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Characteristics of Classroom Chairs and Desks in Use in Senior Secondary Schools in Ibadan, Oyo State, Nigeria

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Abstract
The current status of wooden classroom chairs and desks in use in selected Secondary Schools (SS) in Ibadan was investigated. Fifty-four SS were randomly selected; 12 each from rural and semi-urban, and, 10 from urban areas of Ibadan. Random sampling survey was conducted using structured questionnaire and oral interview and to collect data on chairs and desks types, designs, construction materials and methods, durability and cost factors. Joint features, failure pattern and causes were evaluated via on-the-spot assessments. Simple descriptive statistical tool was used for data analyses. Similar furniture geometry, constructional method and failure mode were noted in rural, semi-urban and urban schools. About 90% of the Schools were using wooden chairs and desks. The two predominant designs were the Single-User (SU), and Multiple-User (MU) types. The production philosophy for both furniture types was one-size-fit all. The SU and MU chairs and desks had a relatively short service life with over 80% of them failing within three months. Poor jointing was responsible for over 69% of the failure. As at December, 2009 a pair of SU and MU chairs and desks cost ₦2500 and ₦3500 respectively.

Keywords: classroom chairs and desks, designs, joint, durability, construction material

INTRODUCTION

At the center stage of the educational facilities is the school furniture. Persistent shortage of school furniture items has been identified as a major problem in educational institutions in the developing countries of the world (Quesada, 2001; Haviaora, 2000). The National Clearing-house for Educational Facilities (NCEF) (2005) identified chairs and tables utilized by students at their places of learning as the first consideration in school furniture. There are different types of chairs and tables employed during different learning situations. While stools and benches are used in semi-sitting conditions as may be found in laboratories, the situation of learning in the classroom calls for prolonged sitting and therefore requires the use of chairs and desks. Of all the materials employed in furniture production in Nigeria, wood stands out in terms of aesthetic value, cost, adequate strength and ease of working. The ease of working, simplicity of the working tools, required environment, among other reasons, account for the possibility of producing wooden furniture even in backyard workshop. Wooden furniture manufacture does not necessarily require high-energy consumption, specialized skills and sophisticated equipment unlike plastic and metal furniture items. However, wooden chairs and desks tend to require frequent replacement as observed by Eckelman *et al*, (2004). The implication of this is the added cost of education coupled with increased pressure on the utilization rate of the wood resources. In many developing countries, resources are limited. Thus outfitting schools with classroom chairs and desks without over-burdening school budgets is a difficult task (Haviaora *et al*, 2001a). In Nigeria, the limitation posed by the costs of supplying and maintaining these items was among the major causes of failure of the Universal Primary Education programme, between 1976 and 1986 in Nigeria (Urwick, 1993; Asagwara, 1997). Unfortunately there is dearth of information on the status and general characteristics of the currently used schoolroom chairs and desks in Secondary Schools (SS) across Nigeria. This study was therefore initiated to examine the available classroom chairs and desks in SS in Ibadan, Oyo State, Nigeria, with a view of documenting their salient characteristics and performance status.

MATERIALS AND METHODS

A survey was conducted to compile information on the types of classroom chair cum desk combinations offered to students in 54 SS. The SS was selected from 232 SS in Ibadan and its environs (Oyo State Ministry of Education Gazette, 2003) using stratified random sampling technique with Local Government Area (LGA) and school's age as the stratifying parameters. The eleven LGAs in Ibadan (Figure 1) were stratified into discernible units, viz urban, semi-urban and rural settings (Table 1) using United States' Agency for International Development (USAID) stratification method. Two schools were selected from each of the

urban areas while four schools were selected from each of the six LGAs (two each from semi-urban and rural areas). The choice of these stratification parameters was informed by the need for adequate spread. For the purpose of data collection, a structured questionnaire was administered *in situ* on schools administrators while oral interview was conducted with 10 parents, 15 head teachers, 20 school carpenters and 14 executive members of Parents, Teachers Association (P.T.A) of the selected SS. The joint nature, geometries and characteristics of 150 failed wooden chairs and desks were examined on-the-spot.

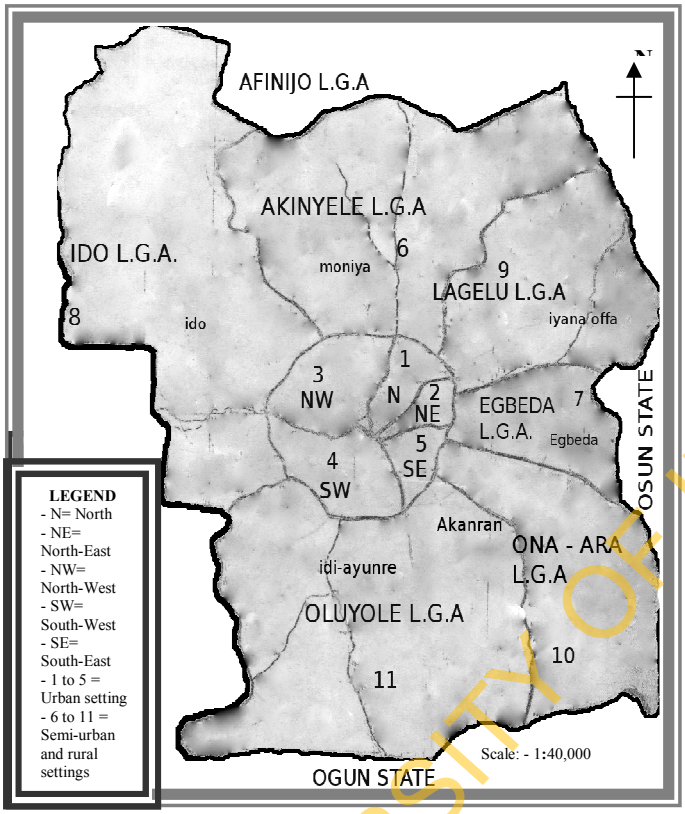

Figure 1: The Map of Eleven Local Government Areas in Ibadan

***Source**: Adapted from Map of Ibadan Retrieved from Oyo State Map Depot, State Secretariat, Ibadan*

Table 1: Local Government Areas in Ibadan and Population Stratification

S/N	Local Government Area/ Headquarter.	Population Designation
1	Ibadan North / Bodija	Urban
2	Ibadan North East/ Iwo road	Urban
3	Ibadan North West/ Onireke	Urban
4	Ibadan South West/ Oluyole	Urban
5	Ibadan South East/ Mapo	Urban
6	Akinyele/ Moniya	Semi-urban / Rural
7	Egbeda/ Egbeda	Semi-urban / Rural
8	Ido/ Ido	Semi-urban / Rural
9	Lagelu/ Iyana Ofa	Semi-urban / Rural
10	Ona Ara/ Akanran	Semi-urban / Rural
11	Oluyole/ Idi Ayunre	Semi-urban / Rural

RESULTS AND DISCUSSIONS

School Profile

The age of the Senior Secondary School selected ranged between 7 and 91 years with about 85.2% being over 20 years old. About 55.6% of the schools were established between 1979 and 1981 by a particular State Government that supplied metallic classroom furniture to public schools. The private schools were relatively young; their age ranging between 1 and 13 years. The school population ranged from 92 to 7,000, the average being 1,900. About 13% of the schools had population not less than 500, while about the same percentage had a population range of 500 to 900. None of the private schools surveyed had a population of over 900 students. Only one public school (public) had student population of 7,000 pupils.

Types of Classroom Chairs and Desks in Use

Table 2 shows statistics of the various forms of chair and desks found in use in the schools. About 90.7% of the schools were using wooden chairs and desks exclusively. About 7.4% of the schools (only public schools) combined metallic with wooden chairs and desks in 20:1 ratio. Metallic chair cum desk combination was in use exclusively in only one private school. Visual assessment showed that a sizeable number of the metallic chairs and desks had been repeatedly repaired. The major factor responsible for the metallic chair and desk failure was rust. A "wooden-metallic" hybrid of chair and desk (Plate 2) was found in use at a private school.

Table 2: Forms of Classroom Chairs and Desks Found in the Schools Surveyed

Furniture forms	No of schools Private	Public	Sub-total	Percentage of total (%)
Wooden	6	43	49	90.7
Metallic	1	-	1	1.9
Wooden & metallic	1	3	4	7.4
Total	8	46	54	100

About 81.5% of the public schools indicated that they had utilized metallic chairs and desks in the past but had to change to the wooden form. Cost, insecurity and rust were indicated as the overriding reasons for changing from metallic form of furniture to wooden. Only about 1.9% of the schools had ever used plastic furniture. This finding confirmed the dominance of wooden chairs and desks in Senior Secondary Schools in Ibadan. The preference was due largely to their relatively low cost of purchase, repair and replacement. Another reason adduced by respondents, for the preference was the ease of manufacture and repair even without necessarily using electric power. Thus

continuous provision of wooden chairs and desks by education provider also coincide with the interest of the users as reported by Khanam *et al, (*2006) that wood will most likely remain the favoured construction material for construction of classroom chairs and desks for very long time because students are more favourably disposed to using wooden chairs and desks.

Types of Wooden Chairs and Desks Employed

There were two major designs and distinguishable by the number of student(s) accommodated: single-user (SU) and multiple-user (MU) type in all the school surveyed. Each of the designs occurred in a variety of shapes and sizes. There had been attempts to modify the basic structure of MU and SU chairs and desks in a number of Schools. Example of such modifications carried out on MU design is shown in Plate 3. The reason was to minimize the cost of repair and replacement. The hybrid (Plate 2) was a product of an attempt to solve the problems of repair and replacement of wooden chairs and desks. The hybrid chairs had their seat and back slat made of wood while the load bearing members were constructed with metal.

Plate 1: (a) MU Designs of Wooden Chair cum Desk Combinations

Plate 1: (b) SU Designs of Wooden Chair cum Desk Combinations

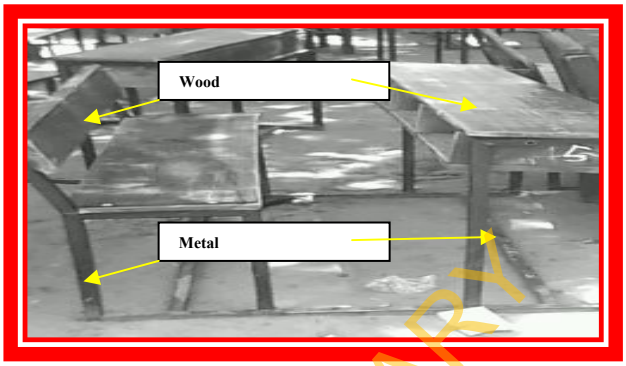

Plate 2: Sample of Wooden-Metallic Classroom Furniture Hybrid in Use

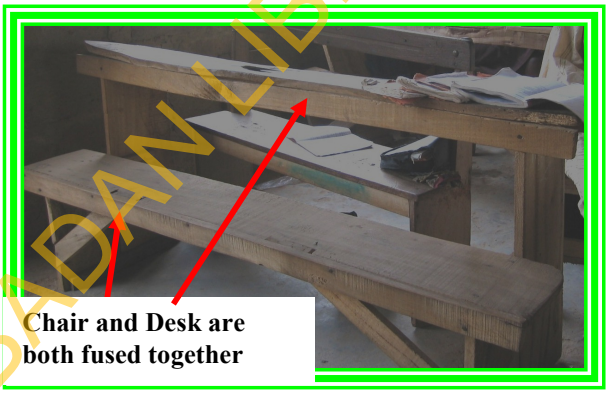

Plate 3: Example of Modified MU Wooden Chair cum Desk Combination

About 41.0% of the respondents mentioned chair legs while 36.0% mentioned the back, legs and joints as the parts of wooden chairs and desks that are frequently repair. Desk legs were unanimously identified as the most frequently repaired part of the two wooden desks designs. Assessment of 150 pieces of failed SU and MU chairs and desks assembled for repair at about 42% of the schools showed that about 91% of the chairs failed at the joints. Joints connecting the two back posts and seat rails were the most prone to failure in SU chairs while nail withdrawal was the major problem in MU chairs and desks. These findings reinforced the observations of Haviarova, *et al* (2001a) and Haviarova (2000) that the durability of wooden furniture could be improved by paying critical attention to joint rigidity. The need to replace many of the wooden chairs and desks within one year in almost all the schools surveyed confirmed their low durability. This has increased the cost of managing schools and thus made the provision of school furniture to constitute one of the most expensive components of education, confirming also an observation earlier made by Havioara (2000). It appears that functional inadequacy of these two wooden chair and desk combinations has led to modification attempts

aimed at minimizing the amount of money spent on repairs and replacement. However, the attempt on MU design appears to further worsening the durability problem because whenever the modified furniture failed, it rendered both chair and desk un-usable at the same time in view of their fused nature (Plate 3). Further investigation revealed that the major factor responsible for poor durability was the non-compliance with engineering principles in design and production. Connectors were wrongly used and sectioning was not guided by needs. Therefore some critical sections were under-designed while some less critical sections were over-designed. The design philosophy adopted appears to be one-size-fit all. The use of wet wood, poor jointing method and poor handling also contributed to the observed failure in the wooden chairs and desks surveyed. While the latter can be corrected through enlightenment, the former requires urgent attention.

Costs of Procurement and Maintenance of Wooden Chairs and Desks

As at December 2009, an SU chair cum desk combination cost an average of ₦2,500 while MU cost ₦3,800 as compared to ₦10,650 and ₦19,870 respectively for metallic SU and MU chair cum desk combinations. About 89% of the schools carried out repairs at the end of every term while about 7% delayed till the end of the session. Only about 4% delayed repairs till 2-3 years. Not more than 20% of the wooden chairs and desks were due for repair in schools that carried out repair not later than the end of each session. Schools where repairs were delayed till the end of the term spent not more than 20% of the original cost on repair. As would be expected, repair cost increased with interval of repair and extent of damage; with the annual maintenance expenditure ranging from 5 to 20 percent of the annual income of the schools.

Producers and the Commonly Used Wood Species

There were two recognizable producers of various wooden chairs and desks by the account of the respondents interviewed. About 78% schools procured their wooden chairs and desks from road-side carpenters while 9% procured theirs from small-scale furniture outfits. About 13% of the respondents could not ascertain the producer because the furniture was supplied by the Government. Visual inspection indicated no difference in the quality of wooden chairs and desks produced by road-side carpenters, small-scale furniture outfits and those supplied by the Government.

Investigation on the wood species used for wooden chairs and desks production in urban, semi-urban and rural areas of Ibadan showed that about twenty wood species were being used (Table 3). Further analysis indicated that twelve out of the twenty species were most preferred. About 58% of the preferred species belonged to relatively low strength (N_6) group according to NCP (1973) classification while none belonged to the relatively strong (N_1 and N_2) strength groups (Figure 1). Few lesser-known wood species appears to have found relevance in the production of classroom wooden chairs and desks in Ibadan as indicated in Table 3. Reason given for these less familiar wood species included relatively low cost and availability in neighborhood plank markets.

Table 2: Wood Species that are used in Production of Wooden Chairs and Desks in Ibadan

S/N	Trade name	Scientific name	Utilization status	Strength group
1	*Black afara	*Terminalia ivorensis*	F	N_6
2	*White afara	*Terminalia superba*	F	N_6
3	*Ayunre	*Albizia zygia*	F	N_3
4	*Ahun	*Alstonia boonei*	LF	N_7
5	*Obeche	*Triplochiton scleroxylon*	F	N_6
6	*Iroko	*Milicia excelsa*	F	N_3
7	*Oro	Nesogodonia papaverivera	F	N_6
8	*Akomu	*Pycnathus angolensis*	LF	N_6
9	*Gmelina	*Gmelina arborea*	LF	N_5
10	*Omo	*Cordia millenii*	F	N_6
11	*Ceiba	*Ceiba pentandra*	LF	N_7
12	*Oro	*Antiaris Africana*	F	N_6
13	Iree	*Funtumia Africana*	LF	N_6
14	Laoro	*Boscia angustifolia*	LF	N_6
15	Ayo	*Brachyestegia eurycoma*	LF	N_3
16	Ogbogbo	*Detarium spp*	LF	N_7
17	Ako	*Holoptela grandis*	F	N_3
18	Agbalumo	*Chrysophyllum albidum*	LF	N_6
19	Obi	*Kola nitida*	LF	-
20	Obobo	*Ficus mucuso*	LF	N_7

Legend : F = Familiar for furniture production; LF= Less Familiar for furniture production
* = the twelve most commonly used wood
Sources: NCP (1973) ; Adewole and Ajibi (2010)

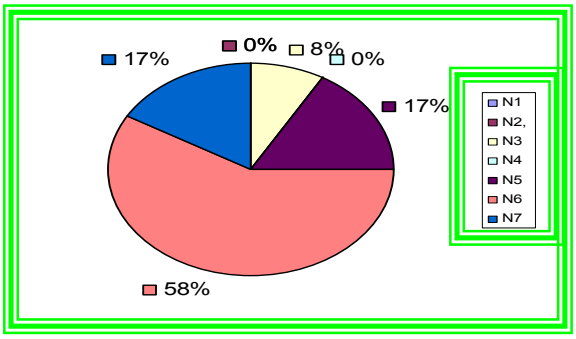

Figure 1: Distribution of Wood Species commonly used for Wooden Furniture Production in Ibadan

The twenty wood species that were in common use were classified into familiar (F) and less familiar (LF) wood species based on the reported utilization trend and availability of information on their wood properties (Table 2). They were among the wood species listed as suitable wood material being currently use for furniture production in Nigeria (Olorunnisola, 2000; Lucas and Olorunnisola, 2002). Lucas (1983) and Lucas *et al,* (2006) however, confirmed the progressive emergence of lesser used species in the Nigerian market. There is an urgent need for the detailed study of the wood properties of these species to guide their optimum utilization.

CONCLUSIONS

This study was able to establish that wooden chairs and desks currently dominate the classrooms in Senior Secondary Schools in Ibadan. The poor durability of these furniture items was traced to poor jointing and non-compliance with detailed engineering principles during production. Similar furniture geometry, constructional method and failure modes were noted in rural, semi-urban and urban schools.

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