



WASTAGE OF SCHOOL MATERIAL RESOURCES AND SECONDARY SCHOOL SYSTEM EFFECTIVENESS: EVIDENCE FROM A SURVEY IN NIGERIA

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ABSTRACT

Article History

Received: 16 April 2020

Revised: 18 May 2020

Accepted: 22 June 2020

Published: 10 July 2020

Keywords

Wastage
Resources
Effectiveness
Secondary
Material resources
School.

This study was undertaken to assess the causal effects of the wastage of school material resources and school system effectiveness in secondary schools in Cross River State of Nigeria. A survey was conducted using a sample of 1,480 respondents (271 principals, 396 vice principals, and 813 teachers). Data were collected through two instruments Wastage of School Material Resources Questionnaire (WSMRQ) designed by the researchers, validated by three experts, and with Cronbach alpha reliability of .895; School System Effectiveness Scale (SSES) designed and validated psychometrically by Bassey, Owan, and Eze (2019) with Cronbach reliability values of .982, .983, and .930 for the three sub-scales, and a reliability coefficient of .941 for the overall instrument. Descriptive statistics and structural equation modelling were employed in analysing collected data. Findings of the study revealed that school material resources are wasted in different and numerous ways. Some of these ways are significant while others are not. Teaching equipment that are wasted in schools include manuals, desks, workbooks, charts, projectors, playgrounds, drawing books, chalks, textbooks, laboratories, chalkboard/whiteboards, markers, handbooks, and computers. It was discovered also that wastage of school farm resources, buildings, and teaching equipment have a direct significant but negative effect on the effectiveness of schools, accounting for 17% of the total variance in the effectiveness of the school. It was concluded, that increment in the wastage of school material resources will cause the effectiveness of schools to decline. The implication of the finding of this study is discussed for global best practices.

Contribution/Originality: This study contributes to the existing literature by being the first to used a structural equation modelling (SEM) approach to analyse the direct and indirect effects of the wastage of school material resources on school system effectiveness.

1. INTRODUCTION

The attainment of full inclusion, rapid economic development, religious unity, and political stability in any country will be a mirage if schools that are supposed to inculcate good virtues in the life of students are failing in their responsibilities. This calls for effective school systems where school leaders are able to integrate and unify

available human and material resources towards reaching set goals. Some key characteristics of effective secondary schools include high rate of students' engagement, performance of activities following laid down patterns and a rate of expectations from staff and students (Owan, Arop, & Agunwa, 2019). The recognition of effective schools can be adjudged through teachers' motivation, students' academic performance, leadership styles of principals, school enrolment and retention figures, graduates' enrolment rate into tertiary institutions, low rates of truancy, drop-out and class repetition (Owan, 2019; Owan et al., 2019). An effective school system is characterized by good leadership, neat environment, basic students' learning rate, internal resource generation and frequent evaluation of learners' progress (Raptis & Fleming, 2003). Therefore, any school with effective teachers, high teachers' motivation, good leadership, good interpersonal relationship amongst staff and between staff and students should be considered to a significant extent, as an effective school (Owan & Ekpe, 2018).

Indices of effective schools, revealed that the effectiveness of many secondary schools in Nigeria seems to be very poor. As such, it requires urgent attention. This is manifested first in the poor service delivery of teachers and secondly, the poor quality of products supplied to both the tertiary education level and the society in general (Bassey et al., 2019). A lot of problems seem to be bedevilling the effectiveness prospect of many secondary schools including the persistent poor performance of secondary school students in normed- and criterion-referenced examinations. Many secondary school leavers are still struggling to pass the Unified Tertiary Matriculation Examination (UTME) as well as aptitude test conducted by universities (Robert & Owan, 2019). For instance, it was revealed that out of 10,423,187 secondary school leavers who sat for the UTME in 2018, only 4.46% scored from 200 and above; 13.51% scored between 180 – 199; 21.59% scored between 160 and 179; 29.71% ; scored 140 – 159; 30.73% scored between 120 – 139 marks (Robert & Owan, 2019). This high rate of failure in UTME has been attributed to the high rate of examination malpractice among students while in secondary schools (Owan, 2019). The prevailing issues of cultism among students, indiscipline and high level of truancy among teachers and students, poor students' attitudes towards academic activities, sales of wares by teachers when they are supposed to be teaching, poor human relations between staff in schools are some compelling reasons of ineffectiveness. Naivety and lackadaisical attitudes of many secondary school principals towards school administration, among others, are other pointers that many secondary schools are ineffective (Madukwe, Owan, & Nwannunu, 2019).

Many stakeholders have been raising questions regarding the quality of schools these days, and are pointing accusing fingers consequently, calling for immediate attention. Efforts has been made by government and other stakeholders to curb the menace of secondary school system ineffectiveness which is prevalence in the provision of school facilities, such as laboratory, library, classroom, staff rooms, and library facilities; frequent payment of staff salaries; provision of retraining opportunities and supply of ICT gadgets. Such remedy of the school system also includes recruitment of new personnel; participative school management with community collaboration; and improved parental support in children education (Aina, Olanipekun, & Garuba, 2015; Arop, Owan, & Ekpong, 2018; Owan, 2019). As a matter of fact, teachers are no longer witnessing delays in receiving their monthly salaries in Cross River State (Owan, 2018). All these measures were anticipated to boost the overall effectiveness of schools through teachers and students, even though the reality still appears to be a nightmare. It was based on this failure that this study was undertaken to shift the paradigm from the highly suspected correlates of school effectiveness to an area that little or no attention appears to have been paid, which could also affect the effectiveness level of schools. This emerging area presumed to affect the quality of schools is the wastage of school material resources.

Wastage of school material resources was considered in this study because these resources offer support to the school and could be used to facilitate effective teaching and learning. Wastages is an unprofitable and uneconomical use of time and resources (Adamu, 2000; Oyetakin, 2011; Samuel, 2004). "Wastage in respect to education refers to human and material resources spent or 'wasted' on students who have to repeat a grade or who drop out of school before completing a cycle" (Ngome & Kikechi, 2015). Wastage denotes the school's inability or inefficiency of a school to make use of available opportunities and resources in the development of students' cognitive, affective, and

psychomotor attributes, that are needed for a productive living and life-long learning (UNESCO, 1998). It is also wastage when students cannot pass examinations and other qualifying tests they have registered for after attaining a certain level of education (Akindele, 2015; Charles, 2013; Muhammad & Muhammad, 2011). The dropout and repetition rates in schools are usually considered as two components of educational wastage (Ngome & Kikechi, 2015).

Wastage of school material resources could be seen as the complete or partial destruction, over-utilisation, and under-utilisation of materials available in the school. Thus, when materials are provided or supplied to schools, and such materials are left to be destroyed by either man, animals, insect, or other biological processes, without serving the need for which they were provided, it is seen as school material resource wastage in the context of this study. Imagine a school where buildings are dilapidated without any efforts made to refurbish them or a school where desks are left in an open atmosphere for both rain, sun, and other natural processes to impede on them. It will lead to destruction and such materials may no longer be available or in good shape for effective utilization. School wastage and stagnation could be affected by various factors such as poverty (inability to pay school fees), school distance, transport communications, teachers' quality, school regime, social environment, school size, school type, violence, and many others (Achoka, 2007; Lyngkhai, 2017).

Materials that are not optimally utilised in line with provisional prescriptions, specifications, and guidelines are also considered as wastage. This is because in cases where lots of facilities are provided beyond the enrolment figures or beyond the number of available users in schools, a large portion of such resources are left unutilized and may rot consequently. This type of wastage is borne out of the over-supply of materials or the under-utilisation of materials that have been provided. Another instance of school material wastage can be seen in a hypothetical example where textbooks are provided by the Government for distribution to students, and for selfish reasons, the principals of some secondary schools refused to distribute same to the target recipients. These books were then stocked in the school library only to be attacked by white ants and termites. In another case, wastage can also be seen in situations where resources are unevenly distributed across classes, sections, schools, or regions. Such that some classes, schools or areas have more than their needs, while other classes, schools, or areas have little or nothing.

Over-utilisation of materials constitutes a waste if available resources are used beyond their carrying capacity or above the degree, they ought to be utilised. Over-utilisation of school material resources occurs due to under-supply of school facilities such that the number of available users exceeds the carrying capacity of facilities. For instance, many school desks could be easily destroyed if the number of students sitting on them is more than the expected number. Imagine 10 students sitting in seats designed for six students. All these forms of material resource wastages could affect the quality of service delivery by teachers, students' academic performance, and the overall effectiveness of schools. This is because many schools could lose their staff, students or both to other well-equipped institutions due to the lack or poor management of required facilities (Dike, 2005). Poor maintenance of school facilities also promotes poor academic performance among learners (Danestry, 2004). There is a nexus between availability of school facilities, students learning and academic excellence in schools (Danestry, 2004). Thus, the optimal use of meagre resources allocated to education and the minimization of wastages can only be guaranteed to ensure efficiency in the educational sector (Akindele, 2005).

More so, poor maintenance of facilities in schools can lead to health and sanitary condition problems. For instance, broken toilets that are not repaired in schools would encourage indiscriminate defecation, that would in turn, give rise to epidemics, infection and other contagious diseases. Thus, putting the lives of the students, members of staff, the immediate neighbourhood and the nation at large at risk (Oladipo & Oni, 2010). It was based on this background that this study was undertaken to assess school material resource wastage and how it affects the effectiveness of the school system.

2. THEORETICAL FRAMEWORK

This study adopts the school effectiveness model (Bassey et al., 2019). This model prescribes that school effectiveness can be traced to two key determinant components – the effectiveness of teachers and the effectiveness of students (Bassey et al., 2019) as shown in Figure 1.

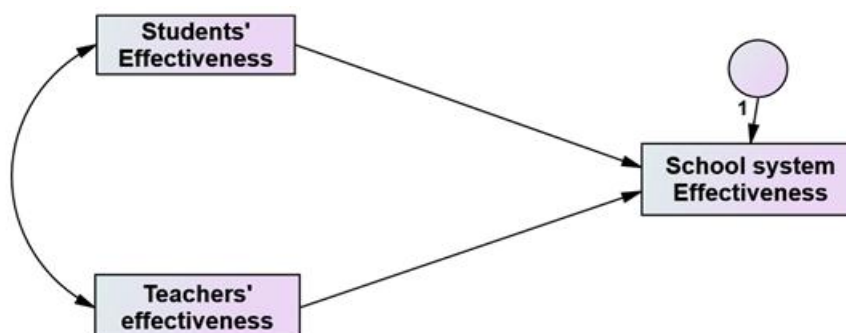


Figure-1. The measurement model of secondary school system effectiveness (Bassey et al., 2019) with estimates removed.

In the model Figure 1, teachers' effectiveness was measured based on indices such as "physical appearance/dressing, subject mastery, lesson preparation, punctuality, instructional delivery, classroom management techniques, students' engagement in learning, understanding of learners' individual differences, monitoring of students' progress, students reinforcement, keeping of students' records, relationships with students, getting students feedback during lessons, lesson evaluation techniques, and academic performance of students" (Bassey et al., 2019). The authors theorised that students effectiveness is concerned with proxies such as "punctuality to classes, time management, students classroom behaviour, class attendance frequency, communication skills, note-taking, attitudes towards assignment, study rate, adherence to school rules and regulation, attitudes towards co-curricular activities, relationship with other students, level of creativity, and examination results" (Bassey et al., 2019). The model predicted that the effectiveness of both teachers and students manifested by the variables listed above will create an effective school system that will be able to implement planned policies, raise high expectations, achieve quality school leadership, maintain cohesion among staff, and build good relationship with the host community. Other benefits of effective school system are provision of good school climate, improving teachers' dedication and students' academic performance, increased graduates enrolment into tertiary institutions, provision of environmental safety, and the attainment of set goals (Bassey et al., 2019).

The implication of this model to the present study is based on the moderating roles teachers' and students' effectiveness will play in linking the wastage of school material resources to school system effectiveness. According to Bassey et al. (2019) teachers' and students' effectiveness are two important measures of school system effectiveness that cannot be left out. Therefore, this study intends to modify this model slightly, by introducing three independent variables – wastage of school farm resources, buildings, and teaching equipment. The modified model of Bassey et al. (2019) based on the variables of this study, is hypothesised in Figure 2.

The model in Figure 2 was hypothesised by the researchers to indicate that wastage of school farm resources, buildings, and teaching facilities have a direct relationship to teachers' effectiveness, students' effectiveness, and school system effectiveness respectively. Teachers and students' effectiveness respectively, were hypothesised to moderate the relationship between wastage of school farm resources, buildings, and teaching facilities to school system effectiveness respectively. Thus, wastage of school material resources was assessed in this study in terms of wastage of school farm resources, wastage of school buildings and wastage of teaching equipment.

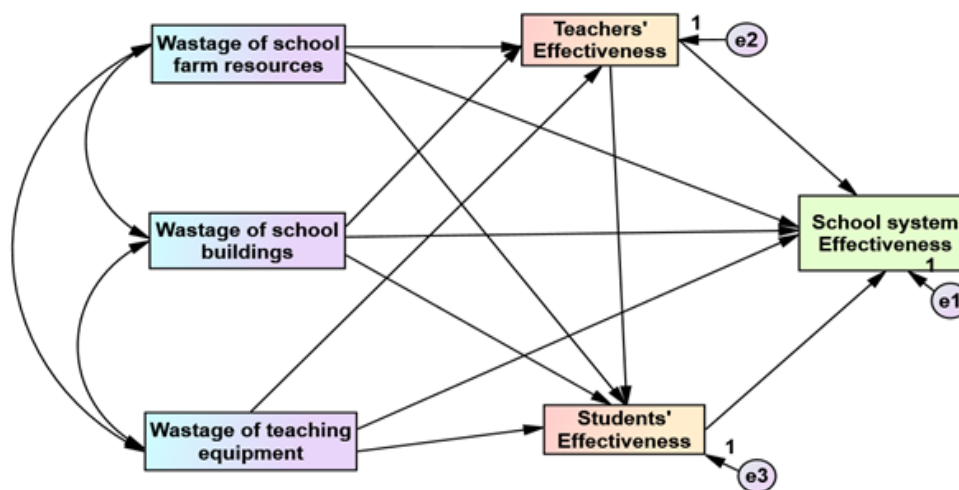


Figure-2. A hypothesised causal model of wastage of school material resources and system effectiveness with teachers' and students' effectiveness as moderating variables.

3. LITERATURE REVIEW

3.1. Wastage of School Farm Resources

Wastage of school farm resources refers to the inability of the school management to effectively maintain and efficiently utilize agricultural outputs and related resources gathered from farming activities in the school. Farming activities in schools is a good source of generating internal revenues to supplement external funding from the Government and other stakeholders. Therefore, the way school leaders manage the output from these farms could go a long way to affect the funding patterns in schools. To [Oladele and Akinsorotan \(2007\)](#) school farms form part of the methods adopted by school heads to generate revenue internally.

The harvest of agricultural products coupled with students' engagement in practical agricultural activities both in terms of crop production and animal husbandry, could also generate revenues for the school. Thus, if these materials are not commercialized for income purposes, the funds they would have generated will be missing. Farm products could be wasted if school leaders divert the monies recovered from the sales of agricultural materials produced in the school into personal projects that do not benefit the school. The consumption of school farm products by staff without any financial returns to the school account is also a waste. Another way in which farm products can be wasted is if they are allowed to be destroyed, stolen or depreciate in value before they are sold.

It had been stated that many school principals rated the school farm as a very important source which provides students with practical experience in agriculture, and promotes agricultural skills in students through agricultural experiments and other opportunities to carryout agricultural demonstration in school plots, among others ([Agili, 2014](#)). Unfortunately, many secondary school heads fail to utilize available school farms as a result of non-availability of seeds, fertilizers, feeds and other operating devices; inadequate training offered to teachers on the use of modern and sophisticated farming implements for practical and instructional purposes; the unserious attitude on the part of the administrators ([Ikeoji, Agwubike, & Disi, 2007](#)). The stated problems have contributed in no small measure to the wastage of school farm resources which leaves the school only in the hands of Parents Teaching Association and other stakeholders for survival and funding. Empirically, a study found that agricultural orientation is given to students through the school farm, especially those with poor or no agricultural background ([Chukwudum & Ogbuehi, 2013](#)). Furthermore, it was reported that school farms are used to stir learners' interest and love for agriculture, and help schools to generate revenue internally ([Chukwudum & Ogbuehi, 2013](#)). Thus, the funds generated from agricultural proceeds could be used to improve other sectors of the school such as the provision of new facilities, employment of part-time teachers to supplement the available full-time teachers, building new blocks, and so on.

3.2. Wastage of School Buildings

It is widely believed that school building to a larger extent has a significant influence on the effectiveness of a school system (McGowen, 2007). By school building we mean physical structures, classrooms, laboratories, libraries, toilets, staff rooms, walls, roofs, drains, doors, windows, floors and also fix furniture. One of the most important facilities necessary to aid rapid school progress and ensure instructional flow is the school buildings (Douglas & Ransom, 2006). Generally, the maintenance culture of Nigerians is very low as many individuals believe that school buildings and other facilities are government properties. Thus, it does not affect them whether they are maintained or vandalized. It is no surprise because there is a popular saying in the country that “government property is no man’s property”, hence, the high rate of negligence by even students who should be the direct beneficiaries of school buildings and other material resources. These acts of negligence seem to have affected schools’ administration as many secondary schools today, lack classrooms, adequate buildings, and other shortcomings that may be attributed to students’ failure to protect material resources provided by the government and other stakeholders. Consequently, it commonplace to see many streams of classes merged into one single room with a class size of over 50 students. This increases the teacher-student ratio above the recommended ratio of 1:35 students by the federal ministry of education (Federal Republic of Nigeria, 2013).

Empirically, Munyi and Orodho (2015) investigated the causes of wastage of school building in public secondary schools from a Kenyan perspective. Findings of the study indicated that many schools lacked enough resources to maintain school buildings, and as a result, there is also increased dropout, repetition as well as low completion and transition rates. This finding implies that there is ineffectiveness of many schools.

3.3. Wastage of Teaching Equipment

Teaching equipment refers to physical and observable resources that are used to facilitate teaching, learning, or both. Teaching facilities include chalk/whiteboards, chalks/markers, textbooks, globes, charts, specimens, map /atlas, workbooks, drawing books, School field (for teaching during co-curricular activities), and so on. This variable was considered because these materials could be wasted through stealing, careless use, malicious destruction, and under-utilization. The wastage of these teaching materials may affect the quality of instruction that will be passed from teachers to students, and the quality of teaching goes a long way to affect teachers’ effectiveness and students’ performance. It was shown in a study that students’ overall academic performance is affected by the relative and composite effects of three critical factors - the condition, effective management and adequacy of educational resources; the combined effects of these three factors outweighed the composite interaction of family background, school attendance, socio-economic status and behaviour on students’ overall performance (Morgan, 2000). It is warned that for educational objectives to be attained, teaching resources are indispensable and should be given a central priority (Abdulkareem, 2011). The only way to achieve this is through principals’ proficient leadership and management capabilities; as well as the timely and adequate provision of school facilities (Abdulkareem, 2011). Using both quantitative and qualitative techniques, a study established that a significant correlation between independent variables such as principal's proficiency, creativity, educational objectives, and the management of school facilities (Uko, 2015). Similarly, Ogbuanya, Nweke, and Ugwokem (2017) discovered that planning, organizing, controlling and coordinating are needed in the management of material resources for effective teaching and learning. The results of the null hypotheses tested revealed that there was no significant difference in mean responses of the respondents on the planning, organizing, controlling and coordinating strategies for proper management of material resources for effective teaching of electrical/electronic technology education.

3.4. The Present Study

Having explored and reviewed literature related to the various areas in this study, it was discovered that there appears to be scanty literature on wastage of school material resources. Previous studies on educational wastage

have focused more on areas such non-employment of school leavers, class repetition rate, premature withdrawals, brain drain, school drop-out rate, misguided education, high rate of failures, and stagnation (Ajayi & Mbah, 2008; Babalola, 2014; Durosaro, 2012; Murithi, 2006; Ngome & Kikechi, 2015; Orwasa & John, 2017; Oyetakin, 2011; Rajesh & Prohlah, 2014; Shiba, 2010; UNESCO, 1998; Yusuf, 2014). These studies have uniqueness since they were carried out in different locations, but with similarity in focus. The present study takes a shift from the conventional model to explore wastage in terms of school material resources. This study was designed to extend the works in the literature into an area that currently appears unattended to. Thus, this study was anticipated to break new grounds and contributes to the literature by filling existing gaps (which is the paucity of research literature on wastage of school material resources).

4. METHODS

This study adopted the descriptive survey research design which is aimed at observing and describing events, facts, and phenomena as they occur in the population. This design does not warrant the manipulation of independent variables. The design was considered appropriate to the study because the researcher made use of data obtained through questionnaires to describe the school materials that are wasted and how they are wasted. The population of this study comprised all the principals (N = 271), vice-principals (N =396) and teachers (6,233) distributed across 271 public secondary schools. Proportionate stratified random sampling technique was adopted in selecting 100% of the principals and vice-principals, and 13% of the available teachers. Thus, all the 271 principals, 396 vice principals were all included in the study, while 813 teachers were randomly selected. This resulted in an overall sample of 1480 respondents. The instruments used for data collection were two sets of questionnaires – Wastage of School Material Resources Questionnaire (WSMRQ) and School System Effectiveness Scale (SSES). The former was designed by the researchers, validated by three experts in educational management, with Cronbach alpha reliability of .895. The instrument has three sub-scales measuring wastage of school farm resources (14 items), school buildings (10 items), and teaching equipment (15 items). In total, the instrument has a total of 39 items. All the items in the questionnaire (WSMRQ) were all organised into the revised four-points Likert scale of Strongly Agree, Agree, Disagree, and Strongly Disagree. The latter (SSES) was designed and validated psychometrically by Bassey et al. (2019) with Cronbach reliability values of .982, .983, and .930 for the three sub-scales, and a reliability coefficient of .941 for the overall instrument (see Bassey et al. (2019)).

Data for the study were obtained from primary sources, as copies of the instrument were administered by the researchers to the respondents. The administration exercise was done on different days based on the schedule prepared by the researchers. Three trained research assistants supported the researchers in collecting data for the study, with efforts made to avoid any loss. In the end, all the administered copies of the instruments were successfully retrieved from the respondents without any shortage. Thus, representing a 100 per cent rate of return on the administered copies of the instrument. All the collected data were scored accordingly for negative and positively worded items, while a computer spreadsheet program (Microsoft Excel 2019 version) was used in coding the data on a person-by-item matrix. Descriptive statistics such as frequency counts, percentage, mean, standard deviation, and bar chart was used to analyse the coded data and answer the research questions; while a structural equation modelling approach (Path analysis) was employed in testing null hypothesis and in building the causal model of the study.

5. RESULTS

5.1. Demographic Characteristics

The participants of this study were 62% males and 38% females. Those who are principals are 18.3%, vice principals are 26.8% and teachers are 54.9%. Most of the participants (55.3%) were first degree holders, while masters, doctorate, and OND/NCE degree holders were 29.5%, 9%, and 6.1% respectively. A higher percentage of

respondents (26.4%) had between 10-14 years' work experience, 24.2% had between 5-9 years' work experience, 18.5% had less than 5 years' experience, 17.4% had 15-19 years' experience, and only 13.4% of the respondents had 20 years work experience and above. In terms of marital status, 66.1% of the respondents are married, 30.1% are single, and only 3.8% had divorced or witnessed a divorce. For age, it was discovered that 23.2% of the respondents are aged 35-44 years, 22.6% are less than 25 years, 21.6% are between 45-54 years, 16.6% are between 25-34 years and 16% of the respondents are either 55 years or older. Furthermore, male respondents who are principals, vice-principals, and teachers stood at 18.8%, 27.8% and 53.4% respectively; and female respondents who are principals, vice-principals and teachers are 17.4%, 25.1%, and 57.5% respectively.

5.2. Research Question 1

In what ways are school farm resources wasted in public secondary schools in Cross River State? This research question was answered using descriptive statistics such as mean and standard deviation. The results of the analysis revealed several significant ways in which school farm resources are wasted in public secondary schools. It was discovered that school farm products are usually stolen by members of the external community before or after they are harvested ($\bar{X}=2.520$, SD = 1.108). Students usually steal farm products before, during, and after harvest ($\bar{X}=2.500$, SD = 1.106). The output from farms are often shared only among staff in the school for private consumption purposes ($\bar{X}= 2.501$, SD=1.104). Farm produce are usually allowed to get rotten while being stored for future purposes ($\bar{X}=2.500$, SD= 1.104). Monies realised from the sales of farm output are usually shared among members of the school farm management committee ($\bar{X}= 2.500$, SD=1.122). Farm resources are also wasted due to poor farm management practices that decrease the yield of crops due to attacks from diseases ($\bar{X}= 2.500$, SD=1.100). Students usually cause damages to farm products due to carelessness while gathering harvested crops ($\bar{X}= 2.500$, SD=1.105). Damages are usually caused to crops during harvest which makes them non-marketable ($\bar{X}= 2.500$, SD=1.100). School farms are operated as staff personal resource rather than a source of generating internal revenue for the school ($\bar{X}= 2.530$, SD=1.100). Fertilizers are not usually applied to crops in the school farm to increase yields ($\bar{X}= 2.510$, SD=1.108).

All these ways mentioned above are considered significant ways in which school farm resources are wasted since their corresponding mean are equal to or greater than the criterion mean value of 2.500. However, other non-significant ways (mean less than 2.500) in which school farm resources are wasted include: damages caused by rodents when farm output are gathered after harvest ($\bar{X}= 2.484$, SD=1.107); poor preservation of farm products due to lack of storage facilities ($\bar{X}= 2.484$, SD=1.107); funds derived from the sales of school farm resources are not used in running the school ($\bar{X}= 2.490$, SD=1.120); animals are not prevented from grazing crops in school farms due to poor fencing ($\bar{X}= 2.480$, SD=1.120).

5.3. Research Question 2

What is the extent to which school buildings are wasted in public secondary schools in Cross River State? Descriptive statistics such as mean and standard deviation were used in analysing the responses. The results indicated that school buildings are wasted to a significant extent in the following ways: Buildings are not regularly maintained to prevent against damage ($\bar{X}=2.523$, $SD= 1.120$); buildings are not used in accordance to provisional prescriptions ($\bar{X}=2.524$, $SD= 1.109$); damaged school buildings are not usually repaired ($\bar{X}=2.526$, $SD= 1.107$); rare inspection of school buildings to determine their state ($\bar{X}=2.511$, $SD= 1.118$); poor re-painting of school buildings when they are washed out ($\bar{X}=2.525$, $SD= 1.120$); Many students cause damage to school building due to poor security ($\bar{X}=2.505$, $SD= 1.202$); rural dwellers sometimes destroy available buildings in schools ($\bar{X}=2.520$, $SD= 1.119$); and school buildings are often used beyond their specified carrying capacity ($\bar{X}=2.516$, $SD= 1.122$). However, the following are non-significant ways in which school buildings are wasted in secondary schools: many school buildings are not used for any purpose ($\bar{X} = 2.482$, 1.122); and woods attached to school buildings are not often treated with chemicals to prevent early damage ($\bar{X} = 2.478$, 1.125). Mean values equal to or greater than 2.500 are considered are significant ways while values below 2.500 are considered as non-significant ways based on the criterion mean of 2.500.

5.4. Research Question 3

What teaching equipment are wasted in public secondary schools in Cross River State? This research question was answered using mean and simple percentage as descriptive statistics. The result of the analysis is presented in [Table 1](#) to show the various school materials that are wasted in secondary schools.

Table-1. Mean rating of teaching facilities and their rate of wastage in secondary schools.

Teaching equipment	Score	Mean	Rate of wastage
Textbooks	4406	2.98	6.65%
Chalks	4411	2.98	6.66%
Charts	4431	2.994	6.69%
Markers	4388	2.965	6.63%
Chalk/whiteboard	4405	2.976	6.65%
Workbooks	4443	3.002	6.71%
Drawing books	4421	2.987	6.68%
Computers	4377	2.957	6.61%
Desks	4452	3.008	6.72%
Handbooks	4389	2.965	6.63%
Manuals	4455	3.01	6.73%
Laboratories	4408	2.978	6.66%
Libraries	4399	2.972	6.64%
Playgrounds	4418	2.985	6.67%
Projectors	4423	2.988	6.68%

Note: *Criterion mean = 2.5.

The result presented in [Table 1](#) indicated that the following teaching facilities such as textbooks, chalk charts, markers, chalkboard/whiteboards, workbooks, drawing books, computers, desks, handbooks, manuals, laboratories,

libraries, playgrounds, and projectors are wasted in secondary schools. These materials are wasted at different rates ranging from 6.61% – 6.73% with their mean values ranging from 2.957 – 3.01. Based on the criterion mean value of 2.500, the mean wastage levels of the teaching facilities contained in Table 1 are considered as significantly high since all their mean values are greater than the criterion mean of 2.5. This result is further presented in Figure 3 below for proper visualisation.

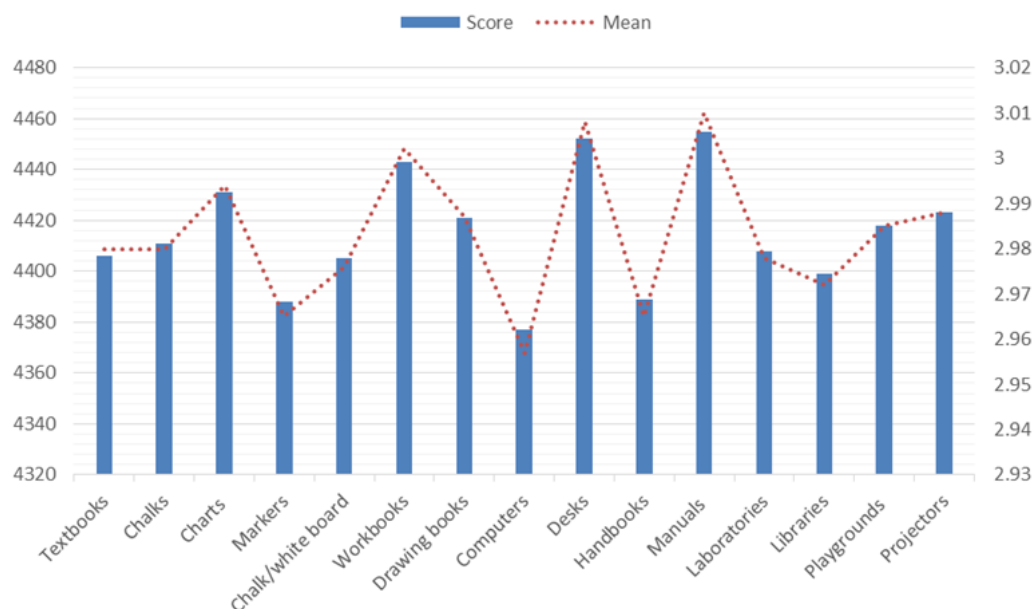


Figure-3. Teaching equipment and the rate of their wastage in secondary schools.

Figure 3 shows that, out of all the teaching facilities that are wasted in secondary schools as indicated by the respondents of this study, manuals were the most wasted. This is followed closely by desks, workbooks, charts, projectors, playgrounds, drawing books, chalks, textbooks, laboratories, chalkboard/whiteboards, markers, handbooks, and computers, in that order.

5.5. Research Question 4

What are the significant paths connecting the association between wastage of school farm resources, school buildings, and teaching equipment to school system effectiveness, with teachers and students' effectiveness as moderating variables? This research question was answered using a structural equation modelling approach based on the hypothesised causal model see Figure 2. The model was tested to determine the significant and non-significant causal paths. However, non-significant paths were removed in the measurement model as shown in Figure 4.

The results in Figure 4 revealed that wastage of school farm resources have no significant direct relationship to teachers' effectiveness and students' effectiveness respectively. Wastage of school farm resources was discovered to have a negative effect ($\beta = -0.056$, $t = -2.072$, $p < .05$) on school system effectiveness. Wastage of school buildings have a significant, direct, and negative effect on teachers' effectiveness ($\beta = -0.292$, $t = -10.926$, $p < .05$), students' effectiveness ($\beta = -0.209$, $t = -7.788$, $p < .05$), and school system effectiveness ($\beta = -0.056$, $t = -2.072$, $p < .05$) respectively. Wastage of school teaching equipment has a direct, significant positive effect on teachers' effectiveness ($\beta = .106$, $t = 4.087$, $p < .05$) and students' effectiveness ($\beta = .059$, $t = 2.364$, $p < .05$) respectively; and a direct significant negative effect on school system effectiveness ($\beta = -0.094$, $t = -3.788$, $p < .05$). Teachers and students' effectiveness moderated the effect of wastage of school buildings and teaching equipment on school system effectiveness. Teachers' effectiveness has a direct positive and significant effect ($\beta = .270$, $t = 10.789$, $p < .05$) and school system effectiveness

($\beta = .264$, $t = 10.249$, $p < .05$) respectively. Students' effectiveness has a direct significant positive effect ($\beta = .187$, $t = 7.270$, $p < .05$) on school system effectiveness.

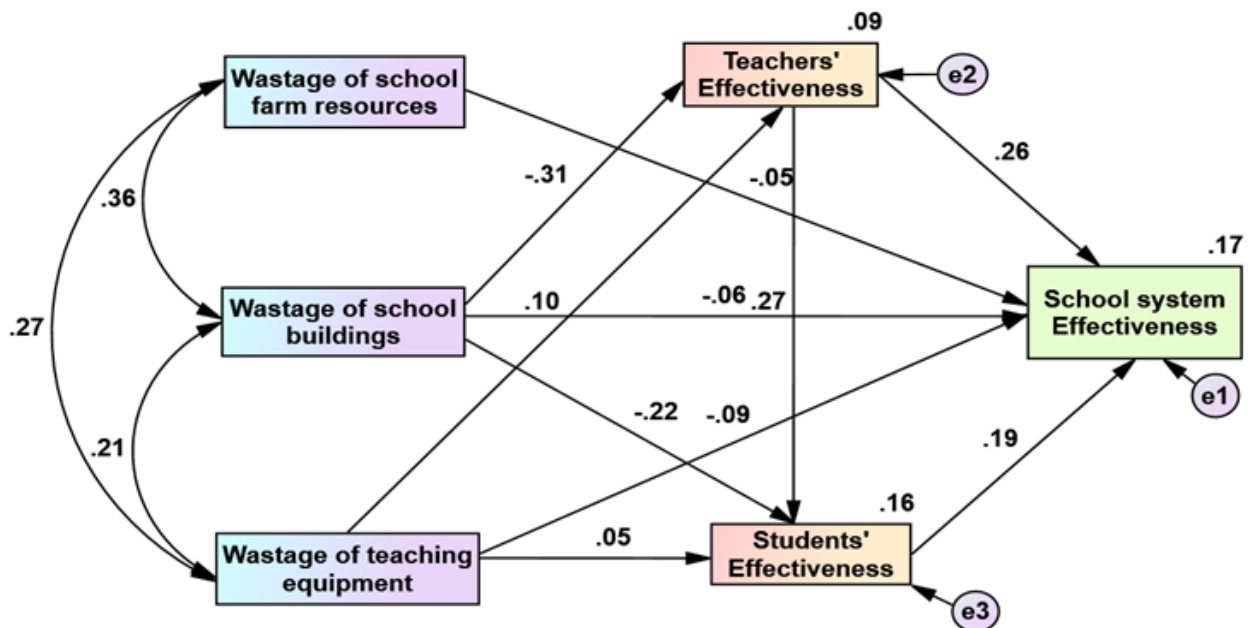


Figure-4. The causal measurement model of the association between school material resources and system effectiveness with non-significant paths removed.

It was also discovered through Figure 4 that wastage of school buildings and teaching equipment contributed on a joint basis, 9% to the total variance in teachers' effectiveness; with the remaining 91% accountable by other independent variables not included in the model. It was also shown that 16% of the total variance in students' effectiveness is explained by the joint effect of wastage of school buildings, wastage of teaching equipment and teachers' effectiveness; with the remaining 84% of the variance explained by other predictors not included in the model. Jointly, wastage school farm resources, school buildings, teaching equipment, students and teachers' effectiveness could be held accountable for 17% of the total variance in school system effectiveness; with the remaining 83% of the variance explained by other independent variables not included in the model.

The structural equations of this study, presented in hierarchical linear regression forms is as follows:

$$TE = WSB + WTE + e_2$$

$$SE = WSB + WTE + TE + e_3$$

$$SSE = WSB + WTE + WSFR + SE + TE + e_1$$

Where:

WSFR = Wastage of school farm resources.

WSB = Wastage of school buildings.

WTE = Wastage of teaching equipment.

TE = Teachers' effectiveness.

SE = Students' effectiveness.

SSE = School system effectiveness.

6. DISCUSSION OF FINDINGS

This study revealed that school farm resources are wasted in numerous ranging from stealing by students, rural dwellers, and attack by pest and diseases, to the non-commercialisation of agricultural products for private consumption by teachers. This finding suggests that school farm resources are given little or no priority as a source of generating internal revenues for the school due to the poor maintenance of school farms, poor security of crops

before and after they are harvested, as well as the gluttonous and selfish attitudes of principals and teachers. This finding tallies with the results of [Ikeoji et al. \(2007\)](#) which discovered earlier that many principals failed in the management of school farm resources due non-availability of seeds, fertilizers, feeds and other operating devices; inadequate training offered to teachers on the use of modern and sophisticated farming implements for practical and instructional purposes; the unserious attitude on the part of the administrators.

It was also discovered in this study that school buildings are wasted generally, to a significant extent. These significant ways include poor maintenance, non-utilisation of school buildings according to prescriptions, poor repairs of damaged buildings, rare inspection and assessments of school buildings, poor re-painting practices, destruction of structures by students and rural dwellers, the poor security and over-usage of school buildings. However, the following are non-significant ways in which school buildings are wasted in secondary schools: many school buildings are not used for any purpose and woods attached to school buildings are not often treated with chemicals to prevent early damages. This finding corroborates the results of [Munyi and Orodho \(2015\)](#) who discovered through findings of a study that many schools lacked enough resources to maintain school buildings, and as a result, there is also increased dropout, repetition as well as low completion and transition rates. The finding of [Munyi and Orodho \(2015\)](#) has implications to the finding of the present study because, where there are inadequate resources to maintain school buildings, the buildings which will be left unattended to, may become dilapidated with serious consequences on the students' and school performance.

It was discovered through the third finding of this study that numerous teaching equipment are wasted in secondary schools. The teaching equipment presented in descending order of wastage include manuals, desks, workbooks, charts, projectors, playgrounds, drawing books, chalks, textbooks, laboratories, chalkboard/whiteboards, markers, handbooks, and computers. This finding is not surprising since many schools either over-utilise or under-utilised these materials. Some of these materials such as workbooks, handbooks, manuals, and other library facilities are usually left to be damaged by insects and due to the poor condition of libraries in many schools. Computers and projectors are also wasted due to ineffective and inconsistent power supply coupled with the unemployment of professional computer science educators. Similar to the finding of this study, the study of [Ogbuanya et al. \(2017\)](#) revealed that there was no significant difference in mean responses of the respondents on the planning, organizing, controlling and coordinating strategies for proper management of material resources. By implication, the finding of [Ogbuanya et al. \(2017\)](#) suggests that poor management of material resources is common among different principals.

This study revealed also that wastage of school farm resources has no significant direct relationship to teachers' effectiveness and students' effectiveness respectively, but was discovered to have a negative effect on school system effectiveness. This finding suggests that there is no business between the wastage of school farm resources and teachers or students' effectiveness. In other words, whether school farm resources are wasted or not, it does not affect the way teachers and students go about their duties but affect the way the school operates. This finding may be because most farm resources are easily converted into monetary values for school improvement. These monies especially when they are not used to motivate teachers or students for their hard work, will not cause any increase in their effectiveness levels. Even when teachers or students are motivated through the proceeds from school farms, the thinking of many of them will be that they are only receiving the rewards of their labour in the school farms. Thus, they are likely not to see such efforts as anything special to warrant a change in their behaviour or attitude to work. The school system will witness a decline because where school farm products are wasted, limited capital will be raised from school farms into the internally generated revenue income stream. This finding supports [Chukwudum and Ogbuehi \(2013\)](#) who discovered that that agricultural orientation is given to students through the school farm, especially those with poor or no agricultural background.

Wastage of school buildings was discovered to have a significant, direct, and negative effect on teachers' effectiveness, students' effectiveness, and school system effectiveness, respectively. By implication, a decrease in the

wastage of school buildings will cause teachers, students, and school system effectiveness to increase, other things being equal. This finding is not a surprise because when school buildings are not wasted, a conducive environment is bound to be available for students and teachers' utilisation. This provides sufficient space for academic and office activities to thrive, thus, increasing the effectiveness of the school directly, or through the moderating effect of the teachers and students' effectiveness.

Wastage of school teaching equipment has a direct, significant positive effect on teachers' effectiveness and students' effectiveness respectively; and a direct significant negative effect on school system effectiveness. This finding is quite surprising that teachers' or students' effectiveness will increase as the wastage of teaching facilities increases. The result may have appeared this way because of the high level of effectiveness of many students towards studies and teachers towards service delivery. Thus, wastage school of farm resources do not seem to affect the quality of their effectiveness. The finding may have appeared also like this, based on how these materials are wasted. If the materials are squandered or over-utilised then it may improve teachers and students' effectiveness, and decrease school system effectiveness (Since it is the school that provides some of the teaching equipment and teachers or students are the ones utilising them) in the short-run.

For instance, imagine a teacher that uses a complete packet of chalk to teach a 40 minutes lesson and throwing the remaining chalks in the packet away. The teacher may go on to teach the lesson effectively, and students may also benefit (since the teacher had taught well), but throwing the remainder of the chalk away will be a cost to the school's management. This finding agrees with the results of [Morgan \(2000\)](#) that students' overall academic performance is affected by the relative and composite effects of three critical factors - the condition, effective management and adequacy of educational resources.

It was discovered that teachers' effectiveness has a direct positive and significant effect on school system effectiveness respectively which supports the model of [Bassey et al. \(2019\)](#). The study also discovered that students' effectiveness has a direct significant positive effect on school system effectiveness which is similar to the results of [Bassey et al. \(2019\)](#).

7. CONCLUSION

Based on the findings of this study, it was concluded that school farms resources and school buildings are wasted in so many ways by principals (through poor management), students and rural dwellers (through theft and malicious damages), insects, pest, disease and other natural processes. Different school teaching facilities ranging from chalks to computers are wasted by teachers, students and other users in the school. It is also concluded that wastage of school material resources has a significant, direct and inverse effect on school system effectiveness generally. Increment in the wastage of school material resources will cause the effectiveness of schools to decline. The implication of the finding of this study is that many school material resources will continue to be wasted in the future unless something urgent is done to address this issue in a timely manner. Secondary school managers will also be able to raise the quantity of internally generated revenues if they are aware of the benefits that proper management of school material resources can provide. Principal awareness of the minimisation of school material resource wastage will also lead to cost efficiency for the attainment of desired educational outcomes in secondary schools in Cross River State, Nigeria. Principals will also be able to use the most efficient ways of achieving secondary school objectives, given a specific amount of school material resources (cost effectiveness) in secondary schools in Cross River State, Nigeria.

8. LIMITATIONS OF THE STUDY

This study made use of only a sample of 1,480 respondents which limits the generalisations made to the entire population, thus a broader study is required in order to validate the results of this study. The study' scope in terms of variables covered and area of study was delimited to one state in Nigeria and three variables of school material

resources wastage. Meaning that future researches in related areas need to integrate more variables, and a large-scale assessment is required for a better understanding. Lastly, the dearth of empirical literature in related areas narrowed the base and theoretical grounds of the study's findings. These limitations have opened up further gaps for prospective researches in the area of wastage of school material resources and school system effectiveness.

9. RECOMMENDATIONS

Based on the conclusion of this study, the following recommendations were made:

- i. Secondary school managers should be sensitised through workshops or conferences on the importance of managing school material resources to eliminate wastage in schools.
- ii. Proceeds from school farms should not purely be shared among staff for private consumption, but should also be marketed to increase internally generated funds in the school.
- iii. Students and rural dwellers should be prevented from gaining unauthorised access to school farm sites or storage location through proper fencing and security at all times.
- iv. Insecticides and pesticides should be applied to school material resources such as library facilities, crops, woods, and barns. This will help in curtailing the rate at which insects and pest will cause damage to school material resources.
- v. Teachers, as well as students, should be enlightened by school principals on the need to avoid negligent utilisation of school material resources which causes wastage that reduces the level of school effectiveness.
- vi. The government at all levels, should support secondary schools in the management of school material resources through an adequate supply of facilities and proper supervision or audit of their utilisation.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Acknowledgement: All authors contributed equally to the conception and design of the study.

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