Role of Ergonomics on Sudanese higher education Institutions ICT class Rooms

Nour Eldin Mohamed Elshaiekh

Assistant Professor, Dean Faculty of Computer Science
Future University, PO Box 10553, Khartoum, Sudan

ABSTRACT

Ergonomic in computer field is the science concerned with conniving safe and comfortable situations for the users of information and communication technology equipment's. In the computer field, ergonomics plays very important role in the design and allocating of all computer equipment's, for that reason in Sudanese higher education Institutions (HEI) ICT class rooms will be affected directly with how the equipment's will be arranged and the environments itself. Due to the current situation of ICT class rooms, Sudanese higher education Institutions were facing problems in the learning activities as most of these class rooms were not equipped and arranged properly using ergonomic steps and processes due to the lack of perception of the importance of the ergonomics. Research paper will focus on the role of Ergonomics on Sudanese higher education Institutions ICT class. The researcher collected data from Different universities in Sudanese HEI. The research questionnaires will be analyzed using SPSS. Descriptive Statistics and the distribution of respondents and percentage of responses to the questions in the questionnaire analysis will be presented to find the results. The Results of the paper will be presented based on the basic ergonomics roles and including the main issues of the ergonomics, which will help these institutions to improve the ICT class rooms and teaching accessibility, Support students /teacher to adopt better pedagogical and provide over all cognizance of the general knowledge.
Keywords: Knowledge management; Ergonomics; Sudanese Higher Education institutions, information and communication Technologies, ICT class Room.

1.INTRODUCTION

This paper will discuss the role of computer ergonomic in Sudanese higher education Institutions ICT class rooms. The paper contains useful information and ideas about the role and importance a of computer ergonomics from the academic and students' point of view specifically information and communication technology equipment's Adjustment in the learning class rooms referring to some literature review of computer ergonomics.

2. BACKGROUND AND LITERATURE REVIEW

This section provides a review of the basic literature of the paper keywords and related works which will help to design the contexts of the study paper. The review for the study includes Ergonomics; Sudanese Higher Education institutions, information and communication Technologies, ICT class Room.

2.2 Ergonomics

The science of fitting the work situation, work demands and work practices to the competences of the working people to keep safety, efficiency and excellence of work" Ergonomics at Work Inc., 2002. Ergonomics relates information about human behavior, aptitudes and boundaries and other features to the design of computer tools, machines, accessories, jobs and environments for creative, safe, comfortable and actual human use" (McCormick and Sanders, 1992).

2.2 Sudanese Higher Education

Education is a basic human right, so the revolution of higher education in Sudan is going on the same linear specifically in the ICT field. Incredibly, there have been more than ninety colleges and universities in Sudan, 65% are public and 35% are private, most of these universities they use the ICT tools in the learning activities method. The Sudanese government has make financial arrangements for future for many infrastructure including ICT tools, and supporting the knowledge of enduring education by scheming ICT training programs to satisfy the educational requirements of students working in the field (Sudan. United Nations Economic Commission, 2009)

2.3 Information and communication Technologies

Information and Communication Technology (ICT) is a large umbrella term that contains all the practical equipment to procedure and communicates information. ICT contains two features of information technology and communication technology. Information technology includes all materials relating to the processing, usages instrument, operation, and organization of information and communication technologies includes the media and tools of communication uses information technology activities (Agde, 2010).

International Journal of Application or Innovation in Engineering & Management (IJAIEM)
Web Site: www.ijaiem.org Email: editor@ijaiem.org

Volume 3, Issue 9, September 2014   **ISSN 2319 – 4847**

2.4 ICT Class room

According to Cox, Preston &Cox (1999) the use of ICT in classrooms include: Making educations more interesting, more pleasant more efficient for teachers and students, more varied, more inspiring, and Helpful of productive learning. Generally, it is strong that the emotional factors of a teacher's will facilitate and barriers to teacher use of technology in the classroom. Those facilitators will make successful ICT classroom.

2.5 Computer Ergonomic Issues

As mentioned by DBCVSRI, Health & Safety Coordinator Leslie Steinberg (40329) and Anderson (1997)Adjusting the workstation to best appropriate of staff/students in education behavior will include the following items: Workstation Design(desks, chairs, space, layout), Work Postures (sitting, standing, reaching, lifting), Work Organization (Pace, Breaks, Variety), Tools, Equipment, and Furniture Design(body size, height, gender, promoting neutral postures, reduced vibration, exposure to acceptable lighting, noise, temperature), Manual Materials Handling(lifting, lowering, pulling, pushing, carrying and holding materials), Work Environment(ventilation, noise, temperature & humidity, lighting and vision).

3. THE PROBLEM

Although the growing use of ICT tools in Sudanese HEI still they did not gain the full effectiveness and advantages of using ICT in the education activities, this could it be a reflection of the less acknowledgement of the role of ergonomic in the applying and designing ICT tools and equipment's in the classrooms. Based on the problem raised the following research question is posed:

What is the role of computer ergonomic in Sudanese higher education Institutions ICT class rooms?

4. RESEARCH MODEL

The following research model (Figure1) was developed based on the Computer Ergonomic Issues identified in the literature in order to assist this study in answering the above questions.
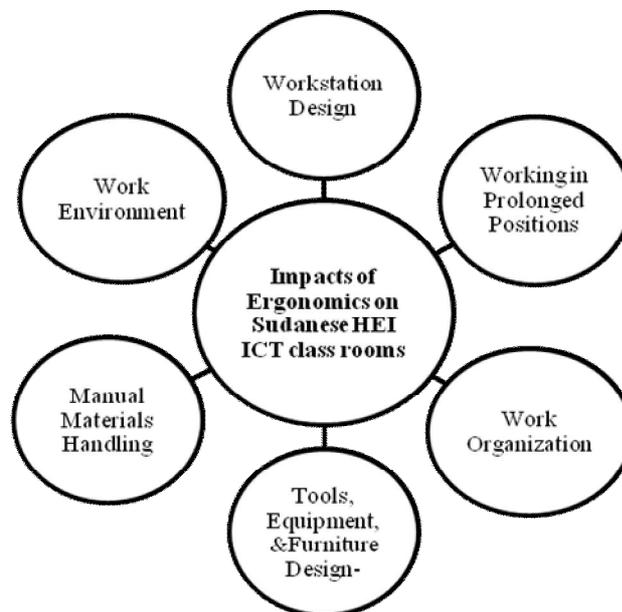

Figure 1: Computer Ergonomics Issues in Sudanese HEI ICT classrooms

5. METHODOLOGY AND SAMPLING

Descriptive statistics analyses techniques was used to analyze the data. The questionnaire technique of data collection was used. A multiple Sudanese Universities/ Colleges purposively (ICT based universities) selected as participant of the questionnaire. The selection of these participants was based on their specialization. Statistical Package for the Social Sciences (SPSS) used to answer the research question. There are approximately 97 university / College in Sudan with a target population of approximately 650,000 students and 21000 academic staff. Even though 300 questionnaires were distributed to the participants, only 95 (31.7%) questionnaires were not returned. Only 161 (53.7%) copies were

completely answered. The remaining of 44 (14.7%) questionnaires could not be included in the study due to incomplete data or poor responses (see Figure 2).
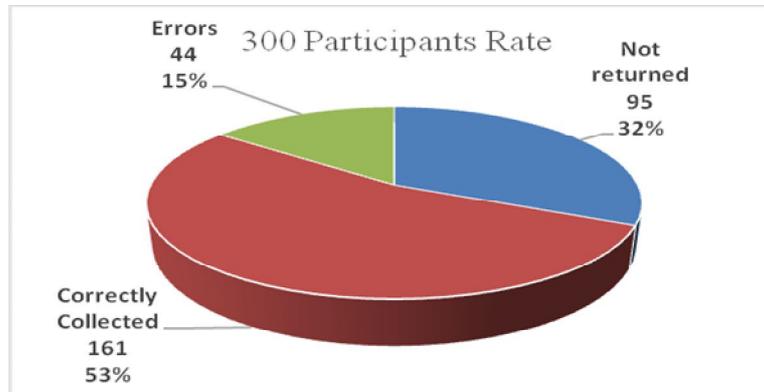

Figure 2: Staff/Students Response Rate

6.DATA ANALYSIS AND RESULT

Quantitative approach was used to answer the question about the role of Ergonomics on Sudanese higher education Institutions ICT class rooms from the participants' point of view. This will include data has been collected from multiple Sudanese Universities/ Colleges to select the participants of the questionnaire. Table 1 mentioned the response of the participant.

Table 1: The Participants Feedback

Ergonomic Issue	Ergonomic tips	Applied	Not Applied	Feedback
Workstation Design	Desks	19%	81%	Negative on impact tools or equipment
	Chairs	12%	88%	Affect with stiffness or cramping
	Space	32%	68%	Nose and stress
	Layout	13%	87%	Negative affect with Compression or contact stress
Working in Prolonged Positions Sitting/Standing-	Postures	25%	75%	Body pain
	Footwear	0%	100%	Foot and back pain and Bending
	Floors	66%	34%	Affect negatively with Nose
Work Organization	Pace	8%	92%	Compression or contact stress
	Breaks	16%	84%	Affect with Forceful exertions
	Variety	12%	88%	Out of mode and understanding
Tools, Equipment, and Furniture Design-	Body	10%	90%	Body Pain, numbness & tingling
	Gender	0%	100%	Female Awkward postures
	Postures	19%	81%	Static or sustained postures
	Vibration	12%	88%	Damage of equipment's and stress for users
	Lighting	9%	81%	Forceful exertions and Stress
	Noise	13%	87%	Compression or contact stress
	Temperature	15%	85%	Uncomfortably, Stress
Manual Materials Handling	Lifting	5%	95%	Compression or contact stress
	Pulling	7%	93%	Compression or contact stress
	Pushing	10%	90%	Compression or contact stress
	Holding Materials	2%	98%	Compression or contact stress
Work Environment	Ventilation	50%	50%	Very bad health environment
	Noise	10%	90%	Inconvenience and stress
	Humidity	60%	40%	Pain and shortness of breath
	Lighting & Vision	45%	55%	Eye strain

7.DISCUSSION CONCLUSION

The computer ergonomic offers very influential procedures to higher education institution classrooms in the Sudan. However, Ergonomics is important because it makes staff/student be in better health environments and be more effective as they work in enjoyable and comfortable environment. Ergonomics usually recovers productivity in learning areas has been stated in several of the studies reviewed. This research paper explores the role of Ergonomics on Sudanese higher education Institutions ICT class rooms. The analysis and findings of the results obtained from the data that were generated through the distribution of questionnaires are presented in this paper. Of the overall computer ergonomic issues the analysis show firstly that the Manual Materials Handling is the less issues with average percentage of (6 to 94), that Sudanese HEI were caring when they design the ICT classrooms and techniques, therefore this will affect negatively in compression or contact environment of students /staff. The second Issues issue is Work Organization with average percentage of (12 to 88), accordingly there is negative affection (Body, foot, back pain). The third issue is Tools, Equipment, and Furniture Design with average percentage (13 to 87), Resulting in the destruction of the classroom devices. The fourth issue is Workstation Design with average percentage (19 t0 81), thus will affect in ICT classrooms with negatively on tools or equipment, with stiffness or cramping, and Compression or contact stress. The Fifth issues is Working in Prolonged Positions Sitting/Standing- with average percentage of (30 to 70), so the ICT class room students will be affecting with foot and back, Bending, and noise. The last issue is Work Environment with average percentage (41 t0 59), accordingly there will be Very bad health environment, Inconvenience and stress, Pain and shortness of breath and Eye strain for Sudanese ICT class rooms staff/students. The overall participant's feedback on of the computer ergonomic issues has been applied in Sudanese HEI classroom shows that the average is 19% only applied correctly, while to average 81% were not applying the computer ergonomic issues which will affect negatively in the Sudanese higher education Institutions ICT class rooms. In spite most of Sudanese HEI was using the ICT tools in their classrooms unfortunately they did belief the importance of ergonomic in the designing of their class rooms and computer equipment's This research study contributes to the body of knowledge by explaining the basic procedures of computer ergonomic. The study harmonized the existing argument in the literature by enhancing the findings of Marklin, R., Simoneau. (2004) Hedge (1999). The Limitations of this study is the participant of our questionnaire survey conducted within some Sudanese universities/ colleges, the results of the study therefore may not be generalized to all other institutions.

REFERENCES

[1] Anderson, J. (1997). Integrating ICT and Other Technologies in Teacher Education: Trends, Issues and Guiding Principles [Electronic Version]. Info share: Sources and Resources Bulletin, pp. 33-35.

[2] Australian Government –Department of Education, Employment and Workplace Relations (2010) ICT Professional Learning: National Mapping of ICT-based Learning, Education Services Australia, Final Report, Melbourne.

[3] Cox, M., Preston, C. and Cox, K. (1999) What Factors Support or Prevent Teachers from Using ICT in their Classrooms? In British Educational Research Association Annual Conference. (Brighton:

[4] Ergonomics at Work Inc., Introduction to office ergonomics, 2002

[5] Sanders M.S., McCormick J., 1992, Human Factors in Engineering and Design, McGraw Hill International.

[6] Hedge, A., Morimot, S., McCrobie, D., 1999, "Effects of keyboard tray geometry on upper body posture and comfort," Ergonomics, 1999, Vol. 42, No. 10, pp. 1333–1349.

[7] Marklin, R., Simoneau, G., "Design Features of Alternative Computer Keyboards: A Review of Experimental Data, Journal of Orthopaedic& Sports Physical Therapy, 2004, Vol. 34, No. 10, pp. 638–49.

AUTHOR

Nour Eldin Elshaiekh Assistant professor, Dean Faculty of Computer Science at Future University of Khartoum, Sudan. He received his B.S. in Information Technology from future university, Sudan, in 1997 and M.S. degrees in Computer Science from University Gezira, Sudan March 2003, and Ph.D. in Knowledge Management from Multimedia University, Malaysia. In 2010, He published more than 20 journal and conference scientific papers. Dr. Nour Eldin has more than 15 years of experience including teaching, training, in M.Sc. B.Sc. levels. He is assigned to be adjunct staff (Senior Lecturer) at multimedia University, Malaysia and he is supervising four PhD students based on Sudan from Multimedia University, he is Supervising Eight students at the Masters level from Sudan University of Science and technology, and Open University of Sudan. He also leads and teaches modules at both B.Sc. and M.Sc. levels in computer science, and knowledge management. He was Manager of International Computer Driving License (ICDL), Future University Center from June 2003 up to date.