NEW TECHNOLOGIES AND BUSINESS EDUCATION: ERGONOMIC APPLICATION IN THE STATE PUBLIC TERTIARY INSTITUTIONS IN IBARAPA REGION

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ABSTRACT

This paper looks into the need to create awareness among Business Education lecturers of the fact that the use of technologies has associated risks if necessary infrastructures are not provided and if preventive measures are not taken. Being a survey research, two research questions and one hypothesis were generated to guide the study. The population for the study consisted of Business Education lecturers from the State public tertiary institutions in Ibarapa Region of Oyo State. All Business Education lecturers formed the population and sample for the study. Questionnaire was used as the instrument which was validated by business education experts and tested for reliability using test-re-test method and a reliability coefficient of 0.78 was obtained. Results revealed that academic activities and environment are not well designed, that lecturers do not have access to new technologies and that they do not experience

Introduction:

Ergonomics is derived from two Greek words "ergon" meaning work and "nomoi" meaning natural laws. In a simpler term, it is the study of the nature of work done, the environment it is done and the tools available to do the work (Emmanuel, Jonathan and Ayodeji 2014).

Ergonomics is all about comfort and efficiency which enhances productivity and work force satisfaction. It is the interaction between people and the objects they use and the environments they function in. If equipment, workstations, work

any health problem as a result of using technologies. This is because they do not use them. The hypothesis was tested at 0.05 level of significance and revealed that there is no significant difference between the responses of male and female lecturers on problems arising from the use of new technologies. The study concluded that since health of workers (lecturers) is irretrievably bound to their academic productivity and success, there is the need for tertiary institutions in Oyo State to provide well-designed academic activities and environment and take more proactive steps in preventing injuries at work in order to enable lecturers perform effectively and efficiently.

Keywords: *business education, ergonomics, technology, workplace.*

methods are designed to suit employees' capabilities and limitations, health, safety and performance is maximize. Ergonomic is fitting the task to the person. Ergonomics improves health and safety, reduces costs from absence and reduce productivity and ensures that social and legal obligations of employers to their employees are being met.

Ergonomists study human capabilities in relation to work demand. Human factors and ergonomics also known as comfort design and user-friendly system is the practice of designing products, systems or processes to take proper account of the interaction between them and people. In essence, it is the study of designing equipment and devices that fit the human body and its cognitive abilities. The two terms ergonomics and human factors are essentially synonymous.

Oborah (2011) sees ergonomics as the science of designing work processes and equipment for employees and should be considered when there are injuries, complaints, staff turnover or absenteeism from work. One method of solving an ergonomic problem or complaint is to adjust the employees' workstation.

Idowu, Adedoyin & Adagunodo (2005) posit that ergonomic requires the following steps: recognizing the complaint/problem and documenting the job tasks; evaluating the existing situation; consulting resources/experts

on best practices; identifying mismatches between the existing situation and human capabilities, identifying potential solutions; providing recommendations and implementing the recommendations and evaluating the success of the recommendations.

As it is well-known that the world every gone technological and this has permeated every field of endeavour including education. Technologies have been used to achieve success in delivering instructions in schools, colleges and universities. As some of these technologies are becoming obsolete, others are emerging with more complexities of operations and application. The need continues to arise for employing these technologies in schools and organizations. Despite the importance of the use of technologies, there are risks associated with prolonged use. As these technologies are used in schools, lecturers will have to use technologies for research purposes, to search for information, prepare lecture notes, and even for teaching. Where these technologies are not available in schools, lecturers use them at home or in the cyber café. This will require prolonged use of these technologies.

Researches have shown that in workplaces, poor jobs and work design cause some ailments which affect the health of workers. For instance, Birbal and Taylor (2004) discovered that computers are a hugely important part of human work as people rely on data gathering and analysis in industries to give them a competitive edge, this type of task is labour intensive, requiring hours of concentrated and repetitive work on the computer by individual operators.

According to them, after a few years in this type of environment, a worker can suffer from a range of health problems such as repetitive strain injury (RSI), Computer Vision Syndrom (CVS), tenosynovitis (teno), muscular skeletal and postular problems, work-related upper limb disorder, reproductive hazards, lower back pain and so on.

In view of the above, there is the need to design jobs and the environment (academic activities and environment) in such a way as to reduce or eliminate injuries that could result from poor designs. This will help to prevent illnesses and protect lecturers' health. According to Birbal and

Taylor (2004), many of these problems can be eliminated or reduced if careful attention is paid to a person's work routine and ergonomics. Ergonomics has been defined as the study of the design and arrangement of equipment so that people interact with the equipment in healthy, comfortable and safe manner. As related to computer equipment, ergonomics is concerned with such factors as the physical design of the keyboard, screens and related hardware, and the manner in which people interact with these hardware devices. (http://education.qld.gov.au/smartclassrooms/parents/ergonomics.htm#erg).

Ergonomics deals with design of equipment that will lead to the least amount of stress by reducing such things as tiredness and discomfort, this is because the human body has needs, limitations and abilities, which ergonomics takes into account. For instance, sitting in a broken chair could very well cause back problems now or later in life; the desk should be such that the height can be changed, and if the ICT users cannot maintain a suitable level for the desk, this could force him to look up to the screen which will probably give him a pain in the neck in an hour or two; however, with the introduction of an ergonomically designed chair, a worker becomes a lot more comfortable. Eyes should be fairly level with the screen, looking slightly down at the screen is the most comfortable way of doing so. The desk and chair should be at a good level with each other. Back should be straight and feet resting on the ground. Monitors, chairs and desks should be adjustable. Workers should be encouraged to take time out to stretch and move around and have plenty of breaks from the PC.

The work environment is as well important as equipment. To the ergonomists, ergonomic is important in order to reduce stress in the work place. Hence Birbal and Taylor (2004) posit that the environment should be characterized by: good ventilation; good lighting and void of noise.

Statement of the Problem

Safety and accident prevention concerns lecturers for several reasons, one of which is the staggering numbers of work-related accidents. Injuries or

illness occurs among lecturers. Computer contribute to stick syndrome symptoms like headache and sniffles which some experts blame on poor ventilation and inappropriate choice of right ergonomic office furniture. Office work is susceptible to other health and safety problems, including repetitive trauma injuries related to computer use, respiratory illness stemming from indoor are quality, and high level of stress, which are associated with a variety of factors including task design. Therefore, this study tries to find out what are the ergonomic practices of lecturers in the public state tertiary institutions in Ibarapa Region of Oyo State.

Purpose of the Study
The study aimed at:
1. Creating awareness to the fact that there are inherent risks associated with prolonged use of ICTs and
2. Finding out whether academic activities and environment are well designed in educational institutions.

Research Questions
1. Are public state tertiary institutions in Ibarapa Region of Oyo State lecturers aware of the problems arising from the use of new technologies?
2. Are academic activities and academic environment well designed in educational institutions?

Research Hypothesis
There is no significant difference between the mean responses of male and female lecturers of Business Education on the problems arising from the use of technologies.

Significance of the Study
The study would be significant in that it will enable lecturers of Business Education to be aware of the fact that there are associated problems in using new technologies. The study will also reveal to lecturers of Business

Education the need to take proactive steps in preventing the associated risks of using ICT.

New Technologies and Business Education

Nwadi (2006) refers to e-learning as the use of computer and ICT in teaching and learning. Citing Chime (2004), it is the application of electronic device such as computer, radio, television, etc in the learning process. It therefore encompasses learning delivered via a range of technologies such as the internet, television, video tape, intelligent tutoring systems and computer based training.

Nworgu (2006) perceives ICTs as the dominant technology of our times and 21st century. Hence, according to him, citing Haag and Kenn (1996), the configuration of a basic ICT system comprises eight essential elements which are referred to as "building blocks of an IT system" which are: input devices, processing unit, software, communication devices, information, output devices, storage devices and people. According to him, people is the most important component of an ICT system. Without people, the ICT system will be non-functional.

Olorundare (2006), citing Nwosu (2003) noted that combined with the traditional sources of information (teachers and textbooks), ICT presents itself a versatile teaching and learning aid which undoubtedly leads to improved and efficient teaching and, therefore, learning. Accordingly, ICT has the following potentials in assisting the teacher in the implementation of the school curriculum:

- Teachers are provided with efficient and effective tools to take care of students' individual differences;
- There are opportunities for close cooperation with colleagues in the same or even other fields through networking and internet services;
- Educators are challenged to new methods of acquiring knowledge through knowledge sharing and be ultimately connected to the world.
- Unrestricted access of teachers to relevant information and developments in subject areas.

Among the general objectives specified by the National Policy for IT (2001), the following are imperative.

- Empowering the youth with IT skills an preparing them for global competitiveness;
- Integrating IT to mainstream of education and training;
- Establishing IT institutions as centres of excellence to ensure Nigeria's competitiveness in international markets, etc.

According to Aluwong (2011), citing Sutherland and Banicink (2005) business education, is the acquisition of and application of the unique set of knowledge and skills used in commercial and industrial occupations. Also citing Infoplease (2006) by Aluwong (2011) also observes that business education is for general knowledge practices; it is also training in specific skills useful in business. Business Education like other manpower training programmes, is usually designed with the primary purpose of upgrading skills or providing citizens with the necessary skills required to obtain gainful employment.

According to Owojori (2011), business education teachers and practitioners should expect rapid changes in the state of the arts in the world of work and the classrooms in this 21st century more than the changes that occurred in the past centuries. According to him, "with several scientific researches and studies going into reducing the strain and stresses at the work place and ergonomics, we should expect serious emerging trends and challenges in Business Education".

Owojori (2011) stresses further that business educators should expect more challenges posed by telecommunications in recent years than the challenges of the future. According to him, Prosser's theorem of vocational education says that the equipment of training must be a replica of the equipment that the graduate will use at his/her place of work after graduation. The ever-changing role of technology continues to be a challenge for all educators, but especially business educators. Business education teachers are constantly required to update their software and hardware skills as well as learn new information-based technologies. The

incorporation of this new knowledge and the constant maintenance and updating of hardware is a real challenge for business educators.

In view of the above, business education is technology inclined. The future of business education will be technology-based. In view of the important part that ICT plays in education, Business Educators need to utilize the new technologies in vogue. Lecturers in state public tertiary institutions are expected to undertake a programme of research because it is a major part of the activities of lecturers in tertiary institutions. For researchers to be effective and produce good results, they are undertaken through the use of new technologies. Observation has shown that prolonged use of technology may result into ill health. There is therefore the health injuries and the need for work and workstation (school environment, laboratories and workshops) designs so as to prevent injuries resulting from work.

Observations have shown that the integration of ICT into teaching and learning in schools is still at the low level. However, researches are ongoing on the need for full integration of ICT into the teaching and learning of business education.

Need for Ergonomic Environment
Wiki (2009) defines ergonomics as the science of designing the job, equipment and workplace to fit the worker. Proper ergonomic design is necessary to prevent repetitive strain injuries, which can develop over time and can lead to long-term disability.

According to Birbal and Taylor (2004), ergonomic environment is the design of a workplace and workstation that make work easy for employees. Hence they believe that ergonomics is the science that makes extensive use of mathematics, physics and biomechanics to determine the best working conditions for humans who work with machines. Also, manufacturers can incorporate features for comfort, efficiency and safety into computer furniture and equipment as ergonomically designed furniture and equipment helps to reduce the risk of injuries as it reduces the strain on several parts of the body.

Ergonomic environment is therefore very important in order to reduce stress in the work place. A work place is a complete working environment, including the heating, lighting, decoration and so on. A good work place design can reduce or even eliminate many of the health

complaints. Erwart (2009) observed that when a research was carried out and the furniture of some employees were improved, the productivity increased by 20%. Room temperature should be okay, well ventilated and lighted, well decorated, well painted, furniture big enough depending on the job design, should not be clustered, should be high enough, suitable chairs (swivel), top of desk should be smooth. Employers should have legal obligations to protect their workers from health hazards since health of workers is irretrievably bound to their productivity. Eye defects should be checked for and taken care of, there must be adequate health and safety training; health entitlements should be provided; security-emergency marks and fire extinguisher provided.

Equipment also has to do with ergonomic environment. The State of Queensland (Department of Education and Training)(2009) defined ergonomics as the study of the design and arrangement of equipment so that people interact with the equipment in healthy, comfortable, and safe manner. As related to computer equipment, ergonomics is concerned with such factors as the physical design of the keyboard, screens and related hardware and the manner in which people interact with these hardware devices. The VDU radiation affects people's eyes and so should be titled to one's comfort. The keyboard should be high enough and soft. The mouse should be well placed as to allow easy movement of the wrist and fingers. Also, software should be user friendly. The systems should be noise proof. Doors should not be banging. Beautiful plants should be planted in the environment to give fresh air. Jobs design must be in such a way as to have a break.

According to The State of Queensland (Department of Education and Training)(2009) the correct posture of a person working at the computer is:

- Feet are rested firmly on the floor or footpad;
- Thighs are fully supported by chair seat except for a two-finger width space behind the knee';
- Curve of lower back is supported by chair back;
- Elbows, hips and knees are bent at approximately 90 degrees.
- Shoulders are relaxed so shoulder blades are free to move;
- Forearms are parallel to the floor or sloping slightly downwards to the desktop.

- Wrists are straight and not bent up, down or to the side. Note that wrist supports help to maintain natural, not extreme wrist position when working with a mouse. Wrist supports to be soft;
- Top of screen is at eye level or slightly below, about arm length straight in front of your eyes;
- Glare and reflection of the screen are avoided by changing angle and orientation of the screen; and
- Neck is relaxed and balanced; chin is not poking upwards.

Consequently, correct posture can be complemented with correct study behavior as follows:

- Take short breaks while keying to relax your hands and prevent fatigue;
- Take longer breaks every 30-60 minutes to get up, walk, and do exercises or another task to move your body and to increase your blood circulation;
- Take time to look further away to help your eye muscle to relax;
- Take breaks to drink water and have nutritious meals; and
- Change position often while obeying the same basic principles of correct posture.

Method

The study employed survey design. The population for the study consisted of all Business Education lecturers from the College of Education Lanlate, Oyo State (10) and Ibarapa Polytechnic, Eruwa (26). As a result of the small size of the population, all Business Education lecturers formed the sample for the study that is 36. Questionnaire was used as the instrument which was validated by business education experts and tested for reliability using test-re-test method. A reliability coefficient of 0.78 was obtained. Only 22 copies of the questionnaire were dully filled and returned which formed 61% return.

Results

Table 1: Responses on Academic Activities/Environment Designs

S/N	Academic activities/Environment Designs	SA (%)	A (%)	D (%)	SD (%)	Remarks
1.	My academic environment is characterized by some or all of the following:					

i.	Good ventilation	13.6	9.1	22.7	54.5	Strongly Disagree
ii.	Well lighted	22.7	18.2	13.6	45.5	Strongly Disagree
iii.	Well decorated with beautiful flowers	36.4	22.7	4.50	36.4	Strongly Disagree
iv.	Short breaks allowed between academic activities	22.7	22.7	13.6	40.9	Strongly Disagree
v.	Seminars and conferences organized	22.3	31.8	13.6	27.3	Agree
vi.	Well-arranged tables and chairs	22.7	13.6	9.10	54.5	Strongly Disagree
vii.	User friendly equipment	13.6	45.5	-	40.9	Agree
viii.	Stress free environment	18.2	45.5	4.50	31.8	Agree
ix.	Relaxation centre	31.8	31.8	9.10	27.3	Strongly Agree
x.	Filthy environment	27.3	18.2	4.50	50.0	Strongly Disagree

Table 1 above shows that items i, ii, iv, vi and x reveal that majority of respondents strongly disagreed that academic activities and academic environment are well designed with the following scores: good ventilation (54.5%), good lightning (45.5%), short breaks between academic activities (40.9%), well arranged tables and chairs (54.5%) and filthy environment (50.0%).

Furthermore, items v, vii and viii agreed that academic activities and environment are well designed with the following scores: seminars and conferences (31.8%), user friendly equipment (45.5%) and stress free environment (45.5%).

Only item iii strongly agreed that the academic environment is decorated with beautiful flowers with (36.4%).

Moreover, majority of the responses scored less than 50%, this shows that academic activities and academic environment are poorly designed.

The result above shows that academic environments are not well designed and that academic activities are unorganized.   This shows lack of ergonomic awareness.

Table 2: Responses on Availability of Infrastructural Facilities for teaching

S/N	Infrastructural facilities for teaching Business Education	SA (%)	A (%)	D (%)	SD (%)	Remarks
2.	The following facilities/equipment are available for teaching in my department.					
i.	Computer Laboratory	27.3	22.7	18.2	31.8	Strongly Disagree
ii.	Shorthand Laboratory	22.7	13.6	22.7	40.9	Strongly Disagree
iii.	Computers	22.7	18.2	22.7	36.4	Strongly Disagree
iv.	Foot rest	22.7	27.3	9.10	40.9	Strongly Disagree
v.	Adjustable chairs with/without arm rest	31.8	31.8	9.10	27.3	Strongly Agree
vi.	Executive tables and chairs	36.4	31.8	4.50	27.3	Agree
vii.	Document holders	40.9	18.2	13.6	27.3	Agree
viii.	Screen filter	31.8	36.4	9.10	22.7	Agree
ix.	Fire extinguisher	31.8	27.3	4.50	36.4	Strongly Disagree
x.	Medical facilities	31.8	36.4	4.50	27.3	Agree
xi.	Satellite	36.4	31.8	9.10	22.7	Strongly Agree
xii.	Telephone	31.8	31.8	9.10	22.3	Strongly Agree
xiii.	Video tapes	27.3	40.9	9.10	22.7	Agree
xiv.	Radio/Television	27.3	31.8	18.2	22.7	Agree
xv.	Word processors	31.8	36.4	9.10	22.7	Agree
xvi.	Projectors	27.3	31.8	22.7	18.2	Agree
xvii.	e-mail	18.2	36.4	18.2	27.3	Agree
xviii.	Internet	22.7	27.3	4.40	45.5	Strongly Disagree
xix.	Photocopier	27.3	22.7	4.50	45.5	Strongly Disagree
xx.	Tapes	27.3	27.3	13.6	31.8	Strongly Disagree

3.	I have full access to the above facilities/equipment	31.8	31.8	18.2	18.2	Strongly Agree
4.	I have frequent visits to cyber café	31.8	22.7	13.6	31.8	Strongly Agree
5.	I am accessible to personal technologies	31.8	27.3	4.50	36.4	Strongly Disagree
6.	I have special space, table and chair for my personal technologies at home or office.	27.3	31.8	9.10	31.8	Strongly Agree

The table above reveals that from 20 items presented, respondents strongly disagreed on nine (items i, iv, ix, xviii, xx and 5) that infrastructural facilities are available for teaching; they however, strongly agreed on six items (v, xi, xii, 3, 4 and 6) and also agreed on nine items (vi, vii, x and xiii-xvii) that infrastructural facilities are available for teaching.

Results from table 2 above reveal that necessary facilities/equipment and technologies are available in the state public tertiary institutions in Ibarapa region of Oyo State.

Table 3: Responses on Problems arising from the use of technologies

S/N	Problems arising from the use of technologies	SA (%)	A (%)	D (%)	SD (%)	Remarks
7.	I encounter the following problems when using new technologies:					
i.	Headache	22.7	22.7	13.6	40.9	Strongly Disagree
ii.	Vision problem	27.3	27.3	18.2	27.3	Agree
iii.	Neck pain	31.8	36.4	9.10	22.7	Agree
iv.	Wrist pain	27.3	31.8	9.10	31.8	Agree
v.	Shoulder	27.3	27.3	-	45.5	Strongly Disagree
vi.	Stomach problem	22.7	27.3	9.10	40.9	Strongly Disagree
vii.	Back pain	27.3	36.4	9.10	27.3	Agree
viii.	Body pain	22.7	36.4	13.6	27.3	Agree
ix	Difficulty in sleeping	31.8	27.3	4.50	36.4	Strongly Disagree
x.	Frequent illness	36.4	40.9	-	22.7	Agree

Table 3 above reveals that out of the 10 items listed, items ii, iii, iv, vii, viii and x agreed that there are problems associated with the use of technologies while items i, v, vi and ix strongly s can disagreed. This shows that majority of respondents agreed on the fact that problems arise from the prolonged use of technologies and that prolonged use of new technologies can lead to ill health.

Testing of Hypothesis

There is no significant difference between the mean responses of male and female lecturers of Business Education on the problems arising from the use of technologies.

Table 4: t-test on mean responses of male and female lecturers on problems arising from the use of new technologies.

Sex	N	Mean	SD	t-cal	df	t-table	inference
Male	12	28.2500	7.30037				
				0.020	20	2.086	not sign.
Female	10	27.3000	6.58365				

From the above table, since the t-cal of 0.020 is less than the t-table of 2.086, there is significant difference between the responses of male and female lecturers on problems arising from the use of new technologies.

Discussion of Findings

The study sought to create awareness to the inherent risks associated with prolonged use of ICTs and to find out whether academic activities and environment are well designed in educational institutions.   From the analysis of data presented in table 1-4, it was revealed that majority of respondents strongly disagreed that academic activities and academic environment are well designed whereas few agreed that they are not well designed. The result shows that academic environments are not well designed and academic activities are unorganized. This shows lack of ergonomic awareness.

The results also reveal that from 20 items presented, majority of respondents agreed that infrastructural facilities are available for teaching. This shows that necessary facilities/equipment and technologies are available in the state public institutions in Ibarapa region of Oyo State.

Results from table 3 reveals that majority of respondents agreed that there are problems associated with the use of technologies and that prolonged use of new technologies can lead to ill health.

These results are in consonance with the view of Birbal and Taylor (2004), who discovered that computers are a hugely important part of human work as people rely on data gathering and analysis in industries to give them a competitive edge, this type of task is labour intensive, requiring hours of concentrated and repetitive work on the computer by individual operators. According to them, after a few years in this type of environment, a worker can suffer from a range of health problems such as repetitive strain injury (RSI), Computer Vision Syndrom (CVS), tenosynovitis (teno), muscular skeletal and postular problems, work-related upper limb disorder, reproductive hazards, lower back pain and so on.

Conclusion

Based on the findings of this study, heath of workers (lecturers) is irretrievably bound to their academic productivity and success. Provision of a well-designed academic activities and environment is inevitable. However, in state public tertiary institutions like the ones in Ibarapa region of Oyo State, there is still the need to take more proactive steps in designing academic activities/environment in order to enable lecturers perform effectively and efficiently.

Recommendations

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

- The state public tertiary institutions in Ibarapa region of Oyo State should ensure that academic activities are well arranged in such a way as to allow breaks;
- Academic environment should be well organized and designed as to prevent injuries to the health of lecturers.
- Academic environment should be well lighted, ventilated and void of noise;
- Equipment/facilities should be user friendly and noise proof. In other words, they should be safe to use;
- Furniture should be stress free and must be adjustable to suit one's height;
- There should be incorporation of ergonomic feature on systems and equipment; and
- ICT centres in the institutions should be well designed to incorporate all of the above.

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