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Computer Ergonomics and Computer-related Illnesses: The Experience of Library Personnel

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COMPUTER ERGONOMICS AND COMPUTER-RELATED ILLNESSES: THE EXPERIENCE OF LIBRARY PERSONNEL

BY

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ABSTRACT

The deployment and frequent use of Information and Communication Technologies (ICTs) in carrying out library tasks had long been leading to computer-related illnesses among library personnel especially in academic libraries. The designing of computer ergonomics in most academic libraries were observed to be affecting the wellbeing and productivity of library personnel. This study was carried out to investigate computer ergonomics and computer-related illnesses: the experience of library personnel.

The study adopted the survey research design with a study population of 60 library personnel in University of Lagos (UNILAG) and Michael Otedola College of Primary Education (MOCPED) libraries, Lagos State, Nigeria. A total enumeration sampling technique was used to include all the entire library personnel in the two selected libraries. Data was collected and analysed from entire sixty (60) library personnel and the analysis was done in an SPSS output format based on simple frequency count and percentage, standard deviation and mean distribution of the population.

Results showed that the ICTs that were very readily available to majority of the respondents were scanners, personal computer (pc), printer, flash drive and projector respectively. It was established that photocopying service was the foremost library service as indicated by almost all the respondents. Results revealed that majority of the respondents noted they used the keyboard on a daily basis. Findings showed that the library personnel strongly agreed they had experienced communication difficulties as a result of frequent ICTs use. Most of the respondents strongly agreed that they had experienced computer-related illnesses such as neck pain, headache, shoulder and finger pains. It was concluded that majority of the respondents were of the view that measures such as medical allowances should be provided to ease the effect of ICTs use. Also, majority of the respondents strongly agreed that comfortable seats should be provided, librarians should always make use of screen protection tools and they should not toil with social gathering.

In as much as the management of libraries is concerned with the provision of effective and efficient library services through the use of ICTs and related devices to forestall user apathy,

they need to be concerned about the adverse consequences that the use of the technologies could have on library personnel who use them. Thus, it is very imperative for those in the top echelon of library management to pay adequate attention to the designing of computer ergonomics if they want to have a functional library with healthy workforce.

Keywords: Computer ergonomics, Computer ergonomics designs, Ergonomics, Library, Library personnel

Introduction

Information and Communication Technologies (ICTs) are tools that need human intervention to completely attain their full potentials. This is true because as they are being used in libraries, works are moving rapidly. These days, library personnel make use of ICT facilities such as computers, printers and scanners to perform one form of task or the other (Nwokedi, Gupiyem, and Agbenu, 2019). More and more works are done with the aid of ICTs that apparently speed up work. Modern libraries especially academic libraries are increasingly being redefined as institutions to get unrestricted access to information in many formats and from many sources.

However, the introduction of ICTs in the libraries had forced library personnel to work long hours in front of computer systems for different library works. Challenges of using computer systems in libraries are numerous, including the designing of computer ergonomics thereby resulting into computer-related illnesses among library personnel. Computer-related illnesses according to Nwokedi et al., (2019), are some form of illnesses that usually arise in the course of prolonged usage computer systems and other ICT facilities for one purpose or the other, and these illnesses may include; computer vision syndrome, neck and back pain, carpal tunnel syndrome and other disorders affecting muscles, spine and joints. Others includes; headaches, backaches, neck aches, sore wrists, arms and legs, and eyestrain; or worse, Cumulative Trauma Disorders (CTDs) or Repetitive Strain Injuries (RSIs).

(Anuja, 2021), posited that poorly designed computer workstations in libraries and low level of knowledge among library personnel regarding ergonomics requirements may trigger computer-related illnesses. In addition, the most visible causes of computer illnesses among library personnel in relation to computer ergonomics may include poorly designed seats, awkward posture, exposure to computer screens on a regular basis without screen protectors, sitting in the same position for continuous long hours, frequent repetitive motion tasks, among others. Others may include; lack of necessary planning, incorrect use of equipment, placement of equipment

which may results into induce muscular disorder, eye fatigue and discomfort, stress, radiation, photosensitive epilepsy and skin rashes.

Asaolu and Itsekor (2014) expressed that computer ergonomics should be designed to facilitate task performance, reduce fatigue and injury by fitting equipment to the body size, strength and range of motion of the user. A befitting computer ergonomics design can reduce the number of injuries suffered as a result of poor body positioning or repetitive motions; thereby reducing group health insurance rates and productivity among library personnel. It is on this basis that this study was set out to investigate computer ergonomics and computer-related illnesses: the experience of library personnel.

Statement of the problem

Studies established that there have been significant application of ICTs in the operations of libraries. In the course of the frequent application and regular use of ICTs to perform library tasks by library personnel, majority of these personnel complain of certain illnesses/discomforts such as eye strain, head-ache, shoulder-ache and backache, vision syndrome, neck and back pain, carpal tunnel syndrome and other disorders affecting muscles, spine and joints. Others includes; neck aches, sore wrists, arms and legs, and eyestrain, and many others. Observations revealed that the implementation of ICTs as well as likely deficiencies in the design of computer ergonomics in most academic libraries led to computer-related illnesses among library personnel. Again, it appears that majority of the library personnel who make use of ICTs to perform tasks are ignorant and do not take safety measures needed to avoid developing computer use discomforts as well as computer-related illnesses, thus affecting their wellbeing and productivity in the library. Therefore, these observations call for investigation. Hence, the need for this study.

Literature review

Computer ergonomics and computer-related illnesses: the experience of library personnel

A study conducted by Nwokedi, Gupiyem, and Agbenu, (2019), titled; staff awareness of ergonomics principles required at the computer workstation: case study of University of Jos Library, revealed that 50% of the library staff were not aware of the sitting posture and 58.33% on working posture of arms and wrist while working in the computer. Another study conducted in Nigerian libraries by Asaolu and Itsekor (2014), titled; ergonomic computer workstation

considerations for library staff, revealed that ergonomic health problems amongst the library staff were due to poorly designed seats, awkward posture, exposure to computers without screen protectors, sitting in the same posture for long hours and frequent repetitive motion tasks. Respondents in the study of James et al. (2018), titled; musculoskeletal discomfort and use of computers in the university environment, revealed that neck pain and shoulder pain were the most prominent musculoskeletal discomforts suffered by the respondents.

Respondents in the study of Pillai and Jayalatha (2016), titled; ergonomics and library professionals - a case study of the University of Kerala posited the experiences they encountered as a result of prolonged computer use for library tasks. At first, only 41.5% of respondents who are using computers admitted that they feel some kind of tension/discomfort during the job. Majority (58.5%) denied it. More than half (59%) of the respondents are suffering from problems related to the hand such as pain in lower arm and the wrist. Vision problems such as blurred or double vision, irritation/ itching in the eyes, headache, discomfort due to prolonged focus, tears coming from the eyes etc. are experienced by 65% of the professionals. Muscular pain, physical discomfort, stiffness etc. are caused during the work of 31.7% of the respondents. About 66% of the professionals suffering from back pain, neck, upper back and shoulder rigidity. 16 respondents (39%) are suffering from joint pains and more than 65% of the professionals feel fatigue/tiredness/illness during or after the job.

Findings from the study conducted by Shikdar and Alkindi (2015) on office ergonomics: deficiencies in computer workstation design revealed that 58%, 45% and 43% of the respondents reported experiencing eye strain, shoulder pain and back pain in the course of using computers to perform library tasks.

Research questions

The following are the research question raised for the study;

1. What are the types of ICTs available to the library personnel?
2. What are the library services for which ICTs are being utilised by the library personnel?
3. What is the frequency of use of ICTs by library personnel?
4. What are the types of computer-related illnesses encountered by the library personnel?

5. What are the effects of computer-related illnesses on the library personnel?
6. What are the ways to minimise computer-related illnesses experienced by library personnel?

Methodology

The study adopted the use of survey method. The population of this study included all library personnel in University of Lagos (UNILAG) Library and Michael Otedola College of Primary Education (MOCPED) Library, Lagos state Nigeria. With a population of 38 library personnel in UNILAG Library and 22 library personnel in MOCPED Library. This gives a total population of sixty (60). The study adopted the total enumeration method to include the entire 60 library personnel in the two selected academic libraries in the study. This technique gave information for each and every unit of the population with greater accuracy. Questionnaire was the instrument used to collect data and was titled Computer Ergonomics and Computer-Related Illnesses: The Experience of Library Personnel. Data analysis was carried with the out use of simple descriptive statistical analysis of frequency counts, percentages, mean and standard deviation for the research questions.

Results and discussions

Demographic characteristics of the respondents

Table 1 presented results on the demographic information of the respondents. Findings showed that majority of the library personnel 22 (36.7%) were between 41-45 years of age, while 6 (10.0%) were between 46 and above. A significant number 32 (53.3%) of the respondents were of the female gender and 28 (46.7%) were males. It was also evident from the results that most of the library personnel 36 (60.0%) had spent between 5-7 years in service and just 2 (3.3%) noted that they had a working experience of between 2-4 years. Results also revealed that most of the respondents 46 (76.7%) were married, while the rest 14 (23.3%) were still single as at the time the study was conducted. Findings on the qualification of the library personnel showed that majority of them 42 (70.0%) had BLIS degree, while 1 (1.7%) had a Ph.D.

Table 1: Demographic information of the respondents

Demographic Characteristics	Frequency	Percentage

Age (in years)		
25 - 30	17	28.3
36 - 40	15	25.0
41 – 45	22	36.7
46 and above	6	10.0
Total	**60**	**100.0**
Gender		
Male	28	46.7
Female	32	53.3
Total	**60**	**100.0**
Working Experience		
2 – 4 years	2	3.3
5 – 7 years	36	60.0
8 years and above	22	36.7
Total	**60**	**100.0**
Marital Status		
Married	46	76.7
Single	14	23.3
Widowed	-	-
Divorced	-	-
Total	**60**	**100.0**
Qualification		
BLIS	42	70.0
MLS	17	28.3
Ph.D.	1	1.7
Total	**60**	**100.0**
Status		
Library Officer	13	21.7
Higher Library Officer	10	16.7
Librarian I	24	40.0
Librarian II	6	10.0
Technical Librarian	4	6.6
Assistant Librarian	3	5.0

Total	**60**	**100.0**

Table 2 showed that all the ICT facilities listed were available to most of the library personnel, though with different levels of availability. Results showed that ICTs that were very readily available to majority of the respondents were Scanners, Personal Computers (PCs), Printers, Flash Drives and Projectors as indicated by 48 (80.0%), 43 (71.7%), 42 (70.0%), 38 (63.3%) and 37 (51.7%) respectively. A significant number of the library personnel 36 (60.0%) also indicated that Mouse and Speaker were also available.

Table 2: Availability of ICTs to Library Personnel in UNILAG and MOCPED Libraries

ICTs	**VRA**		**RA**		**NRA**		**NA**		**Mean**	**SD**
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
Scanner	48	80.0	11	18.3	-	-	1	1.7	3.77	0.53
Mouse	36	60.0	23	38.3	1	1.7	-	-	3.58	0.53
Computer arm rest	34	56.7	20	33.3	4	6.7	2	3.3	3.43	0.77
Joy stick	16	26.7	32	53.3	7	11.7	5	8.3	2.98	0.85
Flash drive	38	63.3	15	25.0	4	6.7	3	5.0	3.47	0.83
Light pen	15	25.0	35	58.3	5	8.3	5	8.3	3.00	0.82
Head set	26	43.3	27	45.0	4	6.7	3	5.0	3.27	0.80
Digital Camera	31	51.7	22	36.7	4	6.7	3	5.0	3.35	0.82
Projector	37	61.7	14	23.3	6	10.0	3	5.0	3.42	0.87
Personal computer	43	71.7	16	26.7	1	1.7	-	-	3.70	0.50
Web cam	22	36.7	28	46.7	5	8.3	5	8.3	3.12	0.89
Motherboard	26	43.3	20	33.3	10	16.7	4	6.7	3.13	0.93
Speaker	36	60.0	15	25.0	5	8.3	4	6.7	3.38	0.90
Processor	29	48.3	22	36.7	5	8.3	4	6.7	3.27	0.88
Printer	42	70.0	12	20.0	4	6.7	2	3.3	3.57	0.77
Internet modem	32	53.3	24	40.0	3	5.0	1	1.7	3.45	0.68
Computer power pack	30	50.0	23	38.3	6	10.0	1	1.7	3.37	0.74
Hard disk	27	45.0	26	43.3	3	5.0	4	6.7	3.27	0.84

Table 3 presented results on the library services that are rendered with the use of ICTs, and findings showed that photocopying services were the foremost library services as indicated by almost all the respondents 58 (96.7%) who chose strongly agree. This was followed by cataloguing services as expressed by more than half of the respondents 38 (63.3%), referral services and current awareness services as noted by a significant number of respondents 37 (61.7%). These results revealed that ICTs are deployed in the readers and technical sections of the selected libraries to ease the routines.

Table 3: ICTs use for library services by Library Personnel in UNILAG and MOCPED

Library Services	**SA**		**A**		**D**		**SD**		**Mean**	**SD**
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
Photocopying services	58	96.7	2	3.3	-	-	-	-	3.97	1.81
Current Awareness Services	37	61.7	20	3.3	3	5.0	-	-	3.57	0.59
Selective and Dissemination of Information (SDI)	29	48.3	29	48.3	2	3.3	-	-	3.45	0.57
Bindery services	25	41.7	27	45.0	5	8.3	3	5.0	3.23	0.81
Cataloguing services	38	63.3	20	33.3	2	3.3	-	-	3.60	0.56
E-mail service	33	55.0	23	28.3	4	6.7	-	-	3.48	0.62
Referral services	37	61.7	19	31.7	1	1.7	3	5.0	3.50	0.77

Table 4 showed the frequency of use of ICT facilities by the library personnel. Results revealed that majority of the respondents 43 (71.7%) noted that they used Keyboard on a daily basis. Mouse were also used on a daily basis by a substantial number of the library personnel 34 (56.7%). Close to half of the respondents 29 (48.3%) affirmed that they used Webcam weekly, 27 (45.0%) were of the opinion that they used Printer daily and 26 (43.3%) also signified that Speaker were also used daily. It is also observable from Table 4 that Scanners were used daily by a significant number of respondents 25 (41.7%), while 24 (40.0%) pointed out that used Flash drives on a weekly basis. Thus it can be concluded that majority of the library personnel in the two Libraries used ICT facilities like Keyboard, Mouse, Printer and Speaker on a daily basis, while others were either used weekly, occasionally or were never used.

Table 4: Frequency of use of ICTs by library personnel in UNILAG and MOCPED

ICT facilities	**Daily**	**Weekly**	**Monthly**	**Occasionally**	**Never**	**Mean**	**SD**

	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
Scanner	25	41.7	21	35.0	7	11.7	7	11.7	-	-	4.07	1.01
Mouse	34	56.7	16	26.7	4	6.7	6	10.0	-	-	4.30	0.98
Computer arm rest	17	28.3	14	23.3	19	31.7	9	15.0	1	1.7	3.62	1.11
Joy stick	18	30.0	15	25.0	16	26.7	9	15.0	2	3.3	3.63	1.16
Flash drive	21	35.0	24	40.0	8	13.3	6	10.0	1	1.7	3.97	1.03
Light pen	17	28.3	18	30.0	13	21.7	9	15.0	3	5.0	3.62	1.20
Head set	12	20.0	18	30.0	17	28.3	11	18.3	2	3.3	3.45	1.11
Digital Camera	22	36.7	17	28.3	13	21.7	7	11.7	1	1.7	3.87	1.10
Projector	18	30.0	17	28.3	15	25.0	8	13.3	2	3.3	3.68	1.14
Keyboard	43	71.7	11	18.3	5	8.3	1	1.7	-	-	4.60	0.72
Web cam	12	20.0	29	48.3	16	26.7	2	3.3	1	1.7	3.82	0.85
Motherboard	20	33.3	22	36.7	15	25.0	2	3.3	1	1.7	3.97	0.94
Speaker	26	43.3	12	20.0	18	30.0	3	5.0	1	1.7	3.98	1.05
Processor	22	36.7	20	33.3	12	20.0	6	10.0	-	-	3.97	0.99
Printer	27	45.0	17	28.3	12	20.0	4	6.7	-	-	4.12	0.96
Internet modem	24	40.0	17	28.3	14	23.3	5	8.3	-	-	4.00	0.99
Computer power pack	23	38.3	22	36.7	13	21.7	1	1.7	1	1.7	4.08	0.91
Hard disk	16	26.7	22	36.7	16	26.7	4	6.7	2	3.3	3.77	1.03

Computer-related illnesses encountered by the library personnel were presented in Table 5. In order to present the result with clarity, respondents that expressed their level of agreement with the strongly agree option were first presented, followed by those who chose agree. Results showed that most of the respondents 30 (50.0%), 27 (45.0%) and 23 (38.3%) strongly agreed that they had experienced neck pain, headache, shoulder and finger pains as a consequence of ICTs use. While more than half of the library personnel 32 (53.3%) also agreed that their use of ICT facilities had resulted into thumb, wrist, arm pain, and hearing problem.

Table 5: Computer-related illnesses encountered by the library personnel in UNILAG and MOCPED Libraries

Computer-Related	SA	A	D	SD	Mean	SD

Illnesses	Freq	%	Freq	%	Freq	%	Freq	%		
Headache	27	45.0	18	30.0	13	21.7	2	3.3	3.17	0.89
Knees and leg swelling	19	31.7	30	50.0	8	13.3	3	5.0	3.08	0.81
Shoulder and finger pains	23	38.3	22	36.7	14	23.3	1	1.7	3.12	0.83
Neck pain	30	50.0	22	36.7	7	11.7	1	1.7	3.35	0.76
Memory	13	21.7	30	50.0	11	18.3	6	10.0	2.83	0.89
Hearing problem	12	20.0	32	53.3	10	16.7	6	10.0	2.83	0.87
Lower and central back pain	22	36.7	30	50.0	7	11.7	1	1.7	3.22	0.72
Eye and chest pain	22	36.7	29	46.7	10	16.7	-	-	3.20	0.71
Thumb, wrist and arm pain	18	30.0	32	53.3	18	13.3	2	3.3	3.10	0.75

Table 6 captured the results on the effect of computer-related illnesses among the library personnel. Those that expressed their level of agreement with strongly agree were presented first, followed by those who chose the agree option. Thus, findings showed that the library personnel that strongly agreed they had experienced communication difficulties as a result of constant ICTs use were 31 (51.7%), while a significant number 28 (46.7%) also strongly agreed that ICTs use had resulted into arthritis pain and 26 (43.3%) expressed concerns over the design of their working time. Furthermore, a significant number of the library personnel 35 (58.3%) and 31 (51.7%) agreed that they had issues with their motor response and had also noticed some carpal tunnel syndrome.

Table 6: Effect of computer-related illnesses encountered by the library personnel of UNILAG and MOCPED Libraries

Effect of Computer-Related Illnesses	SA		A		D		SD		Mean	SD
	Freq	%	Freq	%	Freq	%	Freq	%		
Arthritis pain	28	16.7	23	38.3	8	13.3	1	1.7	3.30	0.77

Carpal tunnel syndrome	16	26.7	31	51.7	10	16.7	3	5.0	2.88	0.76
Musculoskeletal disorder	16	26.7	31	51.7	10	16.7	3	5.0	3.00	0.80
Cognitive ergonomics	18	30.0	28	46.7	12	20.0	2	3.3	2.88	0.87
Memory	18	30.0	28	46.7	12	20.0	2	3.3	3.03	0.80
Reasoning	19	31.7	23	38.3	12	20.0	6	10.0	2.93	0.99
Perception	21	35.0	27	45.0	11	18.3	1	1.7	3.13	0.77
Motor response	12	20.0	35	58.3	13	21.7	-	-	2.98	0.65
Communication difficulties	31	51.7	23	38.3	6	10.0	-	-	3.42	0.67
Crew resource management	16	26.7	26	43.3	15	25.0	3	5.0	2.92	0.85
Work design	22	36.7	26	43.3	10	16.7	2	3.3	3.13	0.81
Work system	22	36.7	25	41.7	11	18.3	2	3.3	3.12	0.83
Design of working time	26	43.3	21	35.0	11	18.3	2	3.3	3.18	0.85

Table 7 presented results on how to minimise computer-related illnesses experienced by the library personnel in the study. Findings revealed that majority of the respondents 45 (75.0%) were of the view that medical allowances should be provided to ease the effect of computer-related illnesses. Most of the library personnel 32 (53.3%) and 31 (51.7%) also strongly agreed that comfortable seats should be provided, library personnel should use screen protection tools and they should not toil with social gathering.

Table 7: Ways to minimise computer-related illnesses experienced by library personnel in UNILAG AND MOCPED Libraries

Ways to minimise Computer-Related Illnesses	**SA**		**A**		**D**		**SD**		**Mean**	**SD**
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
Medical allowances	45	75.0	13	21.7	2	3.3	-	-	3.72	0.52
Use of screen protection	31	51.7	28	46.7	1	1.7	-	-	3.50	0.54

Regular exercise	36	60.0	17	28.3	7	11.7	-	-	3.48	0.70
Provision of comfortable seats	32	53.3	24	40.0	3	5.0	1	1.7	3.45	0.68
Introduction of workers' allowance	29	48.3	28	46.7	3	5.0	-	-	3.43	0.59
Social gathering	31	51.7	24	40.0	5	8.3	-	-	3.43	0.65

Discussion of findings

Findings showed that the components of computer systems that were available to most of the library personnel included scanner, keyboard, printer, flash drive, projector, mouse and speaker. Results revealed that the library services that majority of the respondents agreed they used computer systems for photocopying services, cataloguing services, referral services and current awareness services. Thus, it has become obvious that all aspects of the library routines have benefited from the use of ICTs in making services effective and efficient. Results found that most of the respondents had experienced computer-related illnesses/discomforts such as neck pain, headache, knees and leg swelling as consequences of computer use. Others have also experienced thumb, wrist, arm pain and hearing problem as a result of their use of ICT facilities. Supporting these assertions were the respondents in the study of James et al. (2018), who revealed that neck pain and shoulder pain were the most prominent musculoskeletal discomforts they suffered most. Most of the library personnel were of the opinion that the negative effect of ICTs use could be minimised through the provision of medical allowances and comfortable seats. The need for the library personnel to use screen protection tools and to socialise were also emphasised as ways to minimise computer ergonomics issues.

Conclusion

The use of ICT facilities is inevitable within the modern day library space. These tools assist libraries to meet the diverse information needs of the present day library users who are surrounded with alternative sources of information via various search engines. However, in as much as the management of libraries is concerned with the provision of effective and efficient library services through the use of ICT facilities and other related devices to forestall user

apathy, they need to be concerned about the adverse consequences that the use of these technologies could have on library personnel who make use of them. Failure of which, they could face issues that might incapacitate the manpower of the library and even the best of the personnel could be hindered from carrying out their functions and this could have a negative effect on the provision of library services. Thus, it is very imperative for those in the top echelon of library management to pay adequate attention to ergonomics issues if they want to have a functional library with healthy workforce.

Recommendations

Based on the conclusion, the following recommendations were made;

1. In order to minimise the lower and central back pain, it is important for the management of libraries to make provision for appropriate and adjustable furniture for the library personnel who regularly make use of ICT facilities for their daily routines.
2. Government, corporations and private individuals who own libraries should provide the library personnel with functional health insurance scheme that will limit the burden of health challenges in case of any eventuality.
3. To limit problems associated with the eye, it is needful for library managers to provide computer monitor protectors to the library personnel to guard their eyes when using computer systems.
4. In order to address the problem of thumb wrist and arm pain, it is necessary for the management of the library to provide trolleys to move books and other information resources in a convenient manner round the library.
5. The library personnel should also have the opportunity to enjoy compulsory break in order for them to be free a bit from the demands of the job which could weigh them down at times. However, this break should be scheduled, so that at every time there will be some individuals on ground that will attend to the users and also carry out library services.

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