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EDITORIAL

Human development is a broad and comprehensive concept concerned with economic growth and its distribution, basic human needs and variety of human aspirations, and distress of the rich countries and the human deprivations of the poor. Going beyond economic development, which is concerned with income and growth, human development covers all human capabilities. It is "a process of enlarging people's choices" created by expanding human capabilities.

Economic growth is essential for all human development because no society has been able to sustain the well being of its people without continuous economic growth. On the other hand, it is healthy and educated people that can contribute to economic growth through productive employment and increase in income. Thus, economic development is a means to human development. Hence, development theoreticians and practitioners must pay equal attention to economic development and human development.

Hitherto, emphasis has been on economic development – not on people's adequate nutrition, access to safe drinking water, better medical facilities, better schooling for their children, affordable transport, shelter, secure livelihood and productive and satisfying jobs. It is to address this gap that the *Sustainable Human Development Review* (SHDR) was born January 2009 as an international multidisciplinary academic research journal. Its Volume 1 Number 1 of March 2009, Volume 1 Number 2 of June 2009, Volume 1 Number 3 of September 2009 and Volume 1 Number 4 of December 2009 kept to faith, courtesy of our esteemed contributors across the globe as well as diligence and commitment of our dedicated reviewers and editors.

From *SHDR* Volume 2 Number 1 of March 2010, *Editorial*, which had been hitherto not considered necessary, was introduced, in conformity to the practice of globally acclaimed journals of academic research output. This Volume 9 Number 2 of June 2017 of SHDR presents another set of rich articles touching various topical human development issues.

In the first article, titled *Spatial-temporal analysis of noise pollution from vehicular traffic in Uyo metropolis, Nigeria*, John O. Esin (Ph.D.) and Mfonobong E. Afahakan of the Department of Meteorology and Hydrology, Maritime Academy of Nigeria, Oron, Akwa Ibom State, Nigeria determined the spatial and temporal levels of noise pollution generated from urban traffic in Uyo metropolis. Using noise dosimeter, data on the levels of noise pollution from vehicular traffic were obtained in eight (8) major transport routes, with high traffic density and the values compared to the ambient quality limit of the WHO standards. The noise level readings were taken in the mornings, afternoons and evenings of Monday, Wednesday, Friday and Sunday. Data on health implication of noise pollution were obtained through the use of structured questionnaires administered to 200 randomly sampled households along major streets selected for the study. The results show that 7 out of the 8 streets

sampled for the study had all the weekday noise readings and most weekends exceeding the International Financial Agency and Environmental Protection Agency noise thresholds of 55decibels for residential and 70 decibels for industrial and commercial areas. The study recommended the promulgation and implementation of a noise bill and empowerment of regulatory agency as major ways of solving the menace of noise pollution from vehicular traffic.

In the seccond paper, titled *Effect of open book management on organizational performance in selected manufacturing firms in Enugu State, Nigeria*, Nnaji, P.A. and Agbaeze, E.K. of the Department of Management, Faculty of Business Administration, University of Nigeria, Enugu Campus, investigated the effect of open book management on organizational performance in selected manufacturing firms in Enugu State, Nigeria. The study adopted the survey research design. The population of the study was a total of 1,276 staff of the five selected manufacturing firms in Enugu State, Nigeria. The sample size 125 was obtained from the population using Evans Morris formular at 95% confidence level and 5% margin of error. Data were collected using the questionnaire research instrument which was designed on a 5-point Likert scale and manually administered to the respondents. Interview was also used. The hypotheses were tested using regression analysis. Findings indicated that transparency had a significant and positive effect on organizational survival ($r = 0.875$, $p < 0.05$) and employee participation in decision making significantly had positive effect on employee output($r = 0.866$, $p < 0.05$). The study recommended that in the practice of open book management, organizations should place emphasis on ensuring the practice of transparency among the employees and employees should be involved at certain levels in the decision making process and/or should be kept abreast of management's decision processes and decisions. The study concludes that open book management processes put the organization on a pedestal for achieving organizational growth, employee performance and sustainability

In the third paper, titled *E-waste environmental pollution and health risk implications for early child care, growth and development in Nigeria*, Umar Ibrahim of Department of Early Childhood Care and Education, Federal College of Education, Zaria, Kaduna State, opines that Nigeria is one of the dumping grounds for electrical and electronic waste materials and appliances that are outdated or close to end-of-life cycle (e-waste). E-waste contains potentially harmful substances. Inappropriate and unsafe management practices of these wastes can cause environmental pollution and health hazard and impact early child care, growth and development. The study examines the issues of disposal, recycling and proper management of e-waste materials in order to tackle the menace of health risk exposure to early life. Some recommendations were made as; All stakeholders (government, industry, environmental groups, and citizens) must work in cooperative collaboration with NESREA to effectively manage and mitigate the problems of e-

waste in Nigeria. Nigeria should immediately ratify the Bamako Convention and entrench stringent enforcement regime of the National Environmental (Electrical/Electronic Sector) Regulations 2011 and the Nigerian Decree of 1988 prohibiting all imports of hazardous wastes.

In the fourth paper, titled *E-waste management in Nigeria: Issues and challenges*, S.O. Omorodion of the Department of Metalwork Technology Education, School of Technical Education, Federal College of Education (Technical), Asaba, Delta State notes that access to ICT is pivotal to a country's economic and social development. The access to ICT is currently improving throughout the developed and developing world. Nigeria has been undergoing rapid ICT transformation in recent years, attempting to bridge the digital divide by importing electrical and electronic equipment (EEE), which soon become technologically obsolete and find their way into landfills as electronic waste (e-waste) that pose health and environmental hazards to humans, livestock and ecology, if not properly managed. This paper reviews the issues relating to e-waste and identifies their sources, components and the dangers they pose to the environment. Sustainable means of managing e-waste in Nigeria was discussed. Recommendations were made on appropriate treatment of e-waste in order to make the environment safe for all.

In the fifth paper, titled *African natural resources exploitation and the challenges of sustainable environment*, Hamza Alhaji Sulaiman (Ph.D) of the Department of Curriculum and Instructions, School of General Education, Shehu Shagari College of Education, Sokoto, opines that Africa is the second largest continent on earth with enormous abundance of untapped natural resources, with much of the resources yet undiscovered for exploration, exploitation, mining and development. In the neo-colonial era, Africa is under heavy pressure and tensions leading to wars, poverty and slow development, as the western nations and emerging economic powers like China, exploit Africa's economic powerhouses, taking most of the value and money from it. This informs why the region receives the largest foreign direct investment. African countries lack transparency in governance and in resource development and revenue generation. In combating the situation, African leaders should be mindful of sustainable environment strategy for the benefit of present and future human society. To bring about the needed development, there ought be reforms to enable the governments fight both exploitation and corruption in the sector. There is also the need to ensure the employment of the most recent methods and technologies for exploitation of the various mineral resources.

In the sixth paper, titled *Using ICTs for teaching and learning in early childhood care education (ECCE) in the 21st century*, Obidike, I.V. of the Department of Early Childhood Care and Education, Federal College of Education, Zaria opines that information and communications technologies (ICTs) impact positively on the field of education in most developed countries. But, it they are still relatively new in classroom lerning and instruction in developing countries. This review study is an attempt to explore

the use of ICTs in early childhood care education (ECCE) in the 21st century. The population comprised of 50 teachers from five ECCE schools in Zaria Local Government Area of Kaduna State. The instrument for data collection was structured questionnaire, and data collected were analysed. Findings showed that ICTs are potential powerful enabling tools for effective teaching and learning in early childhood education. However, if not properly used, they can cause harm to the young ones. ICTs can provide additional strategies to address major educational challenges being faced by teachers and children in (ECCE) in the 21st century. The study recommends appropriate use of ICTs to influence and change traditional methods of teaching and learning in early childhood care education, thereby, ensuring quality education.

We pray that all those whose papers could not make it in this issue would understand, and try to send better-quality papers in future for our globally competitive review process. We most sincerely congratulate those whose papers made it to this Issue. We heartily thank all our esteemed contributors and enjoin them not to flag in their zeal for research and publishing, which are veritable tools for confronting abounding development challenges in developing countries in efforts to develop the total man. We welcome contributions in all disciplines across the globe (see *Author's Guide*, p.84).

Contributors are also encouraged to take advantage of our sister journals, *Journal of Applied Sciences and Development* (JASD) and *Technoscience Review* (TR) to stagger their academic outputs in our academic high-quality Journals, which are now published online (see *www.wiprointernational.org*) for visibility and global ranking in line with modern practice. It is gladdening to report that all our three Journals have joined the globally high impact factor and competitive Journals indexed/archived by GoogleScholar, PKP PLN locks, CiteSeerX, DataCite, JSTOR, Scopus, AJOL, Microsoft Academic, etc.

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SPATIAL-TEMPORAL ANALYSIS OF NOISE POLLUTION FROM VEHICULAR TRAFFIC IN UYO METROPOLIS, NIGERIA

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Abstract

The study investigated the relationship between vehicular traffic and noise pollution in Uyo metropolis, Akwa Ibom State, Nigeria. Specifically, the study aimed at determining the spatial and temporal levels of noise pollution generated from urban traffic in Uyo metropolis. Through the use of noise dosimeter, data on the levels of noise pollution from vehicular traffic was obtained at eight (8) major transport routes, with high traffic density and the values compared to the ambient quality limit of WHO standards. The noise level readings was taken in the mornings, afternoons and evenings of Monday, Wednesday, Friday and Sunday respectively. Data on health implication of noise pollution was obtained through the use of structured questionnaires administered to 200 randomly sampled households along major streets selected for the study. The results show that 7 out of the 8 streets sampled for the study had all the weekday noise readings and most weekends exceeding the International Financial Agency and Environmental Protection Agency noise thresholds of 55decibels for residential and 70 decibels for

industrial and commercial areas. The study recommends the promulgation and implementation of a noise bill and empowerment of regulatory agency as major ways of solving the menace of noise pollution from vehicular traffic.

Introduction

Noise is derived from the Latin word "nausea" implying 'unwanted sound' or 'sound that is loud, unpleasant or unexpected'. It is a by-product of urbanization and industrialization, which has been recognized as a major problem in urban areas with many adverse health effects in recent time (Zannin et al., 2003; Lisa and Louis, 2007; Nathaniel, 2007; Pathak et al., 2008). Recent studies indicate that vehicular traffic, railway and air traffic are the most important factors contributing significantly to noise pollution in urban areas (Oyedepo and Saidu, 2010; Sazegar et al., 2005) with vehicular traffic contributing about 55% of the total urban noise (Martin et al., 2006; Omidrain and Nouri 2009; Amrah et al., 2006). This informed why noise pollution from vehicular traffic is recognized as a major problem for the quality of life in urban areas all over the world. Noise pollution from vehicular traffic has been in the increse in the urban areas due to rising number of vehicles in the urban space and increase industrialization. Noise in cities, especially along main arteriars, has reached up an alarming and disturbing levels in recent time. It is therefore not unpopular to see residences far from noise sources and near silent secondary roads as people prefer to live in places far from noisy urban areas (Yılmaz and Özer, 1998).

Several studies (Payer, 2007; Dratva et al., 2010; Matheson, et al., 2010; Dino, et al., 2011) have been conducted to address the problem of noise pollution in many cities of the world, central to the findings of these studies are the scale of discomfort that noise causes in people's lives (Butcha and Vos, 1998; Kura et al., 1999; Ali and Tamura, 2003; Marius et al., 2005). Depending on its duration and volume, the effects of noise on

human health and comfort are classified into four categories: physical effects, such as hearing defects; physiological effects, such as increased blood pressure, irregularity of heart rhythms and ulcers; psychological effects, such as disorders, sleeplessness and going to sleep late, irritability and stress; and finally effects on work performance, such as reduction of productivity and misunderstanding what is heard (Job, 1996; Evans and Hygge, 2000; Stansfeld et al., 2000; Passchier-Vermeer and Passchier, 2000; Quis, 2001; Marius, 2005). Noise is becoming an increasingly omnipresent, yet unnoticed form of pollution even in developed countries. Though noise pollution is a slow and subtle killer, yet very little efforts have been made to ameliorate it. Kiernan (1997) asserts that even relatively low levels of noise affects human health adversely; as it may cause hypertension, disrupt sleep and/or hinder cognitive development in children. The effects of excessive noise could be so severe that either there is a permanent loss of memory or a psychiatric disorder (Bond, 1996). Thus, there are many an adverse effects of excessive noise or sudden exposure to noise.

Arising from the negative impacts of noise pollution on human wellbeing, several initiatives have been taken by various countries to control noise level. For example, USA has taken initiative to create sites where human-caused noise pollution will not be tolerated (Geary, 1996). Similarly, the European Union (with more than 250,000 inhabitants) requires that 'noise maps' of big cities are drawn up by 2002 (New Scientist, 1998). To safeguard against ill effects of noise, the laws of Netherlands do not permit building of houses in areas where 24-hour average noise levels exceed 50dB. And in Great Britain, the Noise Act empowers the local authorities to confiscate the noisy equipment and fine people who create excess noise at night. Recently, several countries set standard limits for noise abatement. The standard guideline for the control of noise states that residential institutional and educational institutions should not be over 55dBA between 7am and 11pm and 45dBA between

11pm till 7am, while industrial and commercial exposure should not be over 70dBA all time (IFC,2007). In some places these standards are usually not complied with, especially in major urban centres, exposing people to the risk of noise discomfort. A report published by Stockholm University for the World Health Organization in 1995 concluded that noise levels outside dwellings should not exceed 55dB(A) to protect the majority of people from being seriously annoyed, and that 50dB(A) should be considered the maximum desirable.

Evidently, noise pollution has assumed alarming proportions affecting adversely the efficiency of various populations, mental health and general quality of life. Moreover, it is becoming a problem of law and order with the growing number of complaints to police and administration. Unless and until, measures are taken to control the level of noise, the quest for rapid urbanization and industrialization may complicate the problem so much that it becomes incurable. The fast growing vehicle population coupled with unplanned traffic route in Uyo metropolis in the recent years, has resulted in considerable increase in traffic on roads causing alarming noise pollution, with obvious socio-economic and attendants health implications. Study by Akpan (199) indicates that on the average a salon car in Uyo metropolis produces noise of the order of 70decibels and a heavy truck, 100 decibels. In spite of these alarming increase in vehicular traffic, no much empirical research has been conducted to ascertain the possible effects of increase level of noise pollution from vehicular traffic on the socio-economic life of humans in the metropolis. Again, while systematic evidence on the implications of noise pollution from vehicular traffic in developing countries is relatively scarce, a growing body of work on noise levels and its possible impacts on the health status of urban dwellers has been documented in many forms in developed countries (Sukuru, 2006; Lee and Fleming, 2002). Given this background, there is a need for a study of to identify the spatial-temporal effects of noise pollution on human health status from vehicular traffic to be carried out, as

such study would provide an empirical and policy driven information on existing noise levels as it affects the health status of urban dwellers. Aside this, such study will further enrich the knowledge of policy makers, researchers and those in academic especially in development studies by providing vital planning inputs evolving policy towards control; aside drawing attention to the inadequacies of policy prescription as it affects diverse and vulnerable sections of the study area.

Against the aforementioned, this study investigated spatial-temporal levels of noise pollution from vehicular traffic in Uyo metropolis, Akwa Ibom State Nigeria, with the following specific objectives:

1. To identify the spatial-temporal patterns of noise pollution from vehicular traffic in Uyo metropolis
2. To determine the relationships between vehicular traffic and noise pollution levels on the one hand and, vehicular traffic concentration and noise pollution levels on the other hand in Uyo metropolis.
3. To identify the effects of noise pollution on the health status of households in Uyo metropolis.

Literature review

Literature on noise pollution from vehicular traffic are well documented, these include Singh and Mahajan (1990); Bhargawa (2001); Schade (2003); Haines et al (2003); Stansfeld et al (2005); Clark et al (2006); Adams et al (2006); Payer (2007); Dratva et al (2010); Matheson et al (2010); NPSE (2010); and Dino et al (2011) among others. Mounting evidence reveals that noise level in several metropolitan cities exceeds specified standard limits, which is responsible for rising incidence of deafness among urban households (Bhargawa, 2001). A study by Singh and Mahajan (1990) conducted in Delhi and Calcutta, found that the noise level is 95dB as against the ambient limit of 45dB. Even at the "calm" places, it does not fall below 60dB. Murli and Murthy (1983) also found

that traffic noise in Vishakhapatanam exceeds 90dB even in morning hours that acts as a source of nuisance. Bond, (1996) reports that 16% of people in Europe are exposed to 40 dB or more of traffic noise in their bedrooms at night compare with W.H.O.'s average estimates of 30 to 35 dB for undisrupted sleep.

As Payer (2007) observes, heightened public sensitivity to noise arose in many European cities during the latter half of the nineteenth century, and was derived in large part from the significant increases in traffic associated with urban industrialization. The influx of horse-drawn carts, pedestrians and cyclists, streetcars, railroads and automobiles to industrialising cities was a notable contributor in this regard, and the side effects of urban noise were being treated by medical health departments as an important health issue by the 1880s, in particular for their association with 'nervous behaviour'. Payer (2007,) attests:

> *Without doubt, noise was assigned a special position among urban nuisances for physiological reasons. Many argued that unlike other sensory organs, the ears could not be sealed and were therefore unprotected against all sorts of penetrating noises.*

Whilst noise is often regarded as a nuisance associated with contemporary urban living (Schade, 2003), the issue is also widely recognised as a significant public health burden, particularly for its association with sleep deprivation, cognitive impairment (in children), high blood pressure, cardiovascular disease, and fatal heart in the transport literature. Dinno *et al.*, (2011,), for example, recognise that long-term noise exposure from rapid transit makes vulnerable those segments of society that the system principally serves; thus, school-age children, elderly people and people of low-income would necessarily be more vulnerable to these negative impacts. Dratva *et al.'s* (2010) research on road traffic-related noise exposure revealed that women reported significantly higher levels of noise

annoyance and thus lower health-related quality of life than men. Children have also been recognised as particularly vulnerable to the negative health effects associated with traffic noise (especially aircraft noise), as exposure has been associated with cognitive impairment and issues with reading comprehension (see Clark *et al.,* 2006; Matheson et al., 2010; Stansfeld *et al.,* 2005, and others), and the impact of aircraft noise is viewed as more significant than road traffic noise (Haines *et al.,* 2003).

Despite the wealth of studies that consider the impact of traffic noise on residents, Adams *et al.* (2006) observe that it is visual aesthetics not acoustic properties that dominate in urban planning policy and guidance. The importance of this issue within the UK, however, has arisen in the form of the *Noise Policy Statement for England* (NPSE) (2010), which recognises the adverse health and quality of life impacts associated with noise exposure (but does not elaborate as to the distributional effects associated with this type of impact); and the Mayor of London's (2004) *Ambient Noise Strategy*, that acknowledges the inequalities regarding noise exposure, such as for children and other disadvantaged groups. The literatures reviewed are significant in understanding different appraoches that may be employed in the measurement of noise pollution from vehicular traffic. Central to the methodology employed by these scholars is the use of noise/sound measuring devices such as dosimeter or sonometer in the measurement of noise. Also the health implications of noise pollution from vehicular traffic were collected using focus group discussions, structured questionnaires and oral interviews. The data obtained were analysed using either descriptive or inferential statistics.

Materials and Methods

Purposive sampling technique was employed in the selection of eight (8) major streets/roads noted for high volume of traffic flow, high population density and rsidential and commercial activities in Uyo metropolis. Data on noise pollution (in decibels) from vehicular traffic along the selected

transport routes was measured through the use of noise sonometer (sound meter) Anoloque Cel 254 K2 at eight (8) points obtained at a height not less than 1.20 m and at a distance of 2-3m from noise sources as defined by Ramis et al. (2003), http://poweracoustics.com (2009), Piccolo et al. (2005) and Jamrah et al. (2005). Erroneous situations were prevented by calibrating the sonometer. Measurements were carried out in the mornings, afternoons and Evenings of Monday, Wednesday, Friday and Sunday. At each measurement point, noise values were recorded in five seconds by taking one noise value in every six seconds. The measurements of the noise levels were done under suitable meteorological conditions, that is, in the absent of wind and rain. Because transportation distances in the metropolis were short, the noise measurement intervals were also short. For this reason, values were obtained between: 7-10am; 12-3pm; and 4-7pm respectively. These periods were chosen as they represent peak periods when traffic density is higher than other hours.

Data on vehicular traffic flow was obtained through traffic census. The counting was taken in three (3) time periods: 7-10am (morning); 12-3pm (afternoon) and 4-7pm (evening) of Monday, Wednesday, Friday and Sunday. Data on traffic concentration was derived by dividing the area of the selected roads by the total number of traffic flow per unit hour. While data on the selected road area was obtained from the Akwa Ibom State Ministry of Works, information on the effect of noise pollution on human health status was obtained through the use of structured questionnaire administered to 200 randomly sampled households within the eight (8) selected transport routes (25 questionnaire was administered to residents in each of the sampled streets/roads in the metropolis, thereby bringing the total number of questionnaire administered to 200). Descriptive statistics was employed in the data analysis.

Results and Discussion

Table 9.2.1.1 shows the tolerance limits for ambient noise emissions. The noise thresholds for residential areas should not exceeds 55decibels, while the allowable threshold for industrial and commercial areas are 70 decibels (USEPA, 1974).

Table 9.2.1.1: Noise sensitivity classification (level of risk exposure)

Db (A)	**Sensitivity**
55-60	Risk
60-65	Mediun Risk
65-70	High Risk
70-75	Dangerous
75-80	Highly Dangerous
80-85	Extremely Dangerous

Source: USEPA (1974)

Table 9.2.1.2: Spatial-temporal variations in noise pollution from vehicular traffic in Uyo metropolis

Location	**MORNING (dBA)**				**AFTERNOON(dBA)**				**EVENING(dBA)**			
	Mon	Wed	Fri	Sun	Mon	Wed	Fri	Sun	Mon	Wed	Fri	Sun
Barracks rd	71.4	70.5	78.5	50.3	72.6	67.8	78.7	48.6	70.1	67.4	75.2	48.6
Nwaniba	78.3	74.2	83.5	49.2	82.4	60.9	82.7	57.5	79.4	78.2	81.6	52.2
Oron Rd	80.2	78.1	82.6	52.3	81.5	75.0	80.2	54.8	82.4	81.5	80.6	54.4
Aka Rd	84.6	80.1	81.1	54.0	79.5	68.9	78.5	56.7	79.8	79.7	82.5	52.7
Abak Rd	81.8	75.9	82.3	53.2	79.8	64.6	84.0	53.4	80.4	80.1	83.2	58.2
IkotEkpene Rd	86.8	79.5	81.5	48.1	85.4	82.1	81.7	50.1	84.2	79.5	84.2	59.8
Ikpa Rd	82.5	77.5	81.3	48.2	79.1	74.3	77.2	48.3	81.3	71.5	80.4	56.1
Ibom Plaza	85.7	80.3	81.5	50.1	83.4	72.6	79.4	49.4	82.0	76.2	84.6	56.5

Source: Authors Field Survey (2017)

Table 9.2.1.2 also shows that all the weekday noise readings in Uyo metropolis greatly exceed the EPA standards of 55dBA and 70dBA for residential, industrial and commercial areas respectively. However, all the Sunday readings fall below the internationally accepted noise levels. Also,

all the weekday afternoon readings exceed the EPA noise level limit of 55dBA, while all Sunday afternoon readings, except along Nwaniba Road, were below the EPA standards. The possible reason for the high Sunday noise readings along Nwaniba Rd is that most of the major worships centers in the metropolis are located along this route. Again, all the weekday Friday readings at all the sampling locations were considerably high, exceeding the EPA limit for commercial and industrial noise levels. It can further be adduced that all the weekday and weekend evening,except along Abak Rd, Ikot Ekpene Rd and Ikpa Rd, which are relatvely higher that the threshold limits of 55dBA readings, exceed the EPA noise limits for residential and commercial/industrial noise levels. Thus, it is abundantly clear that noise levels in all the 8 sampled streets/roads in Uyo metropolis have weekday readings that exceed the EPA standards of 55dBA for residential areas, and 70dBA for commercial and industrial areas, while most of all the weekend readings fall below the EPA threshold limits for residential and commercial areas.

Noise produced on the 8 sampled streets/roads varies spatially from risk levels to extremely dangerous level and poses serious danger to households residing within the metropolis. This kind of situation is found along Ikot Ekpene Rd, Oron Rd, Ibom Plaza, Aka Rd, Abak Rd and Ikpa road respectively where the noise levels produced by vehicular traffic along these roads reaches up to 75-85db(A) during the day. It could, therefore, be concluded that noise poses severe nuisance on the well-being of the people residing or working in and around these locations as they are at a very high risk of noise related ailments like temporary or permanent deafness, high blood pressure, headaches, auditory fatigue, temporary and permanent lessening of hearing ability, sleep disorders, and can even contribute to learning problems in children. There is a gradual increase in noise levels readings from Monday through Wednesday and Friday and a significant decrease in the readings on Sunday. Specifically, there is a general increase in the noise levels mostly on Monday and Friday, while

Sunday records the least noise levels both in the morning, afternoon and evening readings.

Table 9.2.1.3: Temporal features of noise levels from vehicular traffic in Uyo metropolis

Street	Morning(7-10am)		Afternoon(12-3pm)		Evening(4-7pm)	
	TFV	MNL	TFV	MNL	TFV	MNL
Abak Rd	1974	67.68	1173	66.93	887	47.80
Aka Rd	2556	71.30	3012	70.88	1638	53.00
Barrack Rd	1099	73.30	840	72.88	542	54.13
Ikot Ekpene Rd	1675	74.95	2630	70.90	1771	73.73
Ikpa Rd	2918	73.30	1316	70.45	984	55.38
Nwaniba Rd	2719	73.98	2037	74.83	2832	55.88
Oron Rd	2622	72.38	2051	69.73	2711	52.00
Ibom Plaza	3451	74.40	3120	71.20	3567	53.83

Source: Fieldwork (2017)
Where: TFV= Traffic Flow Volume and MNL:Mean Noise Levels

Table 9.2.1.4 shows the relationships between vehicular traffic flow on the one hand and vehicular concentration and the mean noise levels in Uyo metropolis on the other hand. One would have expected that the noise emitted during heavy traffic congestion would be higher than periods with free traffic flow. Contrarily, it is evident from the table that more noise is produced during free traffic flow than does in congested period. It could be said that there is a proportional relationship between the volume of vehicular traffic flow and the mean level of noise generated. Thus it is revealed that increase in the volume of free traffic flow results to a corresponding increase in noise levels. The highest mean noise level is 83.30 dB(A) and this is produced during free traffic flow with increase traffic volume in Ibom Plaza compared to the mean noise level of 81.24dB(A) produced during high traffic concentration. The noise levels

in a free traffic flow is generally higher than the levels in higher traffic concentration in all sampled locations except at sampled points 3, 6 and 7 with higher mean noise levels during periods of high traffic concentration.

Table 9.2.1.4: Relationships between vehicular traffic and noise pollution levels in Uyo metropolis

Street	Traffic Flow	Mean Noise Level	Traffic Conc.	Mean Noise Level
Barracks	4282	67.11±1.32	344	65.31±2.11
Nwaniba	7588	78.30±3.14	474	74.72±3.01
Oron Rd	7384	71.01±6.50	462	75.45±3.32
Aka Rd	7206	83.54±1.21	450	77.26±6.40
Abak Rd	6903	75.25±3.51	535	71.11±0.26
Ikot Ekpene Rd	6076	73.67±4.31	380	79.07±5.04
Ikpa Rd	5218	69.11±6.21	580	76.45±2.05
Ibom Plaza	10,138	89.30±8.01	634	85.21±4.20

Source: Fieldwork (2017)

The possible reason for the low noise levels produced during a congested traffic situation is that during such situation, a long queue usually exists and vehicles invariable move very slowly. This means that at a higher concentration, speed is low and flow is consequently small. At a certain limits of flow and concentration, speed will simultaneously be zero. Also, concentration has a maximum values called jam concentration, Cj when vehicles move in a bumper to bumper fashion. Therefore, between the limits of zero and jam concentration, Cj, the flow must have at least one maximum. It should also be noted that under a condition of high traffic concentration, two things resulting from rapid fluctuation in flow, speed and concentration are visible. First, the situation is always characterized by frequent stopping and starting as drivers drive in a bumper to bumper mode or the vehicle remains in a fixed position steaming, thus enhancing further congestion, which probably results in low noise levels compared to

periods with free vehicular flow. The increase in noise levels during free traffic flow could be directly related to the engine, transmission, exhaust, and suspension of the vehicles during high traffic flow, which is greatest during acceleration, and during engine braking. Frictional noise from the contact between tires and pavement during acceleration contributes significantly to overall traffic noise and is generally greatest at high speed and during quick braking. Poor vehicle maintenance is a contributing factor to this noise source.

At periods of heavy concentration, traffic noise and vehicular vibrations which are concerned with ride comfort becomes paramount on the urban environment. Traffic noise is both annoying and disturbing as it penetrates through the interior buildings disturbing concentration at work and conversation. The level of noise from vehicular traffic as revealed from field observation in Uyo metropolis is influenced by the speed of the vehicles, the density of the traffic (Table 9.2.1.3) and the nature of the surface which the vehicle is operated.

The sampled respondents leaving along the major streets sampled were asked to rank their perception of the possible health implications of exposure to high noise levels on their health status as evidenced in Table 9.2.5. From the respondents ranking, it was revealed that several respondents complained of hearing impairment, sleep disturbance, interference with spoken communication and mental disturbance as the major effects of exposure to noise levels beyond the recommended threshold levels of 55dB(A) for residential and 70dB(A) for commercial and industrial areas. This corroborates findings by Evans and Hygge (2000); Stansfeld et al., (2000); Passchier-Vermeer and Passchier (2000); Quis, (2001); and Marius, (2005) that exposure to excessive noise levels has the tendency of causing hearing defects; sleeplessness, misunderstanding what is heard, and increase blood pressure amongst others. Given the nature of the road surface in Uyo metropolis, the intensity of noise might increase beyond human tolerance limit which

could manifests in severe human health challenge. According to Esin (2009; 2000), noise pollution has adverse effects on man and his environment including land, structures, domestic animals, wild life and ecological systems.

Table 9.2.1.5: Health implication of noise pollution from vehicular traffic in Uyo metropolis

Effects	Ranking
Sleep disturbance	2
Cardiovascular disturbance	7
Hearing impairment	1
Interference with spoken communication	3
Mental disturbance	5
Impaired task performance	4
Negative social behaviour	6
Hearing loss in foetus/new-born	8
Others	9

Source: Fieldwork (2017)

Concluding Remarks/Recommendation

The study has shown that vehicular traffic contributes significantly to the total noise levels produced in Uyo metropolis. It was also revealed that noise levels tend to be greatest a free flow traffic situation than in a congested situation. The study has further revealed that the noise production from vehicular traffic determined by a number of factors: the number of vehicles passing per unit time; the constancy of flow -vehicles tend to be noisier in stop-and-go traffic; and the speed of traffic flow - noisiest at high speeds and the type of vehicles in the stream and their level of maintenance among others. Again, it was revealed from the study that increase noise pollution from vehicular traffic impact negatively on

the health status of households in Uyo metropolis. Based on these, it is recommended that there is urgent need to evolve proper approaches to address the issue of noise and protection of human and environmental health in Uyo metropolis in particular and Nigeria in general. It is recommended that the National Assembly should passed a Noise Abatement bill making it mandatory for all states and local government of the federation to enact similar law to combat noise pollution aggressively in all the major cities/towns in Nigeria. The survey indicates that noise affects individuals in several ways. It results in improper communication, sleeplessness and reduced efficiency. Though the psycho-somatic effects (annoyance and depression) are also common yet the extreme effects e.g. deafness and mental breakdown are not ruled out. There is also the need for public enlightenment, education and sensitization on the potential hazards and human health effects associated with noise pollution. This is indeed very germane because many are still ignorant of the fact that there exist any relationship between noise pollution and their health status.

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EFFECT OF OPEN BOOK MANAGEMENT ON ORGANIZATIONAL PERFORMANCE IN SELECTED MANUFACTURING FIRMS IN ENUGU STATE NIGERIA

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Abstract

This research work critically examined the concept of Open Book Management and its effect on Organizational Performance in Manufacturing Firms in Enugu State, Nigeria. Open book management is based on the principle that managers and employees who know and understand financial performance and goals and share a stake in organizational success are more apt to be highly effective and motivated in meeting those goals. Specifically, the study sought to: ascertain the effect of transparency on organizational survival, and the extent employee participation in decision making affects employee output. The study adopted the survey research design. The population of the study was a total of 1,276 staff of the five selected manufacturing firms in Enugu State, Nigeria. The sample size 125 was obtained from the population using Evans Morris formular at 95% confidence level and 5% margin of error. Data were collected using the questionnaire research instrument and interview which was designed in a 5 point Likert scale and manually

administered to the respondents. The hypotheses were tested using regression analysis. . The findings indicate that transparency had a significant and positive effect on organizational survival ($r = 0.875$, $p < 0.05$); and*Employee participation in decision making significantly had positive effect on employee output*($r = 0.866$, $p < 0.05$). *The study recommends that in the practice of open book management, organizations should place emphasis on ensuring the practice of transparency among the employees; and employees should be involved at certain levels in the decision making process and/or should be kept abreast of management's decision processes and decisions. The study concludes that open book management processes puts the organization on a pedestal to achieving organizational growth, employee performance and sustainability*

***Keywords**: Open Book Management, transparency, participation.*

Introduction

Over the years, organizations have adopted and practiced several management principles and methods in a bid to increase organizational performance. Much has also been written about the organizations' corporate strategy, goals/objectives, mission statement, visions and how to transform organizational performance or activities that will result in the appropriate action by the workforce. To achieve the objectives of the organization, the factors of production which include finance, land, labour and entrepreneur must be in place. The employees who make use of the other factors to achieve the organizations objectives are not engaged optimally to achieve better overall results. (Aggarwal and Simkins, 2001). This results in the employees working to earn a living rather than working to achieve the overall organizational objective. Kantian approach to business ethics analysis by Bowie (1999) emphasize that human beings have free will and thus are able to act from laws required by reason; they have dignity or a value beyond price. Thus, one human being cannot use another simply to satisfy his or her own interests. "Always treat the

humanity in a person as an end and never as a means merely" (Kant, 1990 as cited in Bowie, 1999).

Oko and Agbeze (2013) state that Labour-Human Capital, though a factor of production is not ordinary, thus ought to be managed with care based on well-articulated motivational schemes and policies. They furthermore opine that among these, is the most canvassed Open Book Management system, which tends to recognize the potentials in labour and seesameas almost being at par with the entrepreneur.

McCune (2011) defines open book management as a style of management in which employees learn about a company's bottom line, their contribution to it, and are rewarded for meeting financial targets. Open Book Management is a way of running an organization in which the information received by employees should not only help them do their jobs effectively, but help them understand how the company is doing as a whole. It is a management method that orients employees towards building a better business. Instead of using typical motivational tools and expecting employees to complete their assigned tasks, Open Book Management attempts to actively involve employees in all aspects of the business.

Open Book Management is based on the principle that managers and employees who know and understand financial performance and goals and share a stake in organizational success are more apt to be highly effective and motivated in meeting those goals. As a result, management overhead and the agency problems between employees, managers, and owners will be much lower (Aggarwal and Simkins, 2001). Organizations practicing Open Book Management explain clearly the organization's key measures of business success, allowing employees to make better-informed business decisions. They share financial information (such as income statements, balance sheets and other key metrics) with employees, and ensure they understand them and know how they relate to the organization's key measures of business success. All employees track progress on critical numbers (numbers that indicate the profitability or

break-even point) through regular meetings and scorecards. They are empowered to take action to improve performance as needed.

The issue of whether Open Book Management exists in the Nigerian industrial set-up is very controversial. Some organizations would like to keep their employees in the dark when it comes to the financial information. They hoard some important information and are not transparent in their activities and operations. Some of the managers feel that the knowledge of the important information is their sole prerogative and as such should be protected. Top management likes to remain aloof from its employee so as to build an all-important air around them. It is then very significant that the organizations that hide useful information from their staff are moving towards their peril. This means that such organizations will not be efficient and profitable, because they do not allow employees to participate in all aspects of the business. A highly performing organization is made up of people who are basically all pointing in the same direction – that is, they are in agreement about the reason for the organization to exist, and what they would like to see the organization achieve. But here in Enugu State, Nigeria, those involved are not open and clear about the purpose of the organization and about the ways that it intends to work.

This study was aimed at identifying the effects of Open Book Management on organizational performance. It specifically aims to ascertain the effect of transparency on organizational survival and the extent employee participation in decision making affects employee output.

Review of related literature

Open –Book Management, in principle and practice makes provision for sharing with employees at different and all levels of corporate activities, information hither-to consider the exclusive right of management (Bateman and Snell, 1999). This information relates to budget, income statement, sales, forecasts, financial targets and others that influence

corporate performance and prospects. Stack in Buchko and Goiten (2011) identified three basic principles in practicing OBM management. These are - Know and teach the rules, Follow the action and keep score, andprovide a stake in the outcome.

Organizational performance demands workers' productivity and at such transparency in the management of organizations is highly needed. For Hultmanand Axelsson(2007), Transparency means the individual's subjective perception to be informed about the properties and activities of the other party. In business ethics, transparency is defined asan informational mechanism necessary for performing the virtues of truthfulness, justice, and prudence (Oana B. Albu and Mikkel Flyverbom, 2013). Amittai (2010) in a study on transparency noted that with Open Book Management,financial information is shared with everyone in a company. Moreover, the management also lays out the meaning of the financial information and points to ways the employees can contribute to the company's success.

Stack (1994) states that Open Book Management attempts to actively involve employees to participate in all aspects of the business. The concept of worker participation refers to any arrangement which is designed to involve low cadre employees (workers) in the important decision making within the workplace. This implies that rather than saddling only a group within the enterprise (for instance, Management) with the responsibility of making decisions, all those who are to be affected by these decisions (including the workers) would be involved in its formulation and implementation. Worker participation implies arrangements designed to involve workers in the enterprises decision making process. This allows for workers' involvement in the initiation, formulation and implementation of decisions within the enterprise. In its various forms, employee participation in decision making has been recognized as a managerial tool for improving organizational performance by striving for the shared goals of employees and managers (Ojokuku and

Sajuyigbe, 2014). Vroom (1974) in Irawanto (2015), described participation as involvement.Locke and Schweiger (1979) in Kuye and Sulaimon, (2011) also describe it as 'joint decision making' between managers and subordinates. It is a vital element to the practice of open book management in organizations.

In an empirical study in Oko and Agbaeze (2013) on the Open Book Management System: study of selected firms in Nigeria, it was observed that the level of acceptance and operational efficiency of the technique of Open Book Management is low in Nigeria. They conclude that the situation in Nigeria shows that human capital management is based on the principle of the 4 (four) factors of production, rewards and motivation expenses are budgetary issues of rigid application. Matters that may enhance the right of labour to information on corporate financial management do not receive managerial attention; hence the applicability of the Open-Book Management technique even in the face of its obvious benefits is relegated to the background. They recommended that the Nigeria economy and economic activities should be de-regularized for inter and intra industrial competition which will lead to the establishment of quality relationship between entrepreneurs and the labour force, subsequently; the Open-Book Management technique will be commonly adapted if not adopted.

In another study by HamzehAL-Sha'ar (2016) on the Impact of Open Book Management on achieving differentiation in business organizations aimed to know the concept of open Book management and differentiation in the organizations and studying the effect of the relation between open book administration and differentiation in the organization. It was discovered that there is difference with statistical significance of the influence of open Book management on differentiation in the business organizations due to gender, scientific qualification and practical experience variables and at such recommended an interest in developing and training the employees according to scientific programs with the goal

to develop their capabilities and improving their performance level through: Conducting short- medium periods of training programs to train the employees and encouraging the employees and continuously supporting them to learn in all fields relating to their work. Another study by Rathnaker (2012), on Workers participation in Management Decision Making show that employees in organizations demonstrate a high interest in participation in the decision making process within their respective work places. However, the actual level of involvement in management decision making demonstrated by the employees was found to be relatively low. It then reveals a growing desire of non-management employees in the work environment to exercise greater involvement in the decision making process of the enterprise. The study recommended the use of joint management councils as the method of Workers Participation.

Methodology

The research design that was adopted for this work is survey design. The study analyzed primary data and documented information from secondary data. The primary data was collected through the use of questionnaire, structured oral interview and formal discussions with employees of the sampled organizations. Published and unpublished materials were used for the secondary data. The population of the study is the management and staff of the five selected manufacturing firms made up of one thousand two hundred and seven six (1,276) staff. The study used one hundred and twenty five staff as the sample size of the study. The systematic sampling method was used to select respondents.

The instrument for data collection elicited information on demographic characteristics of respondents and the two (2) objectives. The options for the answers were arranged in a 5-point likert-scale of Strongly Agree (SA: 5 point), Agree (A: 4 point), Strongly Disagree (SD: 3 point), undecided (UD: 2 point), and Disagree (D: 1 point). A test-re-test method was adopted to ascertain the reliability of the instrument. Fifteen (15)

copies of the questionnaire were distributed to the firms understudied; three (3) copies to each firm. These were collected afterwards and re-distributed for the second time.

The outcome of the test-re-test was determined using spearman rank order correlation coefficient and the result gave a reliability coefficient of r = 0.62.Data were presented in frequency and simple percentage tables. The hypotheses were tested using regression analysis, The decision rule for the study is reject null hypotheses (Ho) if the calculated value is greater than the critical value at 5% error. Do not reject null hypotheses (Ho) if otherwise

Analyses

The perception of the respondents on the effect of transparency on organizational survival is presented in Table 9.2.2.1.

Table 9.2.2.1: Effect of transparency on organizational survival

Item	**SA (%)**	**A (%)**	**SD (%)**	**U (%)**	**D (%)**	**Mean**
Transparency increases open communication among the employers and employee	77 (68.1)	21 (18.6)	5 (4.4)	5 (4.4)	5 (4.4)	3.50
Transparency ensures proper understanding of the organizational goals	33 (29.2)	48 (42.5)	12 (10.5)	10 (8.8)	10 (8.8)	2.92
Transparency increases sustainability	44 (38.9)	40 (35.2)	15 (13.3)	10 (8.8)	4 (3.5)	3.19
Transparency increases teamwork among the individuals in the organization	35 (31.0)	50 (44.2)	20 (17.7)	4 (3.5)	4 (3.5)	2.99
Transparency increases the individuals openness for inspection and feedback	14 (12.4)	56 (49.6)	17 (15.0)	14 (12.4	12 (10.6)	2.89

As presented in Table 9.2.2.1, 77 (68.1%) respondents strongly agreed that transparency increases open communication among the employers and employee, 21 (18.6%) respondents agreed with this, 5 (4.4%) respondents strongly disagreed with this, 5 (4.4%) respondents were undecided, while 5 (4.4%) respondents disagreed with this. Having a mean score of 3.50 +

0.84, the respondents agreed that transparency increases open communication among the employers and employee.

With 33 (29.2%) respondents strongly agreeing, 48 (42.5%) respondents agreeing, 12 (10.5%) respondents strongly disagreeing, 10 (8.8%) respondents were undecided, while 10 (8.8%) respondents disagreed as well as the mean score of 2.92 + 0.92, the respondents are of the determination that transparency ensures proper understanding of the organizational goals.

Having a mean score of 3.19 + 0.80 and the responses of 44 (38.9%) respondents who strongly agreed, 40 (35.2%) respondents who agreed, 15 (13.3%) respondents who strongly disagreed, 10 (8..8%) respondents were undecided and 4 (3.5%) respondents who disagreed, the respondents are of the view that transparency increases sustainability.

Based on the responses of 35 (31%) respondents who strongly agreed, 50 (44.2%) respondents who agreed, 20 (17.7%) respondents who strongly disagreed and 4 (3.5%) respondents were undecided while 4 (3.5%) respondents who disagreed as well as the mean score of 2.99 + 0.88, the respondents agreed that transparency increases teamwork among the individuals in the organisation.

The respondents are of the view that transparency increases the individual's openness for inspection and feedback. This is captured in the responses of 14 (12.4%) respondents who strongly agreed, 56 (49.6%) respondents who agreed, 14 (12.4%) respondents were undecided on this, 17 (15%) respondents who strongly disagreed and 12 (10.6%) respondents who disagreed as well as the mean score of 2.89 + 0.90.

The respondents' opinion of the effect of employee participation in decision making on employee commitment is presented in Table 9.2.2.2.

Table 9.2.2.2 Effect of employee participation in decision making on employee outpput

Item	**SA (%)**	**A (%)**	**SD (%)**	**U (%)**	**D (%)**	**Mean**
Employees are involved in management meetings.	10 (8.8)	23 (20.4)	38 (33.6)	14 (12.4)	28 (24.8)	2.13
Participation in decision making increases the level of employee output.	41 (36.3)	37 (32.7)	11 (9.6)	10 (8.8)	14 (12.4)	2.93
Both junior and senior staff members actively participate in decision making	33 (29.2)	37 (32.7)	23 (20.4)	15 (13.3)	5 (4.4)	2.73
Non Participation of employees in decision making increases the cost of management	20 (17.7)	41 (36.3)	37 (32.7)	5 (4.4)	10 (8.8)	2.72
Employees have a sense of belonging when their suggestions during meeting are welcomed	42 (37.2)	41 (36.3)	5 (4.4)	10 (8.8)	15 (13.3)	2.97
Superior quality decision is reached as a result of participation.	66 (58.4)	15 (13.3)	9 (8.0)	18 (15.9)	5 (4.4)	3.42
Individual output is heightened by employee participation in decision making.	31 (27.5)	50 (44.2)	17 (15.0)	10 (8.8)	5 (4.4)	3.12

Source: Field Survey, 2016

Based on the data presented in Table 4.7, the respondents are not of the opinion that employees are involved in management meetings. This is captured in the responses of 10 (8.8%) respondents who strongly agreed, 23 (20.4%) respondents who agreed, 38 (33.6%) respondents who strongly disagreed, 14 (12.4%) respondents were undecided on this and 28 (24.8%) respondents who disagreed, as well as the mean score of 2.13 + 0.89.

From the responses of 41 (36.3%) respondents who strongly agreed, 37 (32.7%) respondents who agreed, 11 (9.6%) respondents who strongly disagreed, 10 (8.8%) respondents were undecided and 14 (12.4%) respondents who disagreed, as well as the mean score of 2.93 + 1.02, the respondents agree that participation in decision making boosts employee commitment.

The mean score of 2.73 + 1.07 and the responses of 33 (29.2%) respondents strongly agreeing, 37 (32.7%) respondents agreeing, 23 (20.4%) respondents strongly disagreeing 15(13.3%) respondents were

undecided and 5 (4.4%) respondents disagreed, show that both junior and senior staff members actively participate in decision making.

The views of the respondents as captured in the responses of 20 (17.7%) respondents who strongly agreed, 41 (36.3%) respondents who agreed, 37 (32.7%) respondents who strongly disagreed, 5 (4.4%) respondents and 10 (8.8%) respondents who disagreed as well as mean score of 2.72 + 0.91, show that the respondents agree that non participation of employees in decision making increases the cost of management.

With 42 (37.2%) respondents strongly agreeing, 41 (36.3%) respondents agreeing, 5 (4.4%) respondents strongly disagreed, 10 (8.8%) respondents were undecided on this and another 15 (13.3%) respondents disagreeing as well as the mean score of 2.97 + 1.02, the respondents are of the view that employees have a sense of belonging when their suggestions during meeting are welcomed.

Having a mean score of 3.42 + 0.83 and 66 (58.4%) respondents strongly agreeing, 15 (13.3%) respondents agreed, 9 (8%) respondents strongly disagreed, 18 (15.9%) respondents were undecided and 5 (4.4%) respondents disagreeing, the respondents are of the determination that superior quality decision is reached as a result of participation.

Based on the responses of 31 (27.5%) respondents who strongly agreed, 50 (44.2%) respondents who agreed, 17 (15%) respondents who strongly disagreed, 10 (8.8%) respondents were undecided and 5 (4.4%) respondents who disagreed and the mean score of 3.12 + 0.83, the respondents are of the opinion that individual commitment is heightened by employee participation.

Test of Hypotheses

The results for the two tests of hypotheses are presented below.

Test of Hypothesis One

Transparency significantly has effect on organizational survival

This hypothesis is tested using the regression analysis. The summarized results are presented in Table 9.2.2.3

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Table 9.2.2.3: Summarised regression results for Hypothesis One

Variable	Coefficient	t-value	p-value
Constant	-0.072	-0.416	0.678
Transparency (T)	0.875	18.119	0.000

r = 0.875; r^2 = 0.747; RegSS = 59.970; ResSS = 20.277; F-value = 328.283; sig. = 0.00

Source: SPSS Results Appendix 2

The result of the regression analysis summarized in Table 3. shows that the model for the relationship between Transparency (T) and organizational survival (OS) is:

OS = -0.072 + 0.875T

This reveals that transparency has positive impact on organizational survival. With t-value > 1.96 (t-critical) and p-value < 0.05, this impact is significant.

Also, the regression coefficient (r) of 0.864 indicates a strong relationship between the independent variable (transparency) and the dependent variable (organizational survival). The coefficient of determination (r^2) of 0.747 reveals that 74.7% of the variation observed the dependent variable is caused by the independent variables. Having a regression sum of square of 59.970> the residual sum of squares of 20.277, this variation is not due to chance. The F-value and corresponding significance value of 328.283 (0.000) shows that these results are significant. Based on this, the results indicate that transparency has a significant and positive effect on organizational survival.

Test of Hypothesis Two

Employee participation in decision making significantly has positive effect on employee commitment.

This hypothesis is tested using the regression analysis. The summarized results are presented in Table 9.2.2.4.

Table 9.2.2.4 Summarised regression results for Hypothesis Two

Variable	**Coefficient**	**t-value**	**p-value**
Constant	1.111	10.018	0.000
Employee Participation in Decision Making (EPDM)	0.877	18.276	0.000

r = 0.866; r^2 = 0.751; RegSS = 68.526; ResSS = 22.772; F-value = 334.026; sig. = 0.00

Source: SPSS Results Appendix 3

The result of the regression analysis summarized in Table 4.shows that the model for the relationship between Employee Participation in Decision Making (EPDM) and Employee output (EO) is:

EO = 1.111 + 0.877EPDM

This reveals that employee participation in decision making has positive impact on employee output. With t-value > 1.96 (t-critical) and p-value < 0.05, this impact is significant.

Also, the regression coefficient (r) of 0.866 indicates a strong relationship between the independent variable (employee participation in decision making) and the dependent variable (employee output). The coefficient of determination (r^2) of 0.751 reveals that 75.1% of the variation observed the dependent variable is caused by the independent variables. Having a regression sum of square of 68.526> the residual sum of squares of 22.772, this variation is not due to chance. The F-value and corresponding significance value of 334.026 (0.000) shows that these

results are significant. Based on this, the results indicate that employee participation in decision making significantly has positive effect on employee commitment.

Discussion of findings

The findings of this study are discussed on the objectives of this study.

Effect of transparency on organizational survival

The study revealed that in the application of open book management, transparency plays a very vital role. The role of transparency is captured in the relevance to enhancing communication among employers and employees. This goes a long way to ensuring that the goals of the organization are properly understood and there is role clarity among the employees. Furthermore, when transparency is promoted in organizations, teamwork increases and employees become more receptive to inspection and feedback. This concurs with the assertion of Hultman and Axelsson (2007), who noted that transparency in the management of organizations is highly needed as it places demands on workers' productivity which results in organizational performance.

Effect of employee participation in decision making on employee output

Employee participation in decision making is an effective aspect of open book management. Its effectiveness is especially noticed in the boosting of the employee output. Employee participation in decision making is practicable when employees are grouped in teams or committees to supervise different segments of production or service provision. With this being the case, decisions are rarely implemented without the employees' knowledge. This creates a sense of belonging among employees, more so when their suggestions are welcomed during meetings. As a results quality decisions are reached that have positive impacts on the employees,

management and the organization, as a whole. This finding is in agreement with the opinion of Ratina (2012) who pointed out that the objective of participation for management is to achieve more elaborate organizational ends, such as improvement in employee output, improved industrial relations, motivation and commitment, and quality of work life.

Conclusion

Open Book Management plays a vital role in the survival and growth of organizations. This is premised on the gains of open book management which aims at ensuring that employees effectively carry out their job description based on the information received from their employers. This management process puts the organization on a pedestal to achieving organizational growth, employee performance and sustainability. Specifically, this study revealed that open book management is relevant to organizational performance in the manufacturing firms in Enugu state. When open book management is practiced in organizations, it ensures that transparency significantly has positive effect on organizational survival and employee participation in decision making positively affects employee output.

Recommendations

Based on the findings of the study, it is recommended that:

i. In the practice of open book management, organizations should place emphasis on ensuring the practice of transparency among the employees;
ii. Employees should be involved at certain levels in the decision making process and/or should be kept abreast of management's decision processes and decisions;

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E-WASTE ENVIRONMENTAL POLLUTION AND HEALTH RISK IMPLICATIONS FOR EARLY CHILD CARE, GROWTH AND DEVELOPMENT IN NIGERIA

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Abstract

Nigeria is one of the dumping grounds for electrical and electronic waste materials and appliances that are outdated or close to end-of-life cycle (e-waste). E-waste contains potentially harmful substances. Inappropriate and unsafe management practices of these wastes can cause environmental pollution and health hazard and impact early child care, growth and development. The study examines the issues of disposal, recycling and proper management of e-waste materials in order to tackle the menace of health risk exposure to early life. Some recommendations were made as; All stakeholders (government, industry, environmental groups, and citizens) must work in cooperative collaboration with NESREA to effectively manage and mitigate the problems of e-waste in Nigeria. Nigeria should immediately ratify the Bamako Convention and entrench stringent enforcement regime of the National Environmental (Electrical/Electronic Sector) Regulations 2011 and the Nigerian Decree of 1988 prohibiting all imports of hazardous wastes.

Keywords: *E-waste generation and management, Environmental pollution, Health hazard, Early child care.*

Introduction

Electronic and electrical waste (e-waste), also referred to as waste electrical and electronic equipment (WEEE), is defined as any end-of-life equipment which is dependent on electrical currents or electromagnetic fields in order to work properly (UNEP, 2007). Included in this definition are small and large household appliances; information technology and telecommunications equipment; lighting equipment; electrical and electronic tools, toys, and leisure and sports equipment; medical devices; monitoring and control instruments; and automatic dispensers. Components of electrical and electronic equipment such as batteries, circuit boards, plastic casings, cathode-ray tubes, activated glass, and lead capacitors are also classified as e-waste (UNEP, 2013). Although e-waste is informally processed in many regions, high-volume informal recycling has been reported in China, Ghana, Nigeria, India, Thailand, Philippines, and Vietnam.

E-waste pollution

Pollutants are released as a mixture, and the effects of exposure to a specific compound or element cannot be considered in isolation. However, a more complex understanding of the interactions between the chemical components of e-waste is needed. Exposure to e-waste is a complex process in which many routes and sources of exposure, different lengths of exposure time, and possible inhibitory, synergistic, or additive effects of many chemical exposures are all important variables. Exposure to e-waste is a unique variable in itself and the exposures implicated should be considered as a whole. Sources of exposure to e-waste can be classified into three sectors: informal recycling, formal recycling, and exposure to hazardous e-waste compounds remaining in the environment (ie, environmental exposure). Informal electronic waste recycling includes the dismantling of end-of-life electronics to retrieve valuable elements with

primitive techniques, without or with very little technology to minimise exposure or protective equipment, allowing the emission of dangerous chemicals (Wong *et al.,* 2007). Formal electronic waste recycling facilities use specifically designed equipment to safely remove salvageable materials from obsolete electronics while protecting workers from adverse health effects. However, these centres are very expensive to build and run and are rare in less developed countries. Varying national safety standards can mean that workers at formal or semiformal recycling centres still risk exposure at low doses (Schluep *et al.,* 2009). Because of the high levels of environmental, food, and water contamination, residents living within a specific distance of e-waste recycling areas are also at risk of environmental exposure, although at lower levels than through occupational exposure (Yu *et al.,* 2006; Fu, *et al.,* 2008). Exposure routes can vary dependent on the substance and recycling process. Generally, exposure to the hazardous components of e-waste is most likely to arise through inhalation, ingestion, and dermal contact. In addition to direct occupational (formal or informal) exposure, people can come into contact with e-waste materials, and associated pollutants, through contact with contaminated soil, dust, air, water, and through food sources, including meat (Robinson, 2009; ATSDR, 2007).

Concept of early years of child care

Early years in life are the most important to the formation of intelligence, personality and social behaviour of a child. The year before a child reaches Kindergarten are among the most critical in his or her life to influence learning. That is why modern societies show serious concern for the education of their young ones by providing needed support to prepare them to succeed later in school (Ejieh, 2006). It is common practice in most societies to make provision for early childhood education programmes of various sorts for children below the official school-going age (usually 6years) mainly to prepare them for education in primary

schools (Obidike, 2012). The Federal Government of Nigeria recognizes the importance of early childhood education in Nigeria and as a result it was given prominence in the National Policy of Education (FRN, 2004) as one of the programmes in the Nigerian educational system. Bagudo (2008), posited that reports across the globe revealed that an estimated figure of one hundred million children, struggle daily for survival in villages and cities, and are exposed to the risks of hunger, poverty, disease, illiteracy and abuses. In support of this view, Mahuta (2007) stresses that the need to address the problems and salvage these children and the next generation of children from these menace, has necessitated the programme of Early Childhood Care Development and Education (ECCDE). Mahuta (2007) also stated that the aim of ECCDE is to foster the proper development of the children, identify and address their problems, harness their potentials, mould their character, enhance their learning, equipped them for life, so that their actions are channeled towards positive personal, communal and global development in all ramifications of life.

Dangers and Implication of e-waste to early years

Children, foetuses, pregnant women, elderly people, people with disabilities, workers in the informal e-waste recycling sector, and other vulnerable populations face additional exposure risks. Children are a particularly sensitive group because of additional routes of exposure (e.g., breastfeeding and placental exposures), high-risk behaviours (e.g., hand-to-mouth activities in early years and high risk-taking behaviours in adolescence), and their changing physiology (eg, high intakes of air, water, and food, and low rates of toxin elimination) (Pronzuk, 2004). The children of e-waste recycling workers also face take-home contamination from their parents' clothes and skin and direct high-level exposure if recycling is taking place in their homes. The effects of some of the most hazardous e-waste components, viz. mercury, lead, chromium, brominated

flame retardants and cadmium. effects of e-waste on humans (UNEP,2007b; Moef, 2008; Envis, 2008; Pinto and Patil, 2008; Osuagwu and Ikerionwu, 2010; Chen *et al.;* 2011).

Table 9.2.3.1: Effects of e-waste on humans

Toxin	**Typical sources**	**Effects on humans**
Mercury	Fluorescent lamps, LCD monitor, switches, flat panel screens	Impairment of neurological development in fetuses and small children, tremours, emotional changes, cognition, motor function, insomnia, headaches, changes in nervous response, kidney effects, respiratory failures, death
Lead	CRT of TV, computer monitor, circuit boards	Probable human carcinogen, damage to brain and nervous systems, slow growth in children, hearing problems, blindness, diarrhoea, cognition, behavioural changes (e.g. delinquent), physical disorder.
Chromium	Untreated and galvanized steel plates, decorator or hardener for steel housings	Asthmatic bronchitis, skin irritation, ulceration, respiratory irritation, perforated eardrums, kidney damage, liver damage, pulmonary congestion, oedema, epigastric pain, erosion and discolouration of the teeth, motor function
BFR	Plastic casings, circuit boards	May increase cancer risk to digestive and lymph systems, endocrine disorder
Cadmium	Light-sensitive resistors, as corrosion retardant, Ni-Cd battery	Inhalation due to proximity to hazardous dump can cause severe damage to the lungs, kidney damage, cognition

Source: UNEP,2007b; Moef, 2008; Envis, 2008; Pinto and Patil, 2008; Osuagwu and Ikerionwu, 2010; Chen *et al.;* 2011

Apart from the hazardous effects on humans, it is discovered that e-waste leaches into the soil to pollute farmland and underground water. E-waste can also cause uncontrolled fire risk, leading to toxic fumes. In addition, uncontrolled burning, disassembly and disposal of e-waste can cause a variety of environmental problems such as groundwater contamination, atmospheric pollution, and occupational and safety effects among those directly or indirectly involved in the processing of e-waste (Ban *et al.*, 2005).

E-waste and the Nigeria situation

The problem of e-waste and its management is not only global but has its own environmental implications. A major driver of the growing e-waste problem is the short life span of most electronic products – less than two years for computers and cell phones (Macauley *e t al.*, 2003; Denga *et al.*, 2006; Bhutta *et al.*, 2011). In tackling the problem of e-waste the European Union (EU), Japan, Taiwan, South Korea and several states of the United States have introduced legislation making producers take responsibility of products reaching the end of their lives, with 65% of the United States being currently covered by some sort of state e-waste recycling law (ETC, 2012; Terada, 2012). The problem of e-waste in relation to human rights has been copiously discussed by Terada (2012). Apart from Rotterdam convention and the Stockholm conventions, the Basel convention (for the control of transboundary movements of hazardous wastes and their disposal) and the Bamako convention (on the ban on the import into Africa and the control of transboundary movement and management of hazardous wastes within Africa) have been put in place by the United Nations all in a bid to deal with the problems of e-waste. Even though the Basel Convention banned the export of hazardous waste to poorer countries since 1992, the practice continues (Woodell, 2008a, b).

Management of e-waste generation

Three-year undercover investigation by Greenpeace (2009) indicated that unfixable WEEE in United Kingdom always end up shipped to Africa, especially Nigeria as "second-hand electronic goods". While the local expertise capacity in Nigeria enables the utilization of thousands of the unfixable WEEE as spare parts, however, majority of these WEEE are usually dumped as e-waste without any proper recycling and thereby posing environmental health threat. Most of the e-waste comes from developed countries (Harder, 2005). According to ABC News (2006),

Americans bought an estimated US$125 billion worth of consumer electronics (computers, monitors, cell phones, televisions, etc.) in 2005. Hundreds of millions of them become obsolete every year and become source of e-waste which are loaded with hazardous contaminants. According to Terada (2012), the developed countries aware of the risks and health hazards to humans and environmental health coupled with the higher cost of safer recycling and the stringent regulations in their home countries find it easier to ship their e-waste to developing countries where there are negligent of regulations and cheap labour. To prevent this environmental injustice, the Basel Convention came into existence. The Basel Convention placed ban on import and control of transboundary movement and management of hazardous e-waste. The Basel Convention was adopted in 1989 and entered into force on May 5, 1992 and amended in 1995 (Terada, 2012; Ogungbuyi *et al.,* 2012; Puckett *et al.,* 2005). The Basel Convention does not contain any explicit enforcement provisions because it is assumed that the national laws of the parties should complement it. In September 2010, 178 nations, including industrialized countries such as Japan, European Union and the United Kingdom, were parties to the Basel Convention. However, USA, the world's highest producer of e-waste, has not ratified the Basel Convention and by such action or inaction has indirectly promoted the dumping of toxic e-waste on developing countries (Terada, 2012; Puckett *et al*., 2005). For instance, under the Basel Convention used electrical and electronic equipment (UEEE) that is functioning and intended for re-use is not considered to be an e-waste, regardless of whether it is hazardous or not (Puckett et al., 2005). That can give leverage to unscrupulous exporter, who can capitalize on such provision to dump near end-of-life UEEE on developing countries, except where proper testing to ascertain the functional state of the UEEE, certification and labelling have been carried out.

Another Convention called the Bamako Convention was adopted on January 29, 1991 and entered into force on April 22, 1998. The

Bamako Convention placed ban on the import and the control of transboundary movement and management of hazardous e-waste within Africa and unlike the Basel Convention, it articulated more specific and active guidelines for both sides of the e-waste trade. In March 2010, 33 African countries signed the Bamako Convention, while 24 of them ratified it (Terada, 2012). Nigeria signed the Bamako Convention in February 2008, but has not yet ratified it; while it not only signed but has also ratified the Basel Convention since May 24, 2004 (Terada, 2012; Puckett *et al.,* 2005). It is strongly believed that one of the major components of the solution to the control of transboundary movement of e-waste from USA, European Union, Asia, etc. to Nigeria requires Nigeria's immediate ratification of the Bamako Convention alongside an effective and efficient enforcement regime of the regulations.

The National Environmental Standards and Regulations Enforcement Agency (NESREA), an Agency of the Federal Ministry of Environment, is responsible for the enforcement of all environmental laws in Nigeria (Amachree, 2013). While NESREA's work is commendable, there is still much room for more work towards the effective solution to the e-waste scenario in Nigeria today. NESREA working with certain stakeholders have put efforts toward creating awareness about the e-waste issue but it is grossly insufficient. In 2009, NESREA sponsored an international conference on e-waste control titled "The Abuja Platform on E-Waste". In February 24-25, 2011, the 1st Eko international summit on e-waste was held in Lagos, Nigeria. The communique of the Summit drew the attention of the Federal Government to not only encourage but also enforce collection, recovery, re-use and recycling (3R) of e-waste management (Eko Declaration, 2011). In November 2010, the Environment Division of the Nigerian Society of Engineers organized a conference in Abuja, Nigeria, titled "Environmental Impact of Telecommunication Projects in Nigeria". The conference called on government in all levels to legislate on e-waste management. In May

2011, "The National Environmental (Electrical/Electronic Sector) Regulations 2011" was gazette in Federal Government Gazette No. 5, Vol. 98. In the gazette, the 3R's of waste management was expanded to 5R's, namely: Reduce, Repair, Reuse, Recycle and Recover. Among other issues such as "Extended Producer Responsibility Programme" to buy-back WEEE is well captured in Schedule VIII of the Regulations. While the fines and punishment for offenders (individuals and corporate) are well articulated and the Regulations very laudable, however, much is required for the full effective implementation and enforcement regime.

Conclusion

The NESREA Regulations 2011 is a laudable legislative document which is line with and complements the Basel Convention. Nigeria is presently a major destination for e-waste from USA, European Union, Asia, etc. Nigeria must, as a matter of urgency, ratifies the Bamako Convention so that the nation can have more stringent enforcement regime. While the efforts of NESREA is commendable, countrywide survey research for this paper revealed gross lack of awareness on the e-waste menace both within the literate and illiterate members of the Nigeria's population.

Recommendations

- All stakeholders (government, industry, environmental groups, and citizens) must work in cooperative collaboration with NESREA to effectively manage and mitigate the problems of e-waste in Nigeria.
- Nigeria should immediately ratify the Bamako Convention and entrench stringent enforcement regime of the National Environmental (Electrical/Electronic Sector) Regulations 2011 and the Nigerian Decree of 1988 prohibiting all imports of hazardous wastes.
- The "Extended Producer Responsibility Programme" to buy-back WEEE should be fully enforced internationally.

- Producer companies should use non-toxic raw materials in the manufacture of EEE to reduce the production of e-waste.
- Develop national database infrastructure on e-waste management in Nigeria.
- Full enforcement of the proof of testing and categorization with respect to the Basel Convention on transboundary movement and management of e-waste.
- All members of the Organization for Economic Cooperation and Development (OECD) and the European Union countries should implement in full the Basel Convention.
- The USA should be made to comply with OECD Council Decision regarding export of hazardous e-waste.

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ELECTRONIC WASTE MANAGEMENT IN NIGERIA: ISSUES AND CHALLENGES

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Abstract
Access to Information & Communication Technology (ICT) is pivotal to a country's economic and social development and is currently improving throughout the developed and developing world. Nigeria has been undergoing rapid ICT transformation in recent years, attempting to bridge the digital divide by importing electrical and electronic equipment (EEE), which soon become technologically obsolete and find their way into landfills as electronic waste (e-waste) that pose health and environmental hazards to humans, livestock and ecology, if not properly managed. This paper reviews the issues relating to e-waste and identifies their sources, components and the dangers they pose to the environment. Sustainable means of managing e-waste in Nigeria was discussed. Recommendations were made on appropriate treatment of e-maste in order to make the environment safe for all.

Introduction

Technology is any modification made to the natural world to meet human needs or wants. Technology includes not only the processes and knowledge needed to operate and create products but also the tangible, physical products itself (Omorodion, 2016). The widespread application of

technology has brought many benefits. For instance, it does not only save time, but also more efficient to cook with a microwave oven or with an electromagnetic cooker. It is easier to communicate with people all over the world through e-mail, instant messaging, Skype, or social media, or even to withdraw or transfer money using an Automated Teller Machine (ATM). The closed-circuit television (CCTV) and improved lighting are more effective in reducing crimes of all dimensions and types. We cannot talk about the benefit of technology in our society today without the role of electronics technologies.

Electronics technologies have generally made life easy and convenient because of their efficiency and time saving in application. Information & Communication Technology (ICT) systems, as they are today, would not have been achievable without electronics technology. Entertainment industry (music, radio, television, computers etc.) would have remained crude if not for continuing development in electronic technology. Infact electronic technology has impact life in different sector of the society such as in communication, entertainment, transport, education, and health care sectors. Electrical and electronic equipment (EEE) have been instrumental to the revolution witnessed in this various sectors of human endeavor around Nigeria (Alabi & Bakare, 2011).

As there appears to be no signs of this revolution slowing down soon so also the growing concern on the increasing e-waste arising from the these sector.However in Nigeria, there is large digital divide, and only a small number of wealthy people have access to certain ICT-wares especially the branded new equipment. Consequently, most of the low-income earners rely on used ICT-wares considering that branded new electronic goods are relatively expensive for ordinary people. It is an attempt to bridge the digital divide that importation of electrical and electronic equipment (EEE), which soon become technologically obsolete and find their way into landfills as electronic waste (e-waste) became rampant.While there are many factors contributing to the digital divide,

the high price of information technology hardware is no doubt a significant one. Domestic and international trade in used EEE presents a possible important avenue to stimulate the dissemination of information technology and bridging the gap between the "haves" and the 'haves-not" (Ongondo & Williams, 2011).

However, imports of used or rather end-of-life electronics to the developing countries such as Nigeria is a double-edged sword: the positive potential also carries with it the risk of becoming a dumping ground for waste equipment from rich developed countries (Agunwamba., Emenike, Tenebe, 2013). electronic waste pose health and environmental hazards to humans, livestock and ecology, if not properly managed. According to Osibanjo (2009). Electronic waste or e-waste is the disposal of electronic goods such as cell phones, mp3 players, televisions, and computers. Electronic waste is further defined as an unwanted electronic or electrical appliances such as old and outdated computers, laptops, televisions, cellular phones, mp3 players, telecommunication equipment, keyboards, mice, photocopiers, typewriters, etc. (Alexander & Bilitewski, 2008). The risk from e-waste affects the entire ecosystems and it is a major environmental health risk to wildlife and humans (Terada, 2012). Therefore Electronic waste, abbreviated as 'e-waste' is a term used to describe old, end-of-life electronic appliances such as computers, laptops, TV's, radios, refrigerators etc., which have been discarded by users. E-waste comprises of numerous valuable but harmful substances that can cause an adverse effect on human health.

According to studies by the United Nations, anywhere between 20 and 50 million tonnes of e-waste are generated globally, an amount growing at a rate nearly three times faster than the overall municipal solid waste stream (Schluep; Hagelüken; Kühr; Magalini; Maurer; Meskers; Müller,& Wang, 2009). Electronic waste or e-waste is one of the fastest growing waste streams around the world, growing at a rate of 3–5% per annum or approximately three times faster than normal municipal solid

waste. Today, the amount of e-waste is rapidly growing in developing countries as they struggle to join the global information society.According to Basel Action Network (BAN) study in conjunction with BCC Nigeria, Nigeria imported more than 500,000 used computers annually through the Lagos port alone; About 25% of the imports are functional used electronics while the remaining 75% is junk or unserviceable, which is eventually burnt or dumped carelessly. According to Amachree (2013), a preliminary survey conducted in Lagos area after the BAN study showed that the volume of imported electronic equipment were: Computer village (15tons), Alaba International Market (100tons), Oshodi Market(15tons), Lawanson Market (30tons) and West Minister(40tons). These figures according Philip (2016) increases annually due to the fact that e-waste collection is not organised; there are no collection centers and most times, they are dumped along with other wastes; furthermore, Philip posited that a lot of e-waste are also stockpiled in offices and homes.

Unfortunately, recycling of these products is still in an inefficient manner. For example, such methods like open burning of plastics/copper wires to reduce waste volume and to salvage valuable metals like copper; and strong acid leaching of printed wiring to recover precious metals are still common. Moreover, e-waste contains hazardous materials such as lead, mercury, beryllium, cadmium, and brominated flame-retardants. It is time the authorities check this mindless export of death to Nigeria, especially as these wastes contain toxic elements such as lead and mercury. Even more worrying is the sight of men and women trawling through the discarded electronics hoping to find something worth selling, thereby exposing themselves to these hazardous elements. The researcher is, however, not oblivious of existing environmental laws and regulations. The Problem is that there is weak enforcement and a lack of awareness of the risks and potential harmful effects associated with e-waste, coupled

with a lack of technical capacity for environmentally sound management. Therefore this paper seek to review the issues relating to e-waste and identifies their sources, components and the dangers they pose to the environment and proffer sustainable ways of managing e-waste in Nigeria.

Sources of E-Waste in Nigeria

Cell phones, cameras, CD players, TVs, radios, drillers, fax machines, photocopiers, printers, toners, ink cartridges, batteries, re-chargeable batteries, digital calculators and clocks, CRT monitors, electric solders, computer mother boards, key board, industrial and house hold electronic machinery such as oven, fridge, sewing & washing machines, fan, air-conditioner, grinder, iron, heater, and laboratory electronic equipment's, etc, are example of electronic and electrical equipment. This can be broadly classified under three major types of goods: White goods which Comprising of household appliances like refrigerators, washing machines, and air conditioners. Brown goods which include televisions, cameras etc. and Grey goods which includes computers, scanners, printers, Mobiles phones etc. when these above mention electronic items are obsolete or no longer in use, therefore discarded, they are refer to or considered as e-waste.

E-waste is generated as a result of advancement in technology, changes in styles, fashion and status, nearing to the end of their useful life and not taking precautions while handling them. Nigeria has a huge appetite for technology, but due to limited financial resources, infrastructure and indigenous IT industry, much of this growth is facilitated by import of 'second hand' equipment from developed countries(Xiaodong, Lee., Jeong., Kim, Cho, 2013). Where such imported devices are beyond repair, they are taken apart and used as spare parts for other broken devices. Scraps and non-reusable parts are either discarded in the main waste dumpster, burnt in major trash cans or just left

to lie around in the environment. Besides the e-waste which is locally generated by consumers in Nigeria, a large quota of the e-waste is either unintentionally or intentionally imported as used Electrical and Electronics Equipment (EEE) (Manhart Osibanjo, Adeyinka & Prakash 2011) . Basically, the e-waste stream in Nigeria originate from two distinct sources; local generation and importation of second hand electronic materials from the developed nations in the name of 'bridging the digital divide(Ongondo & Williams, 2011).

Waste Hazard

E-waste is not hazardous per se. However, the hazardous constituents present in the e-waste render it hazardous when such wastes are dismantled and processed, since it is only at this stage that they pose hazard to health and environment (Ongondo & Williams, 2011). Electronics and electrical equipment seem efficient and environmentally-friendly, but there are hidden dangers associated with them once these become e-waste. The harmful materials contained in electronics products, pose a real danger to human health if electronics products are not properly processed prior to disposal. Electronics products like computers and cell phones contain a lot of different toxins. For example, cathode ray tubes (CRTs) of computer monitors contain heavy metals such as lead, barium and cadmium, which can be very harmful to health if they enter the water system. These materials can cause damage to the human nervous and respiratory systems. Flame-retardant plastics, used in electronics casings, release particles that damage human endocrine functions. These are the types of things that can happen when unprocessed e-waste is put directly in landfill.

E-Waste Component	**Electric Appliances in which they are found**	**Adverse Health Effects**
Lead	Cathode-ray tubes and Solders	Initial symptoms of exposure Are anorexia, muscle pain, malaise, and headache. Long- term exposure to lead decreases the overall performance of the nervous system. High level exposure causes brain damage and death.
Mercury	Found in fluorescent tubes, tilt switches (mechanical doorbells, thermostats), and flat screen monitors.	Sensory impairment, dermatitis, memory loss, and muscle weakness. Environmental effects in animals include death, reduced fertility, and slower growth and development
Arsenic	Found in computer chips and light emitting diodes	Arsenic is a known cancer-causing substance (carcinogen). It is known to cause skin and lung cancer.
Halogens	Plastics and insulation	These substances are of concern because of the possibility that toxins such as dioxins and furans may be created and released burning
Polyvinyl chloride (PVC)	PVC plastic is used in the insulation f some cables used in ICT equipment.	When burnt it produces highly toxic dioxins;
Sulphur	Found in lead-acid batteries.	Health effects include liver damage, kidney damage, heart damage, eye and throat irritation. When released into the environment, it can create sulphuric acid through sulphur dioxide

Sustainable ways of managing e-waste in Nigeria

In view of the hazardous environmental impacts and the high residual value, management of e-waste has aroused worldwide attention in terms of legislations and technologies. With this global trend, E-waste is one of the fastest-growing waste streams in Nigeria, owing to an increase in consumption of electrical and electronic equipment (Peeranart, Ravi, & Ming 2013). Nevertheless, as is the case in some other countries, E-waste management has not received sufficient attention. For the successful implementation of any waste management plan (including an E-waste management plan), the availability of sufficient and accurate information on the quantities and composition of the waste generated. At present, in Nigeria, there is no available and accurate information that describes the characteristics and generation rate of e-waste or the actual practice of management and handling of the waste. Currently, despite the fact that there is a primary national legislation for e- waste management (as part of general electrical / electronics sector waste regulation) existing in Nigeria, this primary legislation is not fully implemented across the States of the country. In practical terms, there is no definite policy or plan for the allocation of funds to prepare suitable equipment and facilities for the management of e-waste.

According to Mundada, Kumar, and Shekdar(2014) Nigeria lack well-established system for separation, collection, storage, transportation and disposal of e-waste as well as adequate enforcement and monitoring of regulations to hazardous e-waste. Laxity is experienced in the enforcement of existing laws that oversees general waste management. State-of-the-art facilities and efficient technological methods for e-waste are not common in developing countries and Nigeria is inclusive (Nnorom & Osibanjo, 2009). As a result, low-ends management options are used to manage e-waste. These options include disposal in open dumps, backyard recycling and disposal into surface water bodies (Puckett, 2005; Omole and Isiorho, 2011; Omole and Isiorho, 2014). In addition, there is no integrated

framework as regards to the management and monitoring of hazardous and toxic materials and waste in developing countries. Inadequate funding is also a factor that has limited the management efficacy of hazardous waste and this has culminated in slow sustainable development (Omole and Ndambuki, 2014). Nigeria is yet to experience a push-up in the recycling procedure associated with e-waste, so open dumping of materials tend to be preferred solution. This process promotes environmental pollution thereby exposing millions to the hazards involved (Okunola,. Alabi., A. Adekunle.,. Bakare., Xijin ., Bin Li., Yuling ., & Xia, 2012).

The sustainability of e-waste management systems has to be ensured by improving the collection and recycling systems. It would be desirable to establish public-private partnerships in setting up buy-back or drop-off centers. Levying advance recycling fees is another approach to ensure waste management sustainability. To identify best e-waste management technologies across the globe and adopt them successfully can be key to a sustainable futuristic growth. Improved management options are required to eradicate e-waste from being indiscriminately disposed together with municipal solid wastes in Nigeria which is the order of the day.

Conclusion and Recommendations

The hazardous nature of e-waste is one of the rapidly growing environmental problems of the world. The ever-increasing amount of e-waste associated with the lack of awareness and appropriate skill is deepening the problem. A large number of workers are involved in crude dismantling of these electronic items for their livelihood and their health is at risk; therefore, there is an urgent need to plan a preventive strategy in relation to health hazards of e-waste handling among these workers in India. Required information should be provided to these workers regarding safe handling of e-waste and personal protection. For e-waste management

many technical solutions are available, but to be adopted in the management system, prerequisite conditions such as legislation, collection system, logistics, and manpower should be prepared. This may require operational research and evaluation studies. Government plays an important role in developing recycling capabilities in Nigeria. Incentives could also be provided to attract private sector partners who would set up state-of-art recycling facilities in Nigeria. This would create job opportunities for many people and take the financial pressure off the State's budget now that the various states of the federation is devising a mean to create job for her timing youth. Finally government should make sure that there is clear distinction between e-waste and other solid waste when choosing a dumping site.

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AFRICAN NATURAL RESOURCES EXPLOITATION AND THE CHALLENGES OF SUSTAINABLE ENVIRONMENT

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Abstract
Africa has enormous natural resources, which the West and are tapping, yet the continent remains underdeveloped, with wars, poverty and slow development. African countries lack of transparency in governance and in resource development and revenue generation. To bring about the needed development, there ought be reforms to enable the governments fight both exploitation and corruption in the sector. There also the to ensure the employment of the most recent methods and technologies in the exploitation of the various mineral resources.

Introduction

The African continent is the second largest on earth with enormous abundance of untapped natural resources. It is believed that much more of these resources are yet undiscovered for exploration, exploitation, mining and development. The scourge of African colonialism would have been prolonged if early discovery of all of the precious raw materials was made by the colonialists. The continent suffered severe underdevelopment in the hands of the imperial European colonialists for over a century. Today, in the neocolonial era, Africa has been put under heavy pressure and tensions

leading to wars, poverty and slow development. The western nations as well as emerging economic powers like China, exploit Africa's economic powerhouses. China exploits Africa's natural resources, taking most of the value and money from it. That informed why the region receives the largest foreign direct investment. In combating the situation African leaders should be mindful of sustainable environment strategy for the benefit of present and future human society.

Review of relevant literature

A map of Africa's natural resources revealed that no part of the continent is empty of a mineral resource that put the continent on a sound prospects and potentials of future economic prosperity and development. The North African countries of Libya, Tunisia, Egypt Mauritania and Morocco are endowed with vast oil and natural gas deposits. The Western Sahara has phosphates in large growth quantity, while the Sahara Desert holds the most strategic nuclear ore raw material. In West Africa are found large deposits of gold, iron ore petroleum, aluminum, diamonds, pozzolana and timber. Most of the countries, and particularly Niger, has very good quality uranium.

Sudan and her neighbors in the central African countries have deposits of Gold, Petroleum and the horn of Africa Somalia has high quality uranium. In the southern part of Africa, countries of Namibia, Angola Zimbabwe South Africa and Lesotho all have abundance of Diamond's Silver Gold. There is also copper platinum Graphite and coal in all these countries.

Fish and water riches are found in all the Pacific Ocean shores from Morocco to West Africa and in the Indian Ocean Shores from Somalia to Kenya down to Mozambique Island shores. Other rare mineral resources found in the continent include titanium, nickel, cobalt, Chromium bauxite, cocoa, beans, woods and tropical fruits. The Africa's

low human density and vast virgin land are also counted as natural resources.

Challenges

African countries lack of transparency in governance and in resource development and revenue remains the most daring challenge of African leadership. In other words, fighting corruption in governance and establishing prudence in the management of resources is desperately needed. Most of the resource-rich countries have suffered a history of squandered or embezzled revenue and government's inability to deliver basic services such as health and education. A Human Rights Watch research report in 2010 indicted both Nigerian and Angolan Governments in oil sector revenues from 1997 to 2002 with a call for reforms to enable the governments fight both exploitation and corruption in the sector.

Another major challenge would be ensuring the employment of the most recent methods and technology in the exploitation of the various mineral resources. They should insist on the best that is friendly to the environment which protect future usage. The exploitation and mining must be based on sustainable environmental strategy that optimize exploitation purify and protect the environment. That include Geochemical, Geological, Geophysical methods of hydrocarbons exploitation of minerals in the earth, others include Modern Airborne Geophysical and Modern Ground water exploitation methods for the different resources.

Protecting the resources neighboring communities is another challenge which African leaders should address. Such community's settlement and compensation often become a source of communal clashes and conflicts in many countries. They often fail to tolerate how they are displaced from their homeland farmland and livelihood.

Purification of contaminated areas where illegal crude exploitation and mining have been taking place. The need to curtle further loses of

lives and properties by employing latest technology in environmental purification is timely now.

Illiteracy and ignorance of the populace compound the state of affairs in most these countries.

Conclusion

African continent is made up of 63 countries making it the second – largest and bestowedby God with abundance of many types of natural resources, However, poor governance has bedeviled the continent,lack of prudence, corruption, squandrans and embezzlement of such resources funds continue to deprived the citizens and the benefits.

The leaders of Africa need to embark upon an aggressive exploitation of all the Natural Resources available to us. That in the process they should explore the use of safe methods and technology to protect the environment. There is greater need for purifying the contaminated areas as well as provision of quality education and a sustained enlightment campaign programme.

Recommendations

For Africa to achieve the much needed development, there is no second to good governance. It is only under good prudent authority that can fight corruption and stamp it out that we can achieve development. The need for establishing democratic rule and order with broad structure of checks and balance is hereby advocated. Stressing the need for an aggressive exploitation of Africa's natural resources caution is also loaded on the necessity of sustainable environment strategy. Experts advice should be sought toensure exploration techniques and sequences for sustainable protection of the environment and promotion of sustainable healthy environment.

Leaders of African Countries should enact enabling environmental laws that would provide for the protection, purification and exploitation of the Natural resources. The laws should also provide protection to the

revenues from the resources against embezzlement, internal or external exploitation and corruption and ensure proper accounting. It is also advocated that leaders of African Countries should embark on strategic provisionof qualitative education to fight the general illiteracy of the populace to enable them rise the poor level of literacy associated with the continent. Strategic enlightment campaign programme of environment education that specifically teach preservation, protection and healthy environment for a lasting benefit of present future human society.

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USING ICT FOR TEACHING AND LEARNING IN EARLY CHILDHOOD CARE EDUCATION (ECCE) IN THE 21ST CENTURY

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Abstract
The Information and Communications Technologies (ICTs) impact positively on the field of education in most developed countries. But, it is still relatively new in classroom lerning and instruction in developing countries. This review study is an attempt to explore the use of ICTs in early childhood care education (ECCE) in the 21st century. The population comprised of 50 teachers from fives ECCE schools in Zaria Local Government Area of Kaduna State. The instrument for data collection was structured questionnaire, and data collected were analysed. Findings showed that ICTs are potential powerful enabling tools for effective teaching and learning in early childhood education. However, if not properly used, they can cause harm to the young ones. ICTs can provide additional strategies to address major educational challenges being faced by teachers and children in (ECCE) in the 21st century. The study recommends appropriate use of ICTs to influence and change traditional methods of teaching and learning in early childhood care education, thereby, ensuring quality education.

Introduction

Information and Communications Technology (ICT), according to Ikoh and Nwankwo (2013), plays an important role in the teaching and learning in early childhood. It is a powerful means of communication and education. Due to its interactive nature, it has the potential to meet the needs of providing practical ways of constructively directing their own learning activities and complete tasks in a way to meet their own interests and need.

There is little doubt that use of ICT plays a significant role in the everyday lives of children in these current times. As Yelland (2006) notes, the very nature of our work and leisure time has been transformed, due to the present use of ICTs. It has pervaded homes and society at large and this influences many aspects of most children everyday lives. As a tool, ICT has the potential to transform the way that education is delivered (Fisher, 2001). ICT can facilitate differentiation and individualization in education: the use of ICT makes it possible to tailor both the content and the presentation of the subject matter to the individual background, experience and needs of children. In addition, as Schiller & Tillett (2004) said, ICT enhances what is possible by amplifying what teachers are able to do, by providing an entry point to content and enquiries that were not possible without the use of ICT, by extending what children are able to produce as a result of their investigations, and finally by providing teachers with the opportunity to become learners again.

The initial interest in the present use of ICTs in Early Childhood Education (ECE) stemmed from extensive teaching experiences in the early childhood sector, where it was evident that ICT was becoming an increasing fixture in the teaching and learning environment. More recently, this interest shifted into a slightly different direction when working with early childhood student teachers within the teacher education context. It became increasingly apparent that teachers and student teachers displayed varying views of the part they considered ICT

played or should play within these settings, coupled with how they chose to use or not to employ ICT resources.

Haugland (2000) argued that computers and ICT can be used in (developmentally) appropriate ways with very young children when they are ready to learn using it. The author recommended that computers be introduced to young children when they are about three years of age. ICT offers a multiplicity of uses and can be integrated into meaningful and learning opportunities for children, assist in administration and management of tasks. It has tremendous potentials to enhance early learning experiences, professional development, communicating with families and communities and administration in early childhood education services. Until fairly recently the bulk of literature in relation to ICT, was centered predominantly on the compulsory education sector. While ICT within the schooling sector has long been considered an integral component of the curriculum, the use of ICT within early childhood education had been afforded less attention.

This lack of attention did not necessarily mean however, that ICT was non-existent or not implemented within early childhood contexts. Several studies suggest that small groups of early childhood teachers have been implementing and integrating lCT within their teaching and learning contexts over a number of years. These innovative practices have contributed to increasing the profile of early childhood education both locally and internationally.

There are, however, significant challenges that are considered stand in the way of ICT deployment in early childhood education, such as equity of access to equipment, and professional development provision, e.g. in terms of training teachers. Understanding gap sexist as Dale, Robertson, and Short (2002) predict that the qualitative and quantitative gaps between the pupils' and the teacher's understanding of the affordances of ICT as a technology of teaching are much greater than has here-to-for been the case with any other teaching technology. Plowman and Stephen

(2005) argued that the curriculum and assessment are less prescriptive for pre-school settings and the use of computers in driving up standards is not yet explicitly stated in pre-school policy documents. They also asserted that pre-school practitioners have a diverse range of qualifications and experience and settings sometimes have very few staff; according to them, pre-school settings do not generally have a high level of ICT resources.

The Alliance for Childhood (2000) argues for the removal of computers in American schools, as they consider that the use of computers is dangerous for children's physical, emotional and intellectual development. On the other hand, Jones (2002) disputed these claims, as his research indicates that children were spending far more time watching television than working on computers.

The literature reviewed on research evidence on the ways in which ICT is used in pre-school settings points to the paucity of good evidence-based writing on the subject. There is a consensus among policy makers, practitioners, academics, and parents on the relationship between play and learning and, increasingly, on the benefits of introducing children to ICT at an early age but there is little evidence-based guidance available for its use in pre-school education.

The major objectives of this study was therefore to determine the extent to which ICT can be used in enhancing early childhood education. Specifically, the study sought to:

1. Determine the roles of the teachers in implementing and integrating ICT within the early childhood context.
2. Identify the ICT materials that are needed for effective teaching and learning in early childhood education.
3. Identify the roles of ICT in the teaching and learning environment in early childhood education.
4. Identify the challenges of ICT in early childhood education.

Methodology

This study is a descriptive survey that was carried out in five nursery schools in Zaria Local Government Area of Kaduna State. The study sought information from teachers of early childhood on the use of computers for teaching and learning in nursery schools. A total of fifty (50) teachers from five ECE schools in Zaria Local Government Area of Kaduna State were respondents.

Three care-givers selected from the five schools worked as research assistants, collecting data from the five different schools. The instrument used for data collection was a structured questionnaire. Three experts validated the instrument. Two experts in early childhood education and one from computer education. The questionnaire items were thirty-five (35) in number generated based on the five nursery schools and four research questions which guided the study. The questionnaire items were assigned a four (4) point rating scale of strongly Agree (SA) Agree (A) Disagree (D) and strongly disagree (SD) and these were 4,3,2 and 1 respectively. The acceptance point for the item was 2.50 and above, any mean score below 2.50 was considered not too influential and seen as negative. The data were coded and collated from the completed research instruments and were treated accordingly with their respective statistics.

Results

The results are presented in the order of the research questions.

Research Question One

Table 9.2.6.1: Mean ratings on the roles of the teachers in implementing and integrating ICT within early childhood education (ECE).

S/N	Item statement	SA	A	D	SD	Mean	Remark
1.	Teachers should develop their own ICT skills	35	15	-	-	3.70	Agree
2.	Teachers should support and guide the child to gain access to information and use ICT successfully.	10	40	-	-	3.20	Agree
3.	Teachers should allow children to explore ICT materials and teach them to respect the materials.	29	21	-	-	3.58	Agree
4.	Teachers should build expertise, learning alongside children, exploring and researching new ways of learning	30	20	-	-	3.60	Agree
5.	Teachers should be knowledgeable in computer and teaching skills	15	35	-	-	3.30	Agree

The data presented in Table 9.2.6.1 revealed that all the 5 items on the roles of the teachers in implementing and integrating ICT within the early childhood education have their mean scores ranging from 3.30 to 3.70 which indicated that the respondents agreed to items 1, 2, 3, 4, 5 as the roles of the teachers in implementing and integrating ICT within the early childhood context.

Research Question Two

Table 9.2.6.2: Mean ratings on the ICT materials needed for effective teaching and learning in early childhood education.

S/N	Item statement	SA	A	D	SD	Mean	Remark
6.	Touch screen: allows children to point at an alphabet by touching the screen.	28 22	-	-	-	3.56	Agree
7.	Digitizer: used to trace or copy drawing.	37	13	-	-	3.74	Agree
8.	Cell phone	36	14	-	-	3.72	Agree
9.	Video projectors	27	23	-	-	3.54	Agree
10.	Web cameras	31	19	-	-	3.62	Agree
11.	Digital cameras	39	11	-	-	3.78	Agree
12.	Video recorders, DVDs and CD recorders	29	21	-	-	3.58	Agree
13.	Electronic musical instrument e.g piano	34	16	-	-	3.68	Agree
14.	Image scanner	17	33	-	-	3.66	Agree
15.	Computer unit	29	21	-	-	3.58	Agree
16.	Electronic toys such as those that can produce rhymes and ringtones.	30	20	-	-	3.60	Agree
17.	Keyboard and mouse	38	12	-	-	3.76	Agree
18.	Display screen	35	15	-	-	3.70	Agree
19.	Joystick	32	18	-	-	3.64	Agree
20.	Audio speakers	26	24	-	-	3.52	Agree

The data represented in Table 9.2.6.2 reveal that all the 15 items on the ICT materials needed for effective teaching and learning in early childhood education have their mean scores ranging from 3.52 to 3.78 which indicates that most respondents agree that the ICT materials listed in items 1-15 are needed for effective teaching and learning in early childhood education

Research Question 3

Table 9.2.6.3: Mean ratings on importance of ICT in the teaching and learning environment in early childhood education

S/N	Item statement	SA	A	D	SD	Mean	Remark
21.	ICT is a very useful and valuable tool to use alongside everything else we do.	28	22	-	-	3.56	Agree
22.	ICT gives early childhood teachers and children arrange of tools to support and enhance learning	32	18	-	-	3.64	Agree
23.	ICT enhances documentation processes by allowing children document their own learning.	40	10	-	-	3.80	Agree
24.	ICT is an asset for children to acknowledge their learning and gain skills.	37	12	-	-	3.72	Agree
25.	ICT helps in strengthening and enhancing relationship with the teaching and learning community.	27	23	-	-	3.54	Agree
26.	Mastering the use of different ICT tools aids children's belief in their own competency.	32	18	-	-	3.64	Agree
27.	ICT use supports effective learning for children	33	17	-	-	3.66	Agree
28.	ICT allows children monitor and reflect on their own learning.	38	12	-	-	3.76	Agree
29.	ICT enables children to actively work together	37	13	-	-	3.74	Agree
30.	ICT is suitable for delivery of learning in all situations	31	19	-	-	3.62	Agree
		31	19	-	-	3.62	Agree

The data represented in Table 9.2.6.3 reveal that all the 10 items on the importance of ICT in the teaching and learning environment in Early Childhood Education have their mean scores ranging from 3.54 to 3.80 which indicates that most respondents agree that ICT is important in the teaching and learning environment in Early Childhood Education (ECE).

Research Question 4

Table 9.2.6.4: Mean ratings on the challenges of ICT in early childhood context

S/N	Item statement	SA	A	D	SD	Mean	Remark
31.	Implementation of ICT can be difficult to maintain.	32	18	-	-	3.64	Agree
32.	Lack of fund to procure the needed ICT materials.	33	17	-	-	3.66	Agree
33.	Lack of infrastructure like power supply and other technology tools.	30	20	-	-	3.60	Agree
34.	Lack of ICT skills on the part of teachers	24	26	-	-	3.52	Agree
35.	Teacher's resistance to the adoption of new Technology	39	12	-	-	3.20	Agree

The data represented in Table 9.2.6.4 also revealed that all the 5 items on the challenges of ICT in the early childhood context have their mean score ranging from 3.20 to 3.66 which indicates that most respondent agree to all the items as challenges of using ICT in the early childhood context.

Discussion of Results

Based on the analyses of the data, certain findings were made, which are now discussed. Research question one deals with the roles of the teachers in implementing and integrating ICT within early childhood education. The data given in Table 9.2.6.1 shows roles of the teachers in implementing and integrating ICT within the early childhood education and are as follows; The teachers should develop their own ICT skills. The teachers should support and guide the children to gain access to information and use ICT successfully; Teachers should allow children to explore ICT materials and teach them to respect the materials; teachers should build expertise, learning alongside children, exploring and researching new ways of learning; the teachers should be knowledgeable in computer and teaching skills. The teachers perceived their roles in relation to ICT no differently than their overall teaching roles within the

"early childhood" context. They saw themselves as supporting and guiding children's learning through the provision of a purposeful and innovative teaching and learning. Ward et al (2005) argued "to increase such use of ICT requires a better understanding of how teachers construct their practice and the place of ICT in that practice. The listed statements were agreed upon by the respondents as the roles of the teachers in implementing and integrating ICT within the early childhood context.

Research question 2 deals with the ICT materials needed for effective teaching and learning in early childhood education. The data in Table 2 shows the ICT materials needed for teaching and learning in early childhood education which are as follows; Touch screen: allows children to point at an alphabet by touching the 'screen, Digitizer: used to trace or copy drawing, Cell phone, Video projectors, Web cameras, Digital cameras, Video recorders, DVDs, and CD recorders, Electronic musical instrument e.g. piano, Image scanner, Computer unit, Electronic toys such as those that can produce rhymes and ringtones, Keyboard and mouse, Display screen, Joystick, Audio speakers are now predominantly being used as a way of enhancing and making visible young children's learning, rather than as disparate pieces of technical equipment for children to learn about (Erb, 2008; Ramsey, et al., 2006; Tringham, 2006). It appears therefore, that the use of ICT has now significantly broadened, with computers being seen as only one of many tools (Colbert, 2006; Hong & Trepanie" - Street, 2004; Federal Ministry of Education, 2009).

The finding of the study in Table 3 shows that the respondents agreed that ICT is a very useful and valuable tool to use alongside everything else we do, 1CT gives early childhood teachers and children a range of tools to support and enhance learning, ICT enhances documentation processes by allowing children document their own learning. ICT is an asset for children to acknowledge their learning and gain skills; ICT helps in strengthening and enhancing relationship with the teaching and learning community.

The teachers in this study expressed an overall positive picture of the roles ICT could play in Early Childhood Education, amid a climate of continuing controversy about the degree to which ICT is appropriate for young children to engage with (Siraj-Blatchford &White bread, 2003). Nevertheless, these teachers were quite clear about the place ICT could hold within the early childhood environment. As Siraj-Blatchford and White bread (2003) states if children are to understand ICT they need to see it used in a meaningful context, and for real purposes.

The Table also shows that Mastering the use of different ICT tools aids children's belief in their own competency (Fisher, 2001). ICT allows children monitor and reflect on their own learning, enables children to actively work together, and is suitable for delivery of learning in all situations. The teachers in this study considered that ICT created increased opportunities for children, their families and teachers to interact more deeply through different digital media. The oral, visual and written nature of these interactions invited diverse, pathways for the community to participate and engage with the early childhood centre (Boardman, 2007; Hong & Trepanier Street, 2004). The development of children's portfolios, containing a raft of documentation, was seen to contribute towards cementing and strengthening relationships (Hatherly, 2006).

The findings of the study in Table 9.2.6.4 show that implementation of ICT can be difficult to maintain, there is lack of fund to procure the needed ICT materials, there is lack of infrastructure like power supply and other technology tools, lack of ICT skills on the part of the teachers, Teachers resistance to the adoption of new technology. However, that due to the commitment and enthusiasm demonstrated by these teachers, these challenges did not appear insurmountable. Nevertheless, the challenge remains for teachers to navigate their way through the array of software programmes and resources to ensure a holistic, yet critical; approach is infused when utilizing ICT materials within the early childhood setting.

Conclusion

The findings from this study identified many benefits of using ICT by teacher's for enhancing inspiring pupils and increasing the provisional satisfaction. The teachers involved in this study considered that ICT in ECE offered valuable opportunities to make children's learning visible and contributed to developing and enhancing relationships with children, families and teachers when integrated in meaningful and purposeful ways within the early childhood teaching and learning community.

It is important that teacher's beliefs, roles and experiences are considered, if changes are to be made to foster and optimize opportunities for young children's learning, and how these beliefs, roles and experiences influence and shape the ways in which teachers implement and integrate ICT within the early childhood context.

Recommendation

The following recommendations were made, based on the findings of the study

1. Researchers and educators should encourage ICT in ECE from the perspectives of children and families. This will help in exploring how early childhood teachers notice, recognize and respond to the impact of ICT on young children, through a series of case studies.
2. Further researchers should examine early childhood teacher education to incorporate adequate ICT content.
3. Government should give teachers opportunities to actively engage in dialogue to explore and articulate their pedagogical approach, to ICT in ECE.
4. Teachers should help to create opportunities for young children to understand and appreciate the benefits of visual images and graphics in knowledge which are part of their everyday experiences.
5. The teachers should be involved in decision making surrounding the purchasing, implementing and application of ICT and sometimes

improvise when necessary rather than being randomly supplied with resources to use.

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