

# Software Quality and Usability for Computer-Based Test in Tertiary Institution in Nigeria: A Case Study of Kogi State University

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**Abstract** Software testing is essential for the development of technically sound software that performance especially during computer-based testing in e-examination. The purpose of this study is to investigate the software quality and usability for computer-based testing in Kogi State University. Information for the study was basically from the questionnaire survey and end-user participatory research method. Analysis of data was executed with the aid of Statistical Package for Social Sciences version 20, tables, percentages, ratios, graphs, group arithmetic mean (GAM) and mean weight values (MWV). The result shows that the basic details of students are covered in the software and it is easy to start. Regarding the user's interaction with the software and its features, a high number of respondents strongly agreed that the icons that are used to assist navigation are clear and intelligible. In a related issue, majority of respondents were of the view that the scoring system of the software is encouraging. Findings of this study also show that the grammar and vocab used in the software/program are accurate. It was deduced from the large response that the software includes pictures, that are relevant and aid in understanding. Respondents can easily give command to change answers, submit their answers, and exit the software during computer-based testing. Even at that, this paper argues for a more flexible data base, sufficient bandwidth, network structure flexibility, feedback mechanism and back-up systems, state of the art computers with high speed to further enhance usability of the software for computer-based testing in the institution.

**Keywords:** *paper pencil test, computer-based test, software quality and usability, Kogi State University*

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## 1. Introduction

In Nigeria, very few Universities have started using the e-exams system for their test/exams and these includes Federal University of Technology Minna, University of Ilorin, Covenant University Ota, Nigerian Open University of Nigeria (NOUN), to mention but a few. all the six Universities operating almost in the same way. Only NOUN uses internet for the e-exams, while others uses intranet setup within the University environments. The intranet was setup in e-exams centers containing 50 to 200 computer systems and a server [1].

Kogi State University (KSU) has adopted computer-based testing and it has helped to reduce the burden of academic and non-academic staff in conducting examinations purposefully, especially general studies examination (GST). This technology based assessment provide opportunities to measure complex form of knowledge and reasoning that is not possible to engage and assess through traditional methods. It is an online assessment which is expected to offer several advantages

for the institution and the student. In this regard, the institution employed simple computer-based testing software in its e-examination which it conducts at the Digital Centre which is self-paced and contains about 300 computer systems and a server

It is against this backdrop that this study attempts to investigate the software quality and usability for computer-based testing in the institution from students' perspective. Students are mostly the end user. As such, a quick assessment done by end users covering a preferably comprehensive impression of user experience is essential. This will allow the users in a very simple and immediate way to express feelings, impressions, and attitudes that arise when experiencing the software under investigation.

## 2. Review of Related Literature

There have been a number of researches focusing on the development of automated examination systems and electronic learning information systems. Zhenming et al [21] developed a novel online examination system based on a Browser/Server framework which carries out

automatic grading for objective questions in computer related topics such as programming, Microsoft Windows operating systems and Microsoft Office applications. It was successfully applied to the distance evaluation of basic operating skills of students offering computer science in some Universities. Lei [15] presented a web-based educational assessment system by applying Bloom's taxonomy to evaluate student learning outcomes and teacher instructional practices in real time. The system performance is rather encouraging with experimentation in science and mathematics courses of two local high schools. Emary and Abu [8] developed an online website for tutoring and e-examination of economic courses. This novel software tool was used for online examination and tutorial application of the syllabus of economic courses so as to ensure that students study all the concepts of economics.

Rashad et al [17] developed an online examination system that carry out the examination and automatic grading for students examinations. The system facilitates conducting examinations, collection of answers, automatically marking the submissions and production of reports for the test. It supports many kinds of questions. It was used via Internet and also suitable for both local and remote examination. The system could help lecturers, instructors, teachers and others who are willing to create new examinations or edit existing ones as well as students participating in the examinations. The system was built using various open source technologies such as PHP, HTML and MYSQL database engine. An automatic grading module was developed to incorporate different examination and question types. The system was tested in the Mansoura university quality assurance center. The test proved the validity of using this kind of web based systems for evaluating students in the institutions with high rate of students. The limitations of the above systems are enormous: these systems are domain / application area - specific, so cannot fit into all deployment area needs; not well secured in terms of data security and integrity; do not present a generalized model for adoption by any user willing to migrate to the e-examination platform; most of the systems are stand -alone applications that only run on distributed networks and thus access is limited to the networked geographical domain [9].

In a study on Open Source Software systems (OSS), Yunwen and Kishida [20] stress the need for more interaction between software users and developers and suggest that the link to the success of an OSS project is to develop a collaborative platform between the two communities. Benson et al [4] observe that in an OSS environment the "feedback cycle with real users" is missing. According to them, the communication gap between the developers and the users, the lack of target users' profiles and the degree of responsibility of the developers are the main challenges to improving OSS quality. Bouktif et al. [6] identify "lack of automated feedback" about the system's quality as one of the major weaknesses of open source environment. They also propose "feedback-driven communication service" to send feedback to developer after each commitment. Iivari [16] in her empirical study about user participation in an OSS project also acknowledges "informative, consultative and participative roles for users". Bevan [5] also considers feedback from users as the most popular form to improve

software usability; however he believes "it leaves open the risk of inadequate final usability". Crowston et al [7] also recommend the collection of users' feedback by building a survey into the software to measure users' satisfaction levels.

For the construction of our questionnaire we rely on a theoretical framework of user experience [10]. This research framework distinguishes between perceived ergonomic quality, perceived hedonic quality and perceived attractiveness of a product. The framework assumes that perceived ergonomic quality and perceived hedonic quality describe independent dimensions of the user experience. Ergonomic quality and hedonic quality are categories that summarize different quality aspects [13]. The focus of ergonomic quality is on the goal oriented or task oriented aspects of product design. High ergonomic quality enables the user to reach his or her goals with efficiency and effectiveness. The focus of hedonic quality is on the non-task oriented quality aspects of a software product, for example the originality of the design or the beauty of the user interface.

Thus, it is assumed that persons perceive several distinct aspects when they evaluate a software product. The perceived attractiveness of the product is then a result of an averaging process from the perceived quality of the software concerning the relevant aspects in a given usage scenario. According to this assumption the constructed questionnaire should contain two classes of items: items, which measure the perceived attractiveness directly; and items, which measure the quality of the product on the relevant aspects [13].

### 3. Methodology

This study adopted the survey and participatory research method. With a view to eliciting information from respondents who were sitting for the second semester GST entrepreneurship examination for the academic year 2013–2014 at the Digital Centre in Kogi State University, a self-developed-user-driven assessment of software quality and usability questionnaire was designed using the dichotomous scale (Yes/No) and Likert-type scale from 1 to 5 (with response options as follows: strongly agree, agree, disagree, strongly disagree, undecided). The questionnaire consisted of three sections. The first section included personal data related to students' name, gender, level, faculty, department, and age. Also, this section incorporated information concerning the software/programme, criteria covering user's interaction, technical aspects of the software and other hardware. Section two of the questionnaire gathered information relating to the perceived credibility of computer based test. A total of 200 questionnaires were randomly distributed to a sample of undergraduate students on one of the days of their computer-based testing on entrepreneurship course in Kogi State University (KSU). The questionnaires were self-administered to respondents with the help of some academic and non-academic staff deployed to invigilate the examination. However, a total of 137 questionnaires were returned upon which the data analysis was based. This represents 63.5% proportion of the sample size. Analysis of data was executed with the aid of SPSS (Statistical Package for Social Sciences) version 20, tables,

percentages, ratios, graphs, group arithmetic mean (GAM) and mean weight values (MWV).

### 4. Discussion of Result

Out of the 137 sampled respondents, 82 were male students and 55 were female students, implying 60% and 40% respectively as shown in the cylinder below.

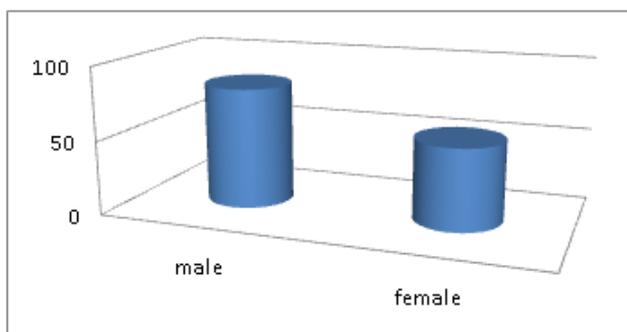


Figure 1. Distribution of respondent base on gender (Source: Field Survey, 2014)

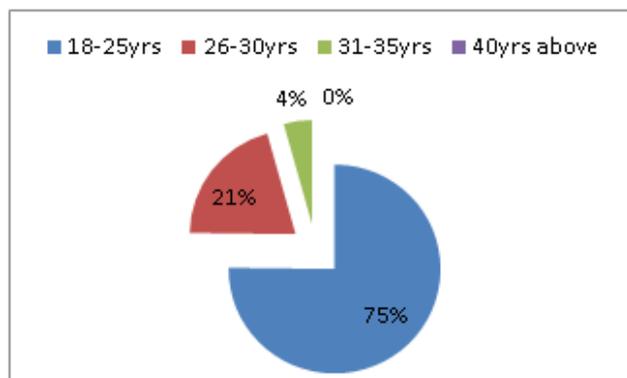


Figure 2. Age bracket (Source: Field Survey, 2014)

The pie chart above reveals that respondents whose ages fall between 18 – 25 years are 103 in number (about 75.18%). About 20.44% of the respondents fell within the age range of 26-30 years (numbering 28). Those under 31-35 years totaled 6, i.e., about 4.38% and there was no respondent above 40years (0%).

Table 1. Distribution of Respondents by Level

|              | Number of Students | Percent       |
|--------------|--------------------|---------------|
| 100 level    | 0                  | 0.00          |
| 200 level    | 127                | 92.70         |
| 300 level    | 10                 | 7.30          |
| 400 level    | 0                  | 0.00          |
| <b>Total</b> | <b>137</b>         | <b>100.00</b> |

Source: Field Survey, 2014.

Table 1 shows that 92.70% of the students that responded were 200 level students and they were 127 in number. This is because the course is a 200 level course. Students from 300 level that responded were spilling or carrying over the course. They make up about 7.30%.

As depicted in Table 2, 0.00% and 5.11% respondents were from Management Science and Law faculties respectively. Percentage of respondents from other faculties include 14.60% (Social Sciences), 6.60% (Natural Sciences), 14.60% (Agriculture) and 15.29%

(Education). The highest response came from Arts and Humanities faculties (43.80%). See Table 3 for the distribution of respondents by department.

Table 2. Distribution of Respondents based on Faculty

|                     | Number of students | Percent       |
|---------------------|--------------------|---------------|
| Arts and Humanities | 60                 | 43.80         |
| Management Sciences | 0                  | 0.00          |
| Social Sciences     | 20                 | 14.60         |
| Natural Sciences    | 9                  | 6.60          |
| Agriculture         | 20                 | 14.60         |
| Education           | 21                 | 15.29         |
| Law                 | 7                  | 5.11          |
| <b>Total</b>        | <b>137</b>         | <b>100.00</b> |

Source: Field Survey, 2014.

Table 3. Distribution of Respondents by Department

| 1) Departments in Faculty of Arts and Humanities | Number of Students |
|--|--------------------|
| a. Arabic & Islamic Studies                      | 7                  |
| b. Theatre Arts                                  | 4                  |
| c. English & Literary Studies                    | 10                 |
| d. History & International Studies               | 11                 |
| e. Philosophy & Religious Studies                | 28                 |
| <b>Total</b>                                     | <b>60</b>          |
| 2) Departments in Faculty of Education           |                    |
| a. Mathematics                                   | 2                  |
| b. Geography                                     | 4                  |
| c. Economics                                     | 3                  |
| d. Art Education                                 | 2                  |
| e) Social Studies                                | 7                  |
| f) Chemistry                                     | 3                  |
| <b>Total</b>                                     | <b>21</b>          |
| 3) Departments in Faculty of Law                 |                    |
| a. International Law                             | 2                  |
| b. Common Law                                    | 3                  |
| c. Commerce Law                                  | 2                  |
| <b>Total</b>                                     | <b>7</b>           |
| 4) Departments in Faculty of Agriculture         |                    |
| a. Animal Science                                | 1                  |
| b. Soil Environment Management                   | 3                  |
| c. Business Agriculture                          | 4                  |
| d. Agriculture Economics                         | 2                  |
| e. Crop Production                               | 4                  |
| f. Animal Production                             | 3                  |
| g. Food Production                               | 2                  |
| h. Agriculture Sc.                               | 1                  |
| <b>Total</b>                                     | <b>20</b>          |
| 5) Departments in Faculty of Natural Sciences    |                    |
| a. Mathematic Sciences                           | 2                  |
| b. Microbiology                                  | 1                  |
| c. Biological Sciences                           | 1                  |
| d. Geography                                     | 2                  |
| e. Bio Chemistry                                 | 3                  |
| <b>Total</b>                                     | <b>9</b>           |
| 6) Departments in Faculty of Social Science      |                    |
| a. Sociology                                     | 8                  |
| b. Geography & Planning                          | 2                  |
| c. Mass Communication                            | 1                  |
| d. Political Science                             | 2                  |
| e. Economics                                     | 7                  |
| <b>Total</b>                                     | <b>32</b>          |
| 7) Departments in Faculty of Management Science  |                    |
| a. Banking & Finance                             | 0                  |
| b. Public Administration                         | 0                  |
| c. Business Management                           | 0                  |
| d. Accounting                                    | 0                  |
| <b>Total</b>                                     | <b>0</b>           |
| <b>Grand Total</b>                               | <b>137</b>         |

Source: Field Survey, 2014.

Table 4. Section B and C of the questionnaire

| Title of software package / program:   |                |            |           |                   |           |          |          |     |     |      |                 |                |  |
|--|----------------|------------|-----------|-------------------|-----------|----------|----------|-----|-----|------|-----------------|----------------|--|
| <b>Information in the Software/Program</b><br>(These information criteria cover the following aspects of the program: relevance to the audience, appropriate language, organization of the information, and information quality) |                |            |           |                   |           |          |          |     |     |      |                 |                |  |
| Are basic details about the student covered in the software/program?   | Yes            | No         | Undecided | Total Response    |           |          |          |     |     |      |                 |                |  |
|  | 102 (74.5%)    | 28 (20.4%) | 7(5.1%)   | 137(100%)         |           |          |          |     |     |      |                 |                |  |
| Is it easy to start the software/program?  | Yes            | No         | Undecided |                   |           |          |          |     |     |      |                 |                |  |
|  | 111(81.0%)     | 21(15.3%)  | 5(3.6%)   | 137(100%)         |           |          |          |     |     |      |                 |                |  |
| <b>User Interaction</b><br>(These criteria cover the user's interaction with the software/ program, the objectives and features of the program, and your analysis of it).  |                |            |           |                   |           |          |          |     |     |      |                 |                |  |
| (tick) →   | Strongly Agree | Agree      | Disagree  | Strongly Disagree | Undecided | Total    | Weighted |     |     |      |                 |                |  |
|  | (5)            | (4)        | (3)       | (2)               | (1)       | Response | Score    | WMS | GAM | D    | Rank            | Remark         |  |
| The icons that are used to assist navigation are clear and intelligible  | 81(59%)        | 26(19%)    | 6(4%)     | 9(7%)             | 15(11%)   | 137      | 560      | 4.1 | 4.1 | 0    | 3 <sup>rd</sup> | High(Accepted) |  |
| The scoring system used does encourage the student   | 88(64%)        | 23(17%)    | 8(6%)     | 12(9%)            | 6(4%)     | 137      | 586      | 4.3 | 4.1 | 0.2  | 2 <sup>nd</sup> | High(Accepted) |  |
| The grammar and vocab used in the software/program are accurate  | 92(67%)        | 29(21%)    | 7(5%)     | 6(5%)             | 3(2%)     | 137      | 612      | 4.5 | 4.1 | 0.4  | 1 <sup>st</sup> | High(Accepted) |  |
| The software/program includes pictures, that are relevant and an aid to understanding  | 63(46%)        | 30(22%)    | 12(9%)    | 10(7%)            | 22(16%)   | 137      | 513      | 3.8 | 4.1 | -0.3 | 5 <sup>th</sup> | Low(Rejected)  |  |
| Students can easily give command to change answers, submit their answers, and exit the program.  | 69(50%)        | 32(23%)    | 6(5%)     | 10(7%)            | 20(15%)   | 137      | 531      | 3.9 | 4.1 | -0.2 | 4 <sup>th</sup> | Low(Rejected)  |  |
| <b>Technical Aspects of the Software and Materials</b><br>(These criteria cover aspects of the computer hardware and programs).<br>(tick) →  | Strongly Agree | Agree      | Disagree  | Strongly Disagree | Undecided | Total    | Weighted |     |     |      |                 |                |  |
|  | (5)            | (4)        | (3)       | (2)               | (1)       | Response | Score    | WMS | GAM | D    | Rank            | Remark         |  |
| The software is run on obsolete computer   | 56(41%)        | 30(22%)    | 17(12%)   | 18(13%)           | 16(12%)   | 137      | 503      | 3.7 | 3.6 | 0.1  | 3 <sup>rd</sup> | High(Accepted) |  |
| The computer speed is slow   | 29(21%)        | 35(26%)    | 31(23%)   | 26(18%)           | 16(12%)   | 137      | 446      | 3.3 | 3.6 | -0.3 | 4 <sup>th</sup> | Low(Rejected)  |  |
| The computer keyboard and mouse are obsolete   | 47(34%)        | 46(34%)    | 19(14%)   | 15(11%)           | 10(7%)    | 137      | 516      | 3.8 | 3.6 | 0.2  | 2 <sup>nd</sup> | High(Accepted) |  |
| Electric supply is constant for powering the computers   | 65(48%)        | 39(29%)    | 11(8%)    | 8(6%)             | 14(10%)   | 137      | 544      | 4.0 | 3.6 | 0.4  | 1 <sup>st</sup> | High(Accepted) |  |
| The internet connectivity is slow  | 30(22%)        | 34(25%)    | 26(19%)   | 22(16%)           | 25(18%)   | 137      | 433      | 3.2 | 3.6 | -0.4 | 5 <sup>th</sup> | Low(Rejected)  |  |
| <b>Perceived Credibility of computer based test (CBT)</b>  | Strongly Agree | Agree      | Disagree  | Strongly Disagree | Undecided | Total    | Weighted |     |     |      |                 |                |  |
|  | (5)            | (4)        | (3)       | (2)               | (1)       | Response | Score    | WMS | GAM | D    | Rank            | Remark         |  |
| The need for double marking is totally eliminated by CBT   | 71(52%)        | 39(28%)    | 11(8%)    | 3(2%)             | 13(10%)   | 137      | 563      | 4.1 | 3.9 | 0.2  | 1 <sup>st</sup> | High(Accepted) |  |
| Time saving by CBT allows more regular assessment that might otherwise have not been possible  | 64(47%)        | 48(35%)    | 6(4%)     | 1(1%)             | 18(13%)   | 137      | 551      | 4.0 | 3.9 | 0.1  | 2 <sup>nd</sup> | High(Accepted) |  |
| CBT allows course evaluation by lecturers to be undertaken more easily   | 54(39%)        | 56(41%)    | 4(3%)     | 6(5%)             | 17(13%)   | 137      | 535      | 3.9 | 3.9 | 0    | 3 <sup>rd</sup> | High(Accepted) |  |
| CBT allows testing of superficial level of understanding   | 53(39%)        | 43(31%)    | 6(5%)     | 5(4%)             | 30(21%)   | 137      | 495      | 3.6 | 3.9 | -0.3 | 4 <sup>th</sup> | Low(Rejected)  |  |
| Security measures during CBT reduce plagiarism   | 58(42%)        | 52(38%)    | 4(3%)     | 5(4%)             | 18(13%)   | 137      | 538      | 3.9 | 3.9 | 0    | 3 <sup>rd</sup> | High(Accepted) |  |

Source: Field Survey, 2011

WMS=Weight Mean Score

GAM=Group Arithmetic Mean

D=Difference

High if MWV is greater than GAM and the difference is positive, but low if MWV is less than GAM and the difference is negative.

As depicted in Table 2, 0.00% and 5.11% respondents were from Management Science and Law faculties respectively. Percentage of respondents from other faculties include 14.60% (Social Sciences), 6.60% (Natural Sciences), 14.60% (Agriculture) and 15.29% (Education). The highest response came from Arts and Humanities faculties (43.80%). See Table 3 in Appendix for the distribution of respondents by department.

Table 4 shows the response of respondents when a two-option format was used to ask about the coverage of basic details of students in the software, 74.5% answered yes, while 20.4% answered no to the question. 5.1% (7) of the questionnaires were turned in blank (i.e., there was no response to the question). Still on information in the software/programme, majority of the respondents (81.0%) said that the software used for computer-based testing in KSU is easy to start. However, 15.3% were of a contrary opinion. 5 respondents were undecided about the matter.

Regarding the user's interaction with the software and its features, 59% of the respondents strongly agreed that the icons that are used to assist navigation are clear and intelligible. On the other hand, 9 (7%) respondents strongly disagreed. 11% (15) respondents were in-between the opinions (i.e., undecided). In a related issue, 64% (88) of respondents were of the view (strongly agreed) that the scoring system of the software does encourage students. However, 9% (12) of respondents viewed it different (strongly disagreed). 4% of respondents did not respond to this issue. Findings of this study show that the grammar and vocab used in the software/program are accurate. This is evident by a strongly agreed response of 92 (67%) respondents compared to 6 (5%) respondents who strongly disagreed. In line with the findings in Table 4, from 46% response of the respondents, it can be deduced that the software includes pictures, that are relevant and aid in understanding. 9% disagreed but 7% strongly disagreed. 50% of the respondents said that students can easily give command to change answers, submit their answers, and exit the program/software during computer-based testing in KSU. Though 15% were undecided, 7% (10) expressed strong disagreement over this topic.

Table 4 contains the weighted scores and means of the issues raised concerning the user's interaction with the software. The Likert scale values are used to calculate the weighted scores and means. These values are ranked and then used to determine the severity and importance of those issues about the software and when the values are compared with Group Arithmetic Mean (GAM), it determined the acceptance or rejection of a problem or issue for decision taking. The two measures indicate that the question on accuracy of grammar and vocab used in the software/program is very vital. This is followed by the scoring system; clearness and intelligibility of icons for navigation; easiness of command to effect changes; and lastly inclusion of relevant pictures in software/program to aid understanding.

Concerning the technical aspects of the software/programme which covers the computer hardware, Table 4 showed that 41% of the respondents are strongly of the opinion (strongly agreed) that the software used for CBT in KSU is run on obsolete computer. 12% did not respond on this issue while about 13% disagreed completely (strongly disagreed). The computer speed is slow; this is shown by the 26% response of respondents.

On the contrary, nearly that per cent of respondents disagreed (23%). The respondent's perceptions indicate that the computer keyboard and mouse are obsolete. 34% agreed while about 34% also strongly agreed. Undecided respondents were 7% while 11% strongly agreed. Close to half (48%) of the respondents strongly agreed that electric supply is constant for powering the computers used in the computer-based testing in KSU. 10% of respondents seemed to be undecided about this question of power supply while 6% strongly disagreed of availability of constant power for running the computers. The internet connectivity is slow as agreed by 25% respondents. Less than 3% of that figure (22%) strongly agreed to that fact. 18% respondents were indifferent on this issue while 19% disagreed and 16% strongly disagreed.

The weighted mean score/value and group arithmetic mean show the order of ranking and acceptance, seriousness or importance of each question for decision making. Accordingly, they are: Electric supply is constant for powering the computers; the computer keyboard and mouse are obsolete; the software is run on obsolete computer; the computer speed is slow and the internet connectivity is slow.

On the perceived credibility of computer-based test (CBT), when asked whether the need for double marking is totally eliminated by CBT, majority of the respondents (52%) as evident in Table 4 strongly agreed that the need for double marking has been totally eliminated by computer-based testing. On the other hand, only 2% of respondents strongly disagreed. As shown by 47% (64) of respondents, time saving by CBT allows more regular assessment that might otherwise have not been possible. Only 1% strongly disagreement was expressed by respondents. A total of about 80% respondents agreed to the idea that CBT allows course evaluation by lecturers to be undertaken more easily (i.e., 39% strongly agree and 41% agree). Similarly, nearly 70% of the respondents are of the opinion (39% strongly agree and 31% agree) that CBT allows testing of superficial level of understanding. Though 21% of respondents were indifferent, 4% were strongly in disagreement on this subject. Concerning the issue of security and plagiarism, 42% of respondents strongly agreed that security measures during CBT reduce plagiarism while 5 per cent strongly disagreed. The ratio of respondents that agreed to those that disagreed is 13 to 1. Nonetheless, 13% of respondents seemed undecided.

The order of ranking and acceptance, seriousness or importance of each question for decision making as shown by the weighted mean score/value and group arithmetic mean are as follows: The need for double marking is totally eliminated by CBT; Time saving by CBT allows more regular assessment that might otherwise have not been possible; CBT allows course evaluation by lecturers to be undertaken more easily; CBT allows testing of superficial level of understanding; and security measures during CBT reduce plagiarism.

## 5. Summary, Conclusion and Recommendation

Over the year, there has been incremental growth in computer-based testing (CBT) as a viable alternative to paper-and-pencil testing. Kogi State University is among

some of the Nigerian universities making a giant move by adopting simple computer-based testing software in its examination, even though computer-based testing is still a new phenomenon in Nigeria. With the exception of using stand-alone PCs, CBT usually requires some level of connectivity, with the most successful implementations having the capability to link multiple computers to the test delivery software and item banks, and to rapidly transmit test materials, results, scores, and other information where and when they are needed.

To investigate the software quality and usability for computer-based testing in Kogi State University, a questionnaire survey and end-user participatory research method was adopted on students sitting for the second semester GST entrepreneurship examination for the academic year 2013-2014. Analysis of the data reveals among others that the basic details of students are covered in the software and it is easy to start. Regarding the user's interaction with the software and its features, a high number of respondents strongly agreed that the icons that are used to assist navigation are clear and intelligible. In a related issue, majority of respondents were of the view that the scoring system of the software is encouraging. Findings of this study also show that the grammar and vocab used in the software/program are accurate. It was deduced from the large response that the software includes pictures, that are relevant and aid in understanding. Respondents can easily give command to change answers, submit their answers, and exit the software during computer-based testing. Even at that, this paper argues for a more flexible data base, sufficient bandwidth, network structure flexibility, feedback mechanism and back-up systems, state of the art computers with high speed to further enhance usability of the software for computer-based testing in KSU.

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