrangements, space ancillaries, etc.).	2.42	.68	LE
5	Others (teacher’s offices, conveniences, space, lighting walkways, stars, computer rooms, ICT centers, etc.)	2.40	.60	LE
Grandmean		2.53	.73	HE

The Results also showed that classroom and practical lesson ergonomics safety provisions have mean scores of 2.82 and 2.51, and SD of 0.86 and 0.79 respectively while the library ergonomics settings, Laboratory ergonomics, and Others (teacher's offices, conveniences, space, lighting walkways, stars, computer rooms, ICT centers, etc), had a mean rating of 2.48, 2.42 and 2.40, and SD of 0.72, 0.68 and 0.60 respectively. Classroom and practical lesson ergonomics safety showed a ‘high extent’ of ergonomic safety provisions, while library ergonomics settings, laboratory ergonomics, and others, showed a 'low extent' to ergonomic safety provisions. The grand mean of the responses of teachers on the extent to which ergonomic safety provisions are available in the building and teaching-learning facilities of secondary schools were $\bar{x} = 2.53$, $SD = 0.73$ (Table 2).

Results of the analysis in Table 3 shows that school buildings, classrooms, and practical lesson halls has a mean score of 2.43, and an $SD = 0.68$, laboratories has a mean score of 2.47, and an $SD = 0.71$, practical lessons and its settings has a mean score of 2.36, and an $SD = 0.48$, libraries has mean score of 2.41, and an $SD = 0.65$ and others (offices, conveniences, lighting, walkways, stairs, computer room, ICT centres, etc.) has a mean score of 2.33, and an $SD = 0.45$, respectively. The table also shows that all the above items fall below the criterion scale of 2.5 (LE), signifying that the regularity of maintenance of the secondary school buildings and teaching-learning facilities in the Ogoja education zone is not assured. Findings in Table 3 also indicated that the grand mean of the responses of teachers on the extent of maintenance services of buildings and teaching-learning facilities of secondary schools were $\bar{x} = 2.40$, $SD = 0.59$.

Table3

To what extent is the maintenance service of buildings and teaching-learning facilities of secondary schools

S/N	Attributes	Mean	SD	Decision
1	Buildings, classrooms, and Practical Lessons halls	2.43	0.68	LE
2	Laboratories and their settings	2.47	0.71	LE
3	Practical Lessons and its settings	2.36	0.48	LE
4	Libraries	2.41	0.65	LE
5	Others (offices, conveniences, lighting, walkways, stairs, computer room, ICT centres, etc.)	2.33	0.45	LE
	Grand mean	2.40	0.59	LE

KEY: VHE = Very High Extent, HE = High Extent, LE = Low Extent, and VLE =Very Low Extent

Discussion

The study revealed that the majority of the buildings and teaching and learning facilities were in unsafe conditions in ergonomic terms. This finding confirmed the statement of Uche et al. (2011) in which they observed that infrastructural development in secondary schools was of low quality and most times are not teacher-friendly, especially in rural areas. School infrastructure such as the classrooms, practical lesson halls, offices, computer rooms, toilets among others, are not safe for teachers' use. This means that the facilities do not conform to ergonomic standards. When teaching and learning take place under ergonomically unsafe environments, the teachers are faced with ergonomic health challenges which lead to teachers' absenteeism and poor productivity, as stated by Ismailet al. (2015). In a situation where educational activities cannot take place effectively due to the state of the environment and inadequate infrastructure, productivity would be hampered or the realization of educational goals would be impaired. This finding is also supported by a statement in the report of the committee on vision 2030 of the IET, which claimed that secondary school education has experienced phenomenal expansion without a proportionate increase in funding and facilities(International Ergonomics Association [IET], 2015). The system suffers from problems such as outdated, dilapidated, or non-existent infrastructure, poorly stocked libraries, inadequate laboratories, and poor conditions of services, prompting educational brain drain" (Odejele,2012).

The findings of this research also revealed a gross lack of regular maintenance of facilities and infrastructure in many secondary schools, which accounted for their poor states. Some school buildings and facilities which may have been given little ergonomic considerations, though not adequate in their design at the initial time, became degraded overtime due to over-use and lack of proper and regular maintenance, and have been rendered unsafe for use. This finding is supported by the findings of Asiabake (2018) who stated, in the study conducted to find out the effectiveness of school facilities, that physical facilities in schools are not fully utilized due to poor maintenance and inadequate facility planning.

Conclusions

The Ergonomic consideration of physical teaching and learning facilities constitutes major determinants of the success of teaching and learning. It is therefore very pertinent that priority is given to the provision of proper design and planning of the educational environment so that the key factors in educational processes can effectively play their roles. The teaching-learning facilities in the

secondary schools in the Ogoja Education Zone, as the findings of this research revealed, were not ergonomically conceived in terms of standards and specifications, and many facilities are not adequately maintained. There is, therefore, a need to engage best practices in the (future) structural and functional design and construction of the school environment to meet the comfort and health demands of users.

Recommendations

1. Government and Educational planners should ensure that appropriate and pragmatic strategies are adopted in schools to improve the teaching and learning environment, particularly, to see to it that facilities are conformed to ergonomic standards.
2. The government should allocate more funds and resources to schools to enable expansion of facilities, repair, and maintenance of already existing but dilapidated infrastructure and to ensure that safety provisions and procedures are made and adhered to in laboratories and workshops. All necessary places and facilities should be regularly maintained by those at the helm of affairs.
3. Training and awareness programs should be organized by school administrators for staff on ergonomics issues, as it pertains to their job descriptions and usage of the learning facilities. Best practices should be encouraged.
4. Ergonomic experts should be consulted by school administrators to identify ergonomic issues that hamper employees' job delivery and students' effective learning.

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