Ergonomic Consideration as Panacea to Organisational Growth and Proficiency in the 21st Century

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Abstract

The 21st century system of operation came with technological innovations and advancements. Ergonomics combined with the 21st century new technological innovations and advancement is aimed at achieving organizational growth, effectiveness and proficiency. New technologies have become an intrinsic component of human life as far as life is concern. They are infiltrating every facet of life and adapting a progressively quality as they become literal part of humans. These technologies will certainly make it easier, quicker and less expensive for humans to communicate, exchange ideas, knowledge, skills, efficiency and proficiency. The contributions are not only yielding proficiency in organizations, it also enhances trade, commerce, social, economic and cultural basis of the organizations and their general improvement in performance. The virtual corporation and visual workplace will become increasingly common in organizations with one aim and vision geared towards organizational growth and development. Furthermore, mechanisms to manage technological changes have been historically unsuccessful as technological development has always out passed the ability of government or business to regulate its usage. The transition from nation based industrial age to a global digital age will require people other than technical specialists to provide inputs into developing new management and leadership skills. Ergonomics tends to ensure that people are mentally and physically encouraged, informed and safe guarded. Ergonomics ensures safety and health aspect of humans across the various fields of discipline and is only a safe and healthy person that can be productive and contribute to national development. This paper is on Ergonomic consideration in the 21st century: A panacea to organizational growth and proficiency. It describes the new and emergent technologies incorporated with ergonomic considerations and principles. It then looks at their effects on organizational management practices and their potential impact on human environment and the level of proficiency in organization, education and industries. Innovation as a global concept is also considered in the study and its relationship with ergonomics. Conclusions and recommendations were also made.

Keywords: Ergonomics, innovation, 21st Century, growth, proficiency.

Introduction

Ergonomics developed into a recognized field during the second world war, when the first-time technology and human science were systematically applied in a coordinated manner. Physiologist, Psychologists, anthropologists, scientist and engineers jointly addressed the problems arising from the operation of complex military equipment. The results of these inter

disciplinary approach appeared so promising that the co-operation was pursued after the war, in industry and other sectors. Ergonomics tends to simplify easy methods of getting any task done in a conducive and a serene environment. Ergonomics ensures safety and good working environment. The 21st century innovations came with a lot of technological tools and advancement, creative ideas and well-modified approaches. Ergonomics combined with 21st century innovations is key to organizational growth, development and proficiency (Buchman, Gardner, Keggm, Kaye, & Donaldson, 2019). This paper considered the various ways ergonomics can contribute to the improvement of quality education in Nigeria. Several basic segments have been identified by several researchers which ergonomics has contributed to the improvement of quality education among Nigerian students. Thus, ergonomics research in education provide a good platform that allows the creation of appropriate ergonomically design solutions which aimed at solving existing problems in education and industries. The paper also focusses on the need to improve growth and proficiency in education and industries with will in turn reduce unemployment and poverty rate in Nigeria.

Concept of Ergonomics

The word Ergonomics is from the Greek word ergon (work) and 'nomos' (law). In some case ergonomics is associated with the term 'human factor'. International Ergonomics Association (IEA) (2020) defined Ergonomics as a scientific discipline that is concerned with understanding of interactions among humans and other elements of a system especially how the profession applies its theory, principles, data and methods of design in order to optimize human wellbeing and the overall system performance. Ergonomics aimed at designing appliances, technical systems and tasks in such a way that improve human safety, health, comfort and performance. In organizations or work places, the focus of Ergonomics is man and its environment. Dikes, Noble, and Legg, (2015) opined that manpower is the source of production of any organization, as such ergonomics seek to ensure that everything that will satisfy man's desire is put into consideration. When human factor is made comfortable, work productivity improves and yields positively and efficiently. Ergonomics seek to ensure that man (human) is positively carried along both expertise, health and safety to ensure productivity and inputs to organizational growth. An important principle of ergonomics is that equipment, technical systems and task have been designed in such a way that they are suited to every user. Ergonomics contributes to the prevention of workers inconveniences and helps improve performance.

Types of Ergonomics

Lutz and Huilt, (2013) classified ergonomics into the following classes;

i. **Physical Ergonomics:** In Physical Ergonomics, it is mainly physical interactions of people and their activities that are concerned in other to maintain mans' comfortability for improved performance. Safety is paramount in the academic environment housing both teachers and students. Safety measures seeks to settle imbalance situation that may affect the environment or cause harm in the environment. Ergonomics ensures that safety measures are made available for optimal educational / organization performance.

ii. **Cognitive Ergonomics:** This aspect of ergonomics focuses on how well the use of a product matches the cognitive capabilities of users.

iii. **Organizational Ergonomics**: This type of ergonomics considers the structures, policies and processes of any organization in respect to the organizational efficiency and productivity.

Benefits of Ergonomics

Ergonomics as a field of study has numerous benefits to both humans and organizations, some of its benefits include the following;

(1) Improvement of productivity and efficiency
(2) Improvement of workers' morale
(3) Reduction of absenteeism
(4) Improvement of savings
(5) Reduction of casualties/ injuries in organizations
(6) Maintenance of comfortability among employees
(7) Ensure smooth running (safety) of daily activities in organizations

Ergonomic Consideration in Education and Industry

Corlett (2006), observed that, in some countries, it is possible to graduate as an ergonomist, other people who are trained in relevant basic technical, medical or social science fields can also acquire knowledge of ergonomics through training and experience. Professional ergonomists can work with authorities like (legislation), training institutions (universities and colleges), research establishments, service industry (consultancy) and the production sector (occupational health services, personnel departments, design departments, research departments, etc). Many professional ergonomists who are active in business (company ergonomists) practice their profession mainly by being an intermediary between designers and users of production systems.

Ergonomist knowledge is essential and provides ergonomic guidelines and advises to designers, users, management and employees in organizations. These may include industrial designers, instructors, company doctors and nurses, physiotherapists, industrial hygienists, and industrial psychologists. Ergonomics can contribute to the solution of a large number of social problems related to safety, health, comfort and efficiency (Saarni, Nigard, Kankianen, & Rimpela, 2007). Daily occurrences such as accidents in workplaces, traffic and at home, as well as disasters involving cranes, airplanes and nuclear power stations can often be attributed to human error. From the analysis of these failures it appears that the cause is often a poor and inadequate relationship between operators and their task. These kinds of accidents can be reduced by taking cognizant of human capabilities and limitations when designing work and environments. Many work situations are hazardous to health, for instance musculoskeletal system (mainly lower back pain) and psychological illnesses due to stress which constitute the most important cause of absenteeism by workers and occupational disability. These conditions can be partly attributed to poor design of equipment, technical systems and tasks (Crimes & Legg, 2004). Ergonomics can help reduce these problems by improving the working conditions in institutions and organization. An important ergonomic

principle is that equipment, technical systems and tasks have to be designed in such a way that they are suitable to every user. For examples while designing workplace environment from ergonomic perspective it requires additional attention such as short or tall persons, overweight of people, handicapped, age of people, ventilation, seating arrangement lighting condition etc. In every organization, the human factor should be considered because they are the engine room of every production in organizations.

Limon and Valinski, (2004) highlighted some of the ergonomic principles as regards individual are as follows:

a. **Practice of Good Posture:** Every individual in various organization must adopt good sitting, standing and working position to ensure safety and effective job delivery. Ergonomics consideration in a work place seeks to address a good posture for each individual worker. Ergonomics intimate workers on the basic gesture and squatting method. Bending can come with dislocation, squatting is the easiest method of picking up smother during performance on the job.

b. **Lift with Your Knees:** Ergonomics consideration emphasis on lifting with knees to hard carriers, it is an ergonomics principle for body and angle balancing which tends to have negative effects when missed. Ergonomist seek to advise and remedy the situation by keeping the work close to the body and simple analysis of getting work done at ease. It avoids stretching of hands and ensuring the job at the moment is not strenuous to the body. In most cases, in some offices and organization, the body is not close to the work at hand, this affects the muscles and joint, makes worker imbalanced and makes the job stressful and compounding to workers.

c. **Get A Good Chair:** Ergonomics consideration in organization tends to improve on sitting position of worker by sitting on a good and flexible chair in office or vehicle. Sitting position affects the yield, smartness, reasoning and proficiency of individuals in organizations. For effective job performance ergonomics helps to maintain active performance and productivity.

d. **Look After Your Eyes:** For a worker who works in any organization the eye is delicate and is used for virtually everything. Ergonomic advices on protecting the eyes at all cost against every form of damages or danger.

21st Century Education

The 21st century is quite different from the 20th century in the capabilities people need for work, citizenship, and self-actualization. This is due to the emergence of very sophisticated information and communications technologies of 21st century. The nature of collaboration is shifting to a more sophisticated skill (Dede, 2014). The current major frameworks for 21st century skills include the revised International Society for Technology in Education, (ISTE) (2016) students' standards for technology in curriculum (2016), as well as digital literacy standards from the educational testing service ICT literacy. Students are not meant to learn only academic contents, they also need to know how to keep learning and make effective and innovative use of what they know by applying critical-thinking and problem-solving skills, communication skills, creativity, innovative skills and collaborative skills.

In today's world, information and knowledge are increasing in such an astronomical rate that no one can learn everything about every subject. What may appear true today could be proven to be false tomorrow, and jobs that student will get after their graduation may not yet exist. Therefore, students need to be taught how to process and use information. Just teaching them ideas and facts, without teaching them how to use them in real-life settings, is no longer enough. The purpose of schooling is to prepare students for success in solving real life problems after graduation. There is need to prioritize knowledge and skills that will be in greatest demands for employers. Information and communication technology (ICT) focuses on the ability to use technology to develop 21st century content knowledge and skills, in the context of learning core subjects. Students must be able to use technology to learn content and skills so that they know how to learn, think critically, solve problems, use information, communicate, and collaborate creatively with others (Akpan & Abraham, 2020). Students apply existing knowledge to generate new ideas, product or processes, to create original works as means of personal or group expression to use models and simulations to explain complex systems and issues. They identify trends and forecast possibilities. Students use digital media and environment to communicate and work collaboratively with others. They also develop cultural understanding and global awareness by engaging the learners of other cultures. In research and information fluency students apply digital tools to gather, evaluate, and use information. They plan strategies to guide inquiries, select information sources based on specific tasks, process data and report results. In critical thinking, problem solving and decision-making students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources.

The 21st century education has to do with a system of education that provides learners with the needed skills to succeed in the society and provide them with platforms to benchmark with global best practice. This system of education is loaded with so much information readily available for learners to share and becomes more productive. Skills such as creativity, critical thinking, communication, collaboration etc. helps individual learners to be productive and improve performance. Creativity as a skill has to do with the ability of learners to make something new that is different from what others are doing, that can be used to solve a particular problem in educational system. It also involves making new connections and coming up with innovative solutions to problems. Critical thinking is about analyzing information and critiquing claims. Communication as a skill involves learners being able to communicate and share information and knowledge among peers, while collaboration is about teamwork and the collective genius of a group that is involved in a particular task. A 21st Century teachers in a typical classroom serve as a guide or mentor for the learners and not as an all-knowing sage who provide learners with all the needed information. Teachers are empowered as facilitators and motivators for learning to take place.

This shift is great news for teachers, instead of struggling to provide learners with all the information they need to succeed in areas the teacher knows little about, they can support learners as they make their own contributions to their learning. In the 21st century education learning environment is flexible for both teacher and learners to make adjustment based on how it suits their learning. Cheung and Wong, (2007) conducted a study that compared the

effects of children's behavior and sitting position in traditional classroom furniture with a chair that is known as "chair 2000" and associate troubles. It was found that children showed a moderate but significant improvement in 'on task' behavior, and a marked improvement in sitting positions on account of the introduction of the newly designed furniture.

Innovation in Education

Ajayi-Dopemu (1984) defined innovation in education as the careful effort made towards the identification and use of ideas and information concerning the realization of greater educational outcome. Innovation in education may involve the use of technological devices to either sustain or disrupt the conventional teaching process as to improve academic performance of the learners. Innovation is the wheel on which educational system are driven to meet the 21st century needs of today's learners. In most cases new concepts, ideas, principles, technique are being initiated and incorporated into educational system in order to improve the system. Innovation as a concept in the present ICT driven economy implies the understanding of how to generate great ideas in solving societal problems. Managers need to encourage and champion ideas that will help their organizations incorporate diverse perspective which can spur creative insights and facilitate creative collaboration by harnessing new technologies. Innovation is the combination of knowledge in relevant, valued new products, processes, or services. Innovation can be seen as implementation of ideas that originate from creative processes. It is the process of translating a novel ideas or invention into good or service that creates value for which customers can pay with satisfaction. Creativity is what drives innovation in any organization. Creative efforts have produced products, service, or process that answers the original need of the people or solves an existing identified problem. Most successful innovation is as a result of a conscious and purposeful search for new knowledge.

Lawanto, Santoso and Liu (2012) defined educational innovation as sudden changes in educational sector which can either disrupt or sustain the educational practice at any level. Innovation is classified into two which are disruptive innovation and sustaining innovation.

i. Disruptive Innovation

Koehler and Mishra (2009) opined that disruptive innovation involves the introduction of new way of doing things or completely taking over of an existing structure by a new one with in a particular system. This may imply replacing and existing practice with a new way of practice. In education disruptive innovation connote the practice or technique of enhancing qualitative education. For instance, the introduction of e-learning system of education in Nigeria is a clear indication of a disruptive system of education because it has come to disrupt the existing system of teaching and learning.

ii. Sustaining Innovation

Prensky (2001), observed that innovation has created rich global resources which are critical for promoting meaningful educational outcome thereby promoting the 21st century learning skills among learner. This is because of the introduction of technological devices into classroom for teaching and learning such as digital recorder, interactive whiteboard, multimedia projectors, smart phones, which has come to sustain and improve the educational practice. The introduction of innovative teaching approaches such as blended learning

approach where learners can learn both online and face-to-face is a sustaining innovation since it is supplementing the traditional teaching approach with the aim of improving the academic performance of the learners. Sustaining innovation is a tool used in enhancing sustainable development in education because it provides learners with the opportunity of exploring their learning content even outside their learning environment.

Technological Advancement for Growth and Proficiency in Organization

Legg (2006) observed that one of the major problems of organizational development (OD) is a data driven process for change, and as a result of this the success of organizations has become increasingly dependent on the use of information technology. The present 21st century is ICT-driven which provides platform for various organizations to rely on for growth and proficiency. For instance, modern organizational Communications is via E-mail, websites, visual meetings etc. which serve time and boost the proficiency level of the organization. Organizational development (OD) efforts targets at developmental feedback which is driven by quality leadership, self-directed learning and career management. The role of information as "vital signs' in driving and evaluating initiatives related to organizational development (OD) and human resource development (HRD) is indeed more significant if there must be growth and proficiency in organizations. Digital integration is also fundamental in achieving technological advancement for growth and proficiency in organization as it is not enough to simply incorporate technology to existing organizational practice but technology must be used strategically to help in archiving the organizational goals.

Conclusion

The significance of ergonomics application is to improve the process of education and organizational growth and development. Ergonomics can solidly contribute to the improvement of quality education and organization growth when viably put in place and observed critically. The improvement of 21st century education and organizational growth has several basic elements which have been identified as key contributors to the improvement of quality education of students and increase their interest for learning. Ergonomics has also been seen as a pivot for improvement of working structure of organization especially in key areas like staff welfare and health. However, with Ergonomics principles being put in place in both school and organizations the 21st century growth and development is certain.

Recommendations

Based on the issues discussed above, the following recommendations were made:

(1) The Ministry of Education should incorporate Ergonomics as a course in undergraduate curriculum of higher institutions.
(2) The Ministry of Labour and Employment should undertake workshops on Ergonomics for Nigerian Labour Congress (NLC) members and workers generally to improve their awareness in the field of Ergonomics.
(3) Every working firm, organization and establishment should seek the advice of Ergonomist to intimate their workers with the benefit enshrined in Ergonomics for better working conditions.

(4) Government and private establishments should introduce a manual for all workers in on the need for collaboration with Ergonomics consultant on the job and off the job training for their workers.

(5) Since Ergonomics deals with human factor, the level of productivity, health and safety of workers becomes a vital aspect, as such government and non-governmental organizations should create agencies for effective implementation of ergonomics principles for all the establishments and firms in Nigeria.

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