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AN EVALUATION OF COMPUTER-BASED TEST SOFTWARE IN KOGI STATE UNIVERSITY: USER'S VIEW

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Abstract: **This research paper is an evaluation of computer-based test software in Kogi state university. A user-driven assessment of software quality and usability questionnaires were randomly administered to a sample of 200 undergraduate students of KSU who were sitting for the second semester GST entrepreneurship examination for the academic year 2013–2014. With help of descriptive statistics and graphical illustrations, the data derived were critically analyzed. It was discovered that a large number of participants were of the opinion that the information on the software is clear and at the same time informative enough and that the capacity of language that the software offers is simple to understand. Similarly, the major facts about students are incorporated in the software in addition to scoring of answers. Also invalid commands are resolved by the software constructively. However, a reasonable quantity of participants was not of the opinion that it is easy navigating through the software/program. An unprecedented percentage of participants strongly think that the software is run on obsolete computer and that the internet connectivity required for the computer used in conducting CBT with the applied software is slow. To advance the software quality and usability further, it will entail more IT infrastructures, and particularly a more flexible data base, sufficiently large bandwidth, network structure adjustability, feedback mechanism and back-up systems, highly sophisticated computers with high speed.**

Keywords: **Paper pencil test, Computer-based test, Software quality and usability, Kogi State University.**

1. INTRODUCTION

An examination is an evaluation designed to quantify a person's knowledge, skill, aptitude, physical fitness, or classification in many other topics. An examination/test can be taken orally, on paper, on a computer, or in a restricted place that demands an individual to physically execute a set of skills. Examination hall intake issues, satisfaction of candidates, hitches in making result available, inappropriate conduct during examination, expenses incured printing examination materials and human error are some of manual technique of examination writing [1], hence, the essence of automation.

The automated examination systems developed over time have experienced many challenges/issues including scalability, robustness, etc[2]; malpractice incidents[3] ; data insecurity and integrity comprise[4]; Available CBT system are stand-alone applications which are only relevant for the application environment [5]. Based on that, there is no agreed model and this is detrimental for e-examination platform[1].

Major outstanding universities stick to conservative methods, such as pen and paper examinations, in a similar manner, other universities just would not hesitate to take a risk and change methods of evaluation. Kogi State University is one of such institutions making a giant move by adopting simple computer-based testing software in its e-examination. This settles the aforementioned challenges of some existing e--examination systems or software developed. It is an online assessment designed to present enormous opportunities for the institution and the student. It is against this backdrop that this study

attempts to investigate the performance of this software 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. LITERATURE REVIEW

Automated examination systems and electronic learning information systems has a focus of many research for a long time. [6] Zhenming et al designed a novel online examination system anchored on a Browser/Server framework. Some characteristics of the examination system include programming, Microsoft Windows operating systems and Microsoft Office applications. It was employed in assessing the basic operating skills of students who registered for computer science in some selected universities. [7]Lei employed Bloom's taxonomy to assess student learning outcomes coupled with teacher instructional practices. It was impressing in two local high schools on science and mathematics subjects. [8]Emary et al on their own fashioned an online website for tutoring and e-examination of courses especially in economic.

This novel software tool was deployed during online examination and tutorial application of the syllabus of economic courses to be certain that students study all the concepts of economics. So, the proposed software was constructed from two primary modules: The first section reviews and self-test mainly for all materials pertaining economics. This section is an online website.

Section two uses a wide database bank of questions in which all students can be quickly assessed no matter the level and some degree of statistical evaluation can be achieved. This section is an online examination. This unique software presents the following characteristics: instructors could introduce additional questions to maximize the size of the bank of questions; different examinations for each student with randomly selected questions from the bank of questions can be done; different reports for the instructors, students, classes, etc., can be obtained; and numerous students can be availed the opportunity of sitting for their exams at once without any challenges inside and outside their university campus. The proposed software was engineered to work particularly on the client server architecture.

Electronic examination in Nigeria was suggested by Ayo et al [3] for Joint Admissions Matriculation Board (JAMB) examinations to reduce the problem of irregularities. Covenant University was where the test running was done. The University is privately owned. The outcome was that impersonation and other tactics of examination malpractices successfully eliminated. [9]Akinsanmi et al developed a web application where tests in multiple choice formats could be taken online and graded immediately. The web application pivots on Microsoft developed technologies. It operates on the Microsoft.net framework, uses the ASP.NET web server, C# as the intermediate language, ADO.NET to interact with the relational database and Microsoft SQL server as the relational database. [10]Rashad et al system facilitates conducting examinations, collection of answers, automatically marking the submissions and production of reports for test. It was applied through Internet and also ideal for both rural and remote examinations. PHP, HTML and MYSQL database engines were used in the building of the system. Mansoura University Quality Assurance Center designed a system for evaluating numerous students in institutions. Some problems of the system include domain / application area - specific, insecurity of data and integrity issue; etc.[1]

For the construction of the questionnaire, Hassenzahl relied on a theoretical framework of user experience [11]. 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[12]. The thrust 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 main point of hedonic quality is on the non-task oriented quality aspects of a software product. Thus, it is assumed that individuals 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 comprise dual categories of items: items which measure the perceived attractiveness directly; and items which measure the quality of the product on the relevant aspects[12].

3. COMPUTER-BASED TEST SYSTEMS IN NIGERIAN UNIVERSITIES

In Nigeria, a minimum number of Universities have commenced the application of 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. The six Universities operate in a similar pattern/manner. Only NOUN uses internet for e-exams while others use intranet setup within the university environments. The intranet was established in e-exams centers containing 50 to 200 computer systems and a server [13]. Another obvious fact is that most of these centers are being managed by private company (Electronic Test Company Limited) which undermines the integrity of the results.

4. AREA OF STUDY

Kogi State University, located at Anyigba, is the University of Kogi State Nigeria. It was established in 1999 and commenced academic activities in April, 2000 in six Faculties. Namely Faculties of Agriculture, Arts and Humanities, Law, Management Sciences, Natural Sciences and Social Sciences, presently comprising about 30 Departments. The University has commenced the establishment of Faculty of Medicine with the office and laboratory complexes under construction. The Centre for Pre-Degree and Diploma Studies was established to run diploma and pre-degree programmes. The University offer many courses such as Microbiology, Biochemistry, Geology, Physics, Mathematics, Computer Sciences, Law, Public Administration, Statistics, Business Administration, Accounting, Banking and Finance, Theatre Arts, Food, Nutritions and Home Sciences, Agricultural Economics and Extesion, Crop Production, Animal Production, Soil Science, Food Science and Technology, Fishery and Forestry, Islamic Studies, Religious and Philosophy, English, History and International Studies, Sociology, Mass Communication, Economics, e.t.c. About 90% of the courses offered in the university are accredited by the Nigeria University Commission (NUC).

4.1 Methodology:

The main test population for the study was the undergraduate students of KSU who were sitting for the second semester GST entrepreneurship examination for the academic year 2013–2014. The course is taken by several hundred students in 100 level in different department each semester; for most of them the course is their second significant exposure to computer-based test. The research was carried out at the Digital Centre, Kogi State University, Anyigba. The Digital Centre is self-paced and students were assisted by some academic and non-academic staff deployed to invigilate the examination. Actually, the use of students as evaluators lends greater generality to the results since this makes it more of a field study than a laboratory one.

A user- driven assessment of software quality and usability questionnaires were administered to a sample of 200 students using random sampling technique. This kind of questionnaire is a tool for the user-driven assessment of software quality and usability. It allows an efficient quantitative measurement of product features. It is combined with other quality assessment methods to achieve interpretable result. We administered a first batch of questionnaires in the second day of the computer-based test and a second questionnaire in the last day of the test.

A total of 137 correctly filled questionnaires were returned which indicate a response rate of about 68.5% proportion of the sample size. 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. In some parts of the questionnaire, two-option response format was used while a Likert-type scale from 1 to 5 (with response options as follows: strongly agree, agree, disagree, strongly disagree, blank) was also employed. Data analysis was done quantitatively using various tools of Microsoft Excel and SPSS 20. The analysis of data was based on the frequency of the respondent's perception over issues under investigation and this was determined by a simple percentage representation and graphical illustrations. In the interpretation, the higher the percentage means the greater the impact or performance of such variable on the subject matter.

5. 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 pie chart below.

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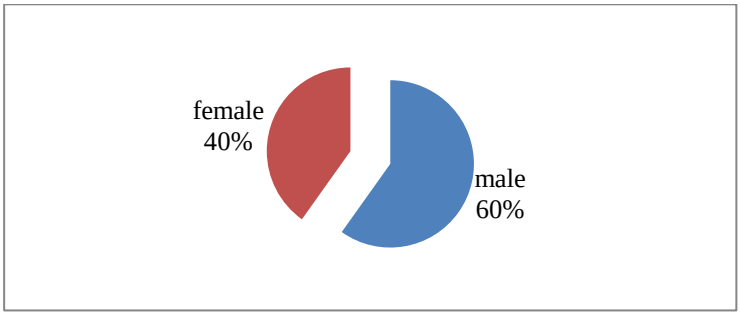

Figure.1: distribution of respondent base on sex

Source: Field Survey, 2014.

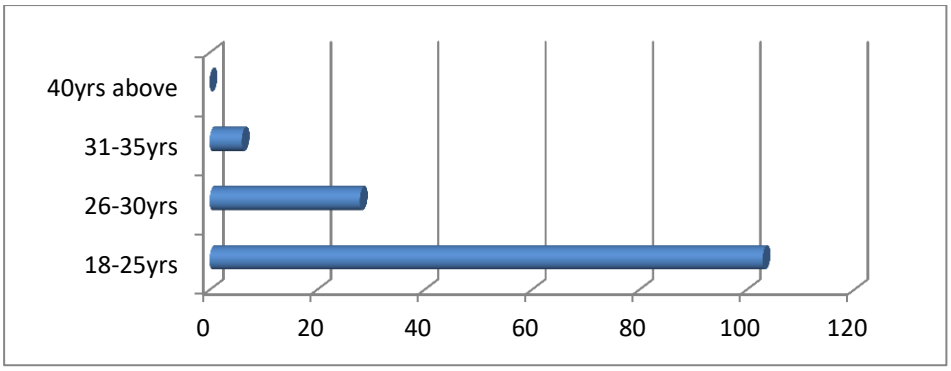

Figure.2: age bracket

Source: Field Survey, 2014.

The bar 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
200 level	127	92.7
300 level	10	7.3
400 level	0	0
Total	137	100

Source: Field Survey, 2014.

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

Table.2: distribution of respondents based on faculty

	Number of students	Percent
Arts and Humanities	60	43.8
Management Sciences	0	0
Social Sciences	20	14.6
Natural Sciences	9	6.6
Agriculture	20	14.6
Education	21	15.29
Law	7	5.11
Total	137	100

Source: Field Survey, 2014.

As depicted in Table 2, 43.80% of students that responded were from Arts and Humanities faculties. Percentage of respondents from other faculties include 14.60% (Social Sciences), 6.60% (Natural Sciences), 14.60% (Agriculture), 15.29% (Education), 0,00%(Management Science) and 5.11% (Law). Table 3 in Appendix shows the distribution of respondents by department.

Table.4: is the information on the software clear and informative to the student?

Response		Frequency	Percent	Valid Percent	Cumulative Percent
	No	13	9.5	9.5	9.5
	Yes	120	87.6	87.6	97.1
	Blank	4	2.9	2.9	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

The questionnaire was also intended to find out if the information on the software is clear and as well as informative enough to the student. As showed in table 4, about 87.6% of the respondents agreed that is clear and informative, while about 9.5% said no to it. Only about 2.9% were undecided and as such refused to respond to the question.

Table.5: is the level of language that the software/program offers simple to understand?

Response		Frequency	Percent	Valid Percent	Cumulative Percent
	No	17	12.4	12.4	12.4
	Yes	116	84.7	84.7	97.1
	Blank	4	2.9	2.9	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

Table 5 revealed that high number of the respondent (116) agreed that the level of language that the software offers is simple to understand. On the other hand, 17 respondents out of 137 answered no to the question. As a result of indecision, 4 respondents chose to return their questionnaires blank.

Table.6: are basic details about the student covered in the software/program

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	28	20.4	20.4	20.4
	Yes	102	74.5	74.5	94.9
	Blank	7	5.1	5.1	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

When asked whether the basic details about students are covered in the software, 74.5% answered yes, while 20.4% indicated no. 7 questionnaires which is about 5.1% were turned in blank as shown in Table 6 above.

Table.7: is it easy to start the software/program?

Response		Frequency	Percent	Valid Percent	Cumulative Percent
	No	21	15.3	15.3	15.3
	Yes	111	81.0	81.0	96.4
	Blank	5	3.6	3.6	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

Table 7 shows majority of the respondents (81.0%) saying that the software is easy to start. However, 15.3% are of the opinion that the software used for the computer-based testing in KSU is not easy to start. Out of the returned questionnaire, 5 respondents showed that they were undecided about the issue raised and so handed over the questionnaires without responding on the question.

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Table.8: the user interface is easy to understand					
Option		Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly agree	96	70.1	70.1	70.1
	Agree	17	12.4	12.4	82.5
	Disagree	2	1.5	1.5	83.9
	Strongly disagree	2	1.5	1.5	85.4
	Blank	20	14.6	14.6	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

Table 8, above revealed that from a total frequency of 137 student respondents, majority (70.1%) of the respondents strongly agreed that the user interface of the software used in CBT in KSU is easy to understand, while 12.4% agreed. Nonetheless, 1.5% disagreed while about 1.5% also strongly disagreed.

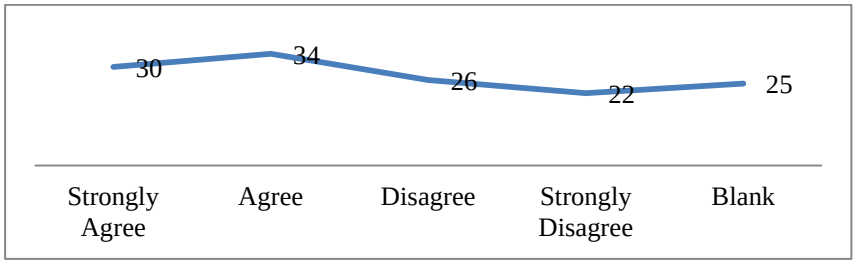

Figure.3: is it easy to navigate through the program?

Source: Field Survey, 2014.

About navigating through the software/program, the graph above shows that 34 respondents from a total of 137 agreed that it is easy while 30 respondents strongly agreed. Nevertheless, 26 respondents expressed their displeasure by disagreeing, that is, it is not easy navigating the software during computer-based testing. Some respondents strongly disagreed (22) while 25 blank questionnaires were returned.

Table.9: the Icons that are used to assist navigation are clear and intelligible					
Response		Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly agree	81	59.1	59.1	59.1
	Agree	26	19.0	19.0	78.1
	Disagree	6	4.4	4.4	82.5
	Strongly disagree	9	6.6	6.6	89.1
	Blank	15	10.9	10.9	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

The results in Table 9 suggest that the icons that are used to assist navigation are clear and intelligible. This is as shown by a high frequency of respondents (59.1%) that strongly agreed. 4.4% of the respondents disagreed on this and 6.6 % further strongly disagreed.

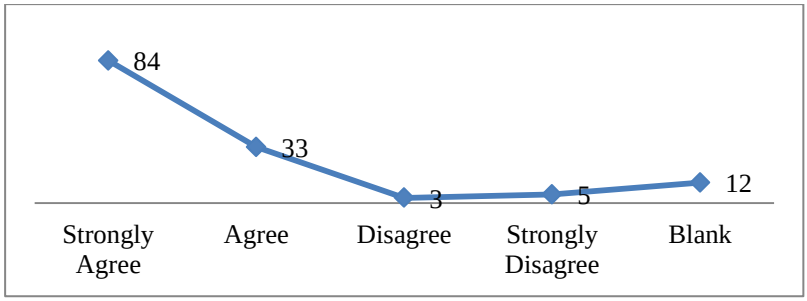

Figure.4: it is always clear to the students which point he/she reached in the program

Source: Field Survey, 2014.

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Evidence from figure 4 shows that when put to the respondents that it is always clear to each point they reach when using the software/program, 3 out of the total respondents disagreed while 33 agreed. In the same vein, 5 respondents strongly disagreed while 84 respondents went for the option of strongly agree (i.e., about 61.3%). The graph also showed that 8.8% respondents (12) showed no concern on this issue.

Table.10: the software/program include scoring

Option		Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly agree	90	65.7	65.7	65.7
	Agree	30	21.9	21.9	87.6
	Disagree	5	3.6	3.6	91.2
	Strongly disagree	4	2.9	2.9	94.2
	Blank	8	5.8	5.8	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

The findings from Table 10 regarding inclusion of scoring in the software/programme shows that 21.9% respondents agreed while a large percentage of respondents (65.7%) strongly agreed. Conversely, 5 respondents (3.6%) disagreed and 4 strongly disagreed. For some reasons, 8 respondents declined indicating their response on the issue.

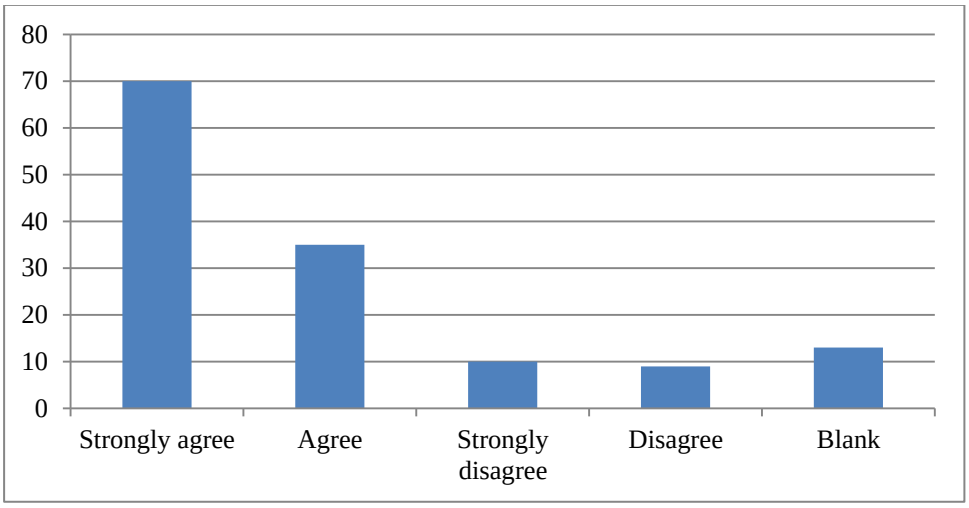

Figure.5: invalid commands are handled constructively

Source: Field Survey, 2014.

The bar chart in Figure 5 presents the number of respondents and their options when asked about how invalid commands are handled when using the software in KSU for computer-based testing. 51.1% (70) respondents indicated that they strongly agree that constructively, invalid commands are handled by the software especially during CBT. However, while 9 respondents strongly disagreed, 13 respondents referred not to comment or give any answer to the question.

Table.11: the software/program should be used in computer testing for other courses/subjects

Option		Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly agree	59	43.1	43.1	43.1
	Agree	32	23.4	23.4	66.4
	Strongly disagree	13	9.5	9.5	75.9
	Disagree	12	8.8	8.8	84.7
	Blank	21	15.3	15.3	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

Table 11 presents the responses on the question of using the software in computer testing for other courses/subjects. The result reveals that 32 respondent out of a frequency total of 137 agreed or subscribed to the idea. In the same vein, about 43.1% of respondents (i.e., 59 of them) agreed strongly. 15.3% of respondents submitted their questionnaires blank on this matter. Those that disagreed and strongly disagreed were 12 and 13 in number respectively (i.e., 8.8% and 9.5%).

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Table.12: the software is run on obsolete computer					
Option		Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly agree	56	40.9	40.9	40.9
	Agree	30	21.9	21.9	62.8
	Strongly disagree	17	12.4	12.4	75.2
	Disagree	18	13.1	13.1	88.3
	Blank	16	11.7	11.7	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

The different responses on the question of the software being run on obsolete computer are presented in Table 12. The result suggest that 40.9% of respondents strongly think (agreed) that the software used in CBT in KSU is running on obsolete computer. Less than 19% of respondents (21.9%) ticked agreed. Though 11.7% refused to comment on the issue, 13.1% and 12.4% showed disagree and strongly disagree on their responses.

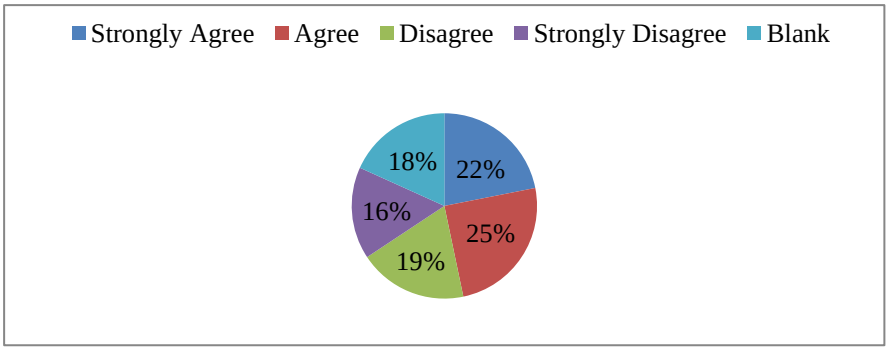

Figure-6: the internet connectivity is slow

Source: Field Survey, 2014.

The pie chart in Figure 6, houses the responses on internet connectivity in KSU. 22% of respondents felt that (strongly agreed) the internet connectivity required for the computer used in conducting CBT with the applied software is slow. Even though 16% strongly disagreed, majority of the respondents agreed (25%).

Table-13: CBT gives the opportunity for re-using questions					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly agree	47	34.3	34.3	34.3
	Agree	50	36.5	36.5	70.8
	Strongly disagree	18	13.1	13.1	83.9
	Disagree	12	8.8	8.8	92.7
	Blank	10	7.3	7.3	100.0
	Total	137	100.0	100.0	

Source: Field Survey, 2014.

On the issue of computer-based testing giving the opportunity for re-using questions for subsequent examinations, Table 13 reveals that 50 respondents (36.5%) agreed to that. 7.3% respondents turned in their questionnaires blank on this subject. The strongly agreed responses were about 34.3%. However, a few respondents disagreed strongly (13.1%).

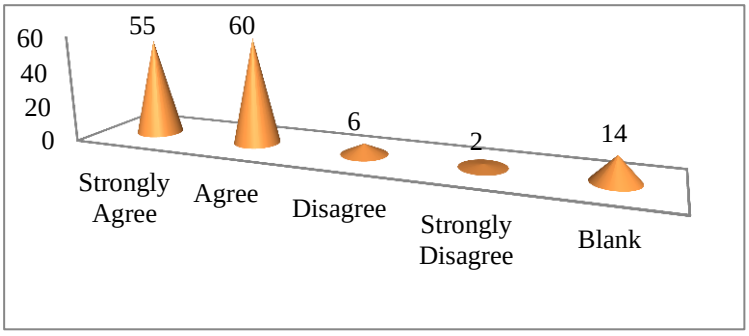

Figure.7: CBT enables the assessment of a wide range of topics very quickly

Source: Field Survey, 2014.

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The cones in Figure 7 show the responses on CBT enabling the assessment of a wide range of topics very quickly. According to the result, 60 respondents agreed to it while 55 others agreed strongly. 6 respondents disagreed and 2 others strongly disagreed. 14 respondents did not respond on this matter.

Table.14: CBT reduces the time dedicated to marking

		Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly Agree	66	48.2	48.2	48.2
	Agree	47	34.3	34.3	82.5
	Disagree	6	4.4	4.4	86.9
	Strongly Disagree	6	4.4	4.4	91.2
	Blank	12	8.8	8.8	100.0
	Total	137	100.0	100.0	

Source: Computer analysis, 2014.

As the Table above shows, about 34.3% of the sampled respondents agreed that CBT reduces the time dedicated to marking examination answers. 13.9% more respondents (about 48.2%) strongly agreed. Though 8.8% blank questionnaires on this topic were turned in by respondents, 6% both disagreed and strongly disagreed.

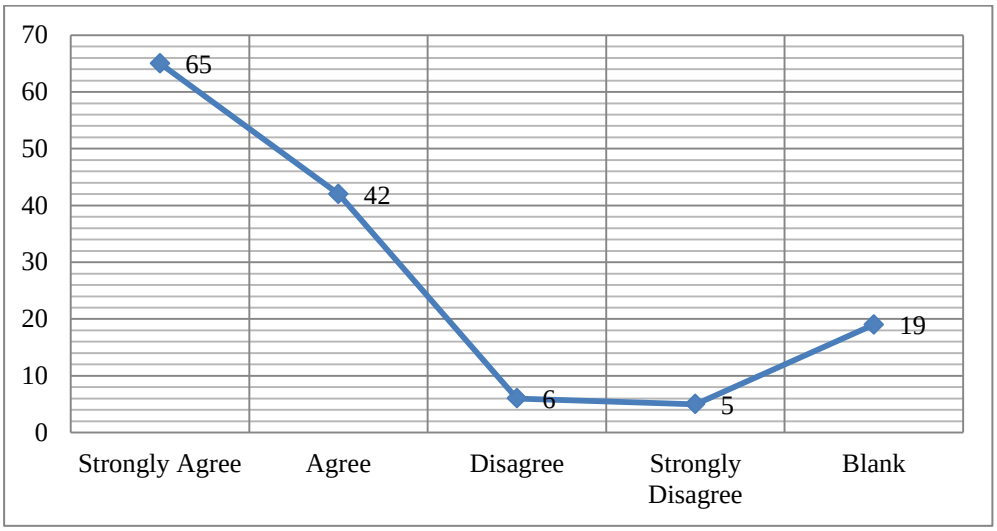

Figure.8: CBT enables more detailed knowledge of students' progress

Source: Computer analysis, 2014.

As shown in Figure 8, 19 respondents out of a total of 137 respondents decided not to select any options given on the questionnaire regarding the question of CBT enabling more detailed knowledge of students' progress. Some of the respondents (42) agreed but majority of the respondents strongly agreed that CBT provided detailed information of students' progress in KSU. Nevertheless, a few respondents (5) strongly disagree of this notion.

Table.15: the construction of valuable CBT needs adequate staff training

Response		Frequency	Percent
	Strongly agree	60	43.8
	Agree	55	40.1
	Disagree	4	2.9
	Strongly disagree	3	2.2
	Blank	15	10.9
	Total	137	100.0

Source: Computer analysis, 2014.

Only 3 respondents (10.9%) strongly disagreed on the notion that the construction of valuable CBT needs adequate staff training as indicated in Table 15. A closer examination of the table shows that 43.8 % (60) respondents are strongly of the opinion that adequate staff training is needed in the construction of valuable computer-based testing. 15 (10.9%) respondents chose not to tick any of the options given on the questionnaire on this issue.

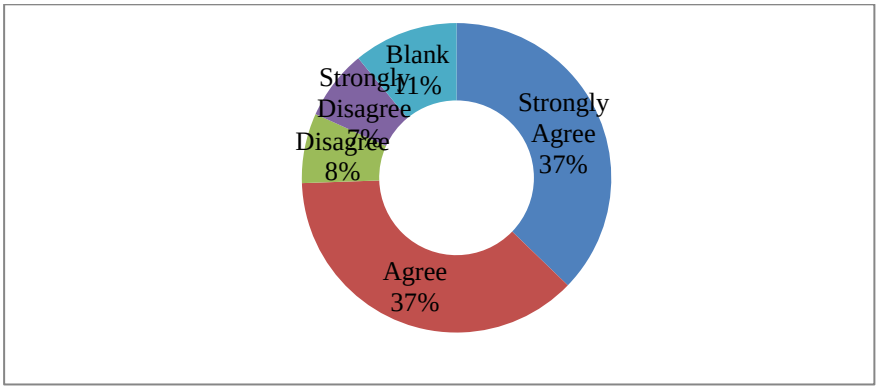

Figure.9: CBT creates propensity for original thinking during test

Source: Computer analysis, 2014.

Figure 9 above presents the outcome of responses from respondents on CBT creating propensity for original thinking during test. The result revealed that 37% of respondents both agreed and strongly agreed concerning this issue. 11% of participants were undecided. Nevertheless, 7% respondents strongly disagreed.

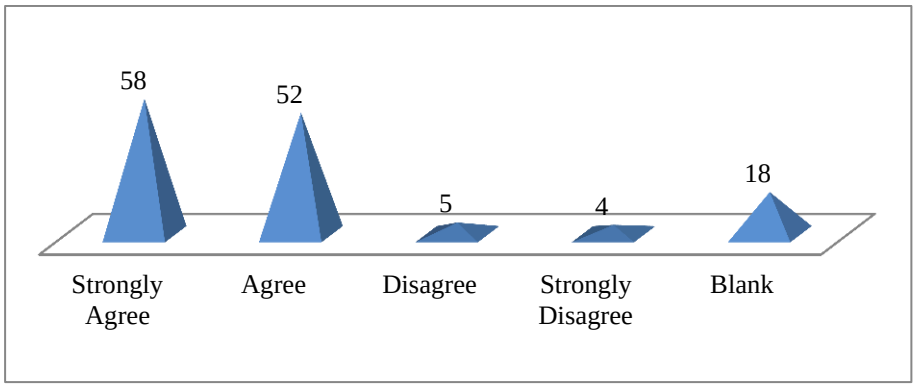

Figure.9: security measures during CBT reduces plagiarism

Source: Computer analysis, 2014.

Further findings indicate that out of the total number of respondents, 58(42.3%) are strongly of the opinion that security measures during CBT reduces plagiarism. This is as against 4 (2.9%) respondents who strongly disagreed as shown in Figure 9 above. The descriptive statistics of these responses is presented in Table 16 in Appendix.

6. CONCLUSION, SUMMARY AND RECOMMENDATION

The inclusion of ICTs in education is required to re-consider and re-think, modify or change the traditional examination methods. Computer-based tests presents enormous opportunities over traditional paper-and-pencil or paper-based tests. Though Computer Based Test is still a new phenomenon in Nigeria, Kogi State University is among some of the Nigerian universities making a giant move by adopting simple computer-based testing software in its e-examination. Computer Based Test (CBT) is an effective solution for mass education evaluation.

Though, in this present time, a large extent of distinctively different e-assessment approaches and systems have been fashioned, yet lack of flexible timing functionality to automatically log-off candidates upon expiration of allotted time, result integrity comprise, stand-alone deployment, lack of flexibility, robustness and scalability coupled with human error are major hitches of the existing platforms.

The above evidence from the results of the analysis of software used in KSU shows that a well-designed software can deliver the intended benefit to student and lecturers alike during e-examination, especially general examinations with huge numbers of students. To further enhance the software quality and usability, it will entail more IT infrastructures, and particularly a more flexible data base, sufficient bandwidth, network structure flexibility, feedback mechanism and back-up systems, state of the art computers with high speed.

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APPENDIX - A

Table-3, distribution of Respondents by Department

• Departments in Faculty of Arts and Humanities • Arabic & Islamic Studies	Number of Students 7
• Theatre Arts • English & Literary Studies	4 10
• History &International Studies • Philosophy & Religious Studies Total • Departments in Faculty of Education • Mathematics	11 28 60 2
• Geography	4
• Economics	3
• Art Education • Social Studies	2 7
• Chemistry Total	3 21
• Departments in Faculty of Law • International Law	 2

• Common Law	3
• Commerce Law	2
Total	7
• Departments in Faculty of Agriculture	
• Animal Science	1
• Soil Environment Management	3
• Business Agriculture	4
• Agriculture Economics	2
• Crop Production	4
• Animal Production	3
• Food Production	2
• Agriculture Sc.	1
Total	20
• Departments in Faculty of Natural Sciences	
• Mathematic Sciences	2
• Microbiology	1
• Biological Sciences	1
• Geography	2
• Bio Chemistry	3
Total	9
• Departments in Faculty of Social Science	
• Sociology	8
• Geography & Planning	2
• Mass Communication	1
• Political Science	2
• Economics	7
Total	32
• Departments in Faculty of Management Science	
• Banking & Finance	0
• Public Administration	0
• Business Management	0
• Accounting	0
Total	0
Grand Total	137

Source: Field Survey, 2014.

Table -16, descriptive statistics: response on security measures during CBT reduces plagiarism

	N	Range	Minimum	Maximum	Sum	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Plagiarism	137	4.00	1.00	5.00	314.00	2.2920	.13153	1.53948	2.370	.933	.207	-.726	.411
Valid N (listwise)	137												

Source: Computer analysis, 2014.