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Impact of Computer-Based Computation of Final Results of Students in Colleges of Education, North Central Zone of Nigeria

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Abstract

One of the problems facing colleges of education in Nigeria today is inadequate facilities required to compute students' results which has resulted in some colleges of education adopting the manual method of computing results that is tedious and error prone. This prompted the study to investigate the impact of computer- based computation of final results of students' in colleges of education, North-Central Zone of Nigeria. The study considered both the federal and state colleges of education. Three research questions were answered qualitatively while three hypotheses were formulated and tested through percentage computation, post hoc test and Analysis of variance. The population of the study included all the colleges of education within the North Central Zone of Nigeria totaling fifteen. The sample for the study comprises two federal and two state colleges of education which were randomly selected. 112 questionnaires were administered to collect data. The results of analyses of the data among others showed that the level of adoption of computer-based result computation is not encouraging among colleges of education in the zone. It was recommended among others that adequate infrastructures and facilities in terms of hardware and software for results computation should be provided in each department of all the colleges of education.

Keywords: *Computation, College of Education, Computer-based, Results and Impact*

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Background to the Study

Generally, information about students' examination results is expected to be properly recorded and preserved by educational institutions. The processing of results is tedious, time consuming and error prone especially when computed manually and with large number of students, unless an accurate and effective method is used. The errors associated with manual method of processing of students' results in most colleges of education make it not only desirable but imperative that computerized approach be used in computing students' results (Adeyemi & Olaleye, 2010). The continuous rise in students' population in tertiary institutions, especially colleges of education in Nigeria makes manual computation of results tedious and error prone. Academic board meetings to consider students' results are sometimes put on hold and a times postponed as a result of delay in computing and presenting students' results and NCE Students missing opportunities of gaining admission into universities of their choice through JAMB direct entry as a result of delay in result computation and presentation.

Edet and Francis (2013) stated that college of education is an institution for training manpower for education sector and for equipping the individuals to determine their level of performance for future roles. The state of colleges of education in Nigeria is poor, this may be partly as a result of the use of obsolete equipment in data collection, result processing, storage, and retrieval. In line with this, John and Timperley (2007) see students' result processing as a feedback mechanism. They stated that feedback is conceptualized as information provided by a teacher regarding aspect of students' performance.

In formal reporting of computed results, Yusuf, Afolabi and Loto (2013) opined that if assessment is to contribute effectively in facilitating consistent and coherent progress in the learning and development of individual student, the reporting of assessment information should transcend the mere requirements of statutory provision. Assessment information is central to a variety of individuals and bodies that will be involved in furthering the students' progress and development and therefore should be in a form that will be uniform in a region or a country. Formal reporting of students' results is important to students themselves, parents, other lecturers, other colleges, and other professionals concerned with the students' education. In this context colleges should publish the results of the assessment of students at the end of every semester using appropriate technology; this will enable all those who are concerned with the students' academic performance to access published results without having to travel long distance.

Haruna (2012) postulated that one of the greatest investments in any educational institution is the creation, maintenance and retrieval of information. Information is highly essential for correct students' record and examination data. Student information if not properly created and stored, will cause many errors in usage. Every section of the educational system requires information processing with the use of computers for information processing.

Statement of the Problem

Manual method of result computation being employed by some colleges of education suffers a number of setbacks such as wrong computation of Cumulative Grade Points Average

(CGPA), late presentation of students' results, unnecessary wastage of stationeries and students missing opportunities of furthering their education immediately on completion of NCE programme. The need to accurately identify the impact of computer-based computation of students' results in colleges of education in Nigeria cannot be over-emphasized, hence the need for this research.

Research Questions

In achieving the aim of this study the following research questions were raised to be answered in the course of this study:

1. What is the level of adoption of computer-based result computation among colleges of education in North central, Nigeria?
2. What is the level of impact of computer-based result computation on the educational system among colleges of education in North central, Nigeria?
3. What is the perception of the respondents on adoption of internet enhanced computer-based result computation?

Hypotheses

In addition to the research questions that were raised to be answered in the course of this study, the following hypotheses were also formulated to be tested accordingly to help establish the significance or otherwise of computer-based system of results computation.

$H_0$1: There is no significant difference in the level of adoption of computer-based result computation among the colleges of education in North Central, Nigeria.

$H_0$2: There is no significant difference in the level of impact of computer-based result computation among the colleges of education in North Central, Nigeria.

$H_0$3: There is no significant difference in the perception on the adoption of internet enhanced computer-based result computation among colleges of education in North Central, Nigeria**.**

Methodology

Methodology, for purpose of this study consist of the design of the study, population, sample and sampling techniques, procedure for data collection and method of data analysis.

Research Design

A descriptive survey design was adopted for this study, and this is a systematic method of collecting and analyzing the responses of large samples of people to polls and questionnaire developed to elicit the opinions of the people about the research topic (Nworgu, 1991).A systematic method of data collection was used and the data collected from representative colleges of education within the zone were analyzed. The use of survey for this research was to enable the researchers gather data available about the target colleges of education in North Central Zone, Nigeria.

Population

The target population of the study is all the colleges of education in each state within the North Central Zone of Nigeria that are training teachers for Nigeria Certificate in Education

(NCE) programmes. There are fifteen colleges of education in the North Central Zone of Nigeria comprising of four federal colleges of education and eleven state colleges of education.

Sample and Sampling Techniques

The sample for the study comprises of two federal and two state colleges of education within the states of the North Central Zone of Nigeria. Thus four colleges were involved in the study, the colleges are: Federal College of Education, Kontagora, Kwara State College of Education, Ilorin; Federal College of Education, Okene and Nasarawa State College of Education, Akwanga. The sample of the population that participated in this study was obtained through stratified and random sampling techniques because the colleges were already stratified into Federal and State owned institutions. The four colleges of education used for the study were randomly selected from all the colleges of education in the North Central Zone, Nigeria irrespective of stratification through balloting by replacement.

Procedure for Data Collection

Questionnaire was used to collect data for the study. The questionnaire which was developed by a five-member research team in line with the topic of the study was segmented into two sections, A and B. Section A contains the demographic information of the respondents while section B contains 20 items related to the research questions and hypotheses raised for the study. The result of the data collected from the pilot study was used to ascertain the reliability of the research instrument; this is in line with Aigbomiran and Momoh (1996) and Sambo (2005) who pointed out that an instrument cannot be considered useful if it is not valid and reliable. The validity and reliability of the instrument was carried out through a pilot study in the colleges outside the studied sample (two federal and two states). The researchers administered the questionnaires personally to avoid influencing the results. 112 copies of the questionnaire administered were collected immediately after the respondents had completed them. However, research assistants were used for purpose of interviewing the respondents.

Method of Data Analysis

The software package used for the analysis of data collected in this study is the Statistical Package for the Social Sciences (SPSS) version 20.0. Both descriptive and inferential statistics were used for the interpretation of the results. The research questions were answered qualitatively while the null hypotheses were tested using Analysis of Variance (ANOVA) and multiple comparisons between the variables. All the null hypotheses were tested at $P < .05$ level of significance. For purpose of this study, the mean value for adoption of computer-based result computation was pegged at 2 while that of the manual was 1.

Data Analysis and Discussion of Results

The results of the analysis of data collected for this study are presented in the relevant tables and the interpretation of results followed each table.

Research Question 1: What is the level of adoption of computer-based result computation among colleges of education in North Central, Nigeria?

Table 1: Frequency on Mode of computation

	Frequency	Percent	Valid Percent	Cumulative Percent
Manual	50	44.6	44.6	44.6
Computerized	62	55.4	55.4	100.0
Total	112	100.0	100.0	

Source: Researchers' Study, 201

Table2: Comparison of means on Mode of computation

Institution	Mean	N	Std. Deviation	% of Total Sum
FCE Okene	1.8846	26	.32581	28.2%
COE Ilorin	1.0750	40	.26675	24.7%
COE Akwanga	1.6957	23	.47047	22.4%
FCE Kontagora	1.8696	23	.34435	24.7%
Total	1.5536	112	.49936	100.0%

Source: Researchers' Study, 2017

The results revealed that the frequency on mode of computation of students' academic result in colleges of education, North Central, Nigeria showed 50 representing 44.6% for manual computation and 62 representing 55.4% for computerized method. The result in table 1 showed that most colleges of education in the zone are still using manual method of result computation considering the margin between 55.4% and 44.6% for computerized and manual methods respectively. Pouezevara, Sabry and Niamh (2014) postulated that ICT also provides lecturers and colleges with an effective means of recording and storing the results of assessments. Assessment records can be stored in a manageable and easily accessible form, and databases and spreadsheets can be used to analyze and extrapolate information on the progress and attainment of individual students, groups and classes in the different curriculum areas using computer.

Comparing the means on mode of computation for each of the colleges of education sampled, Federal College of Education, Okene, College of Education, Akwanga and Federal College of Education, Konatgora had means of 1.8846, 1.6957 and 1.8696 respectively which are approximately 2 which is the maximum mean value for adoption of computer-based result computation. This implies that the colleges have varying degrees of computer-based result computation from their various means shown on table 1. However, College of Education, Ilorin had the mean of 1.0750 which is approximately 1, that is the maximum means of manual computation. The results show that the level of adoption of computer-based result computation is still not very encouraging among colleges of education in North-

central, Nigeria. The findings disagreed with Brian and Richard (2013) who stated that ICT has potential role to play in both assessment of performance and for learning.

Research question 2: What is the level of impact of computer-based result computation on the educational system among colleges of education in North Central, Nigeria?

The impact of the computer-based result computation was measured by the level of effectiveness of this method on the educational system in colleges of education in North Central, Nigeria and the results are shown in table 2

Table 2: Impact of computer-based result computation

Institution	Mean	N	Std. Deviation	% of Total Sum
FCE Okene	3.5000	26	.48990	24.0%
COE Ilorin	3.2750	40	.74205	34.5%
COE Akwanga	3.3261	23	.53531	20.2%
FCE Kontagora	3.5217	23	.46413	21.3%
Total	3.3884	112	.59921	100.0%

Source: Researchers' Study, 2017
Key: 3.5-4.0- Very impactful, 3.0-3.49- Impactful, 2.0-2.99- Fairly impactful, below 2- Not impactful.

The findings revealed that computer-based result computation is very impactful in Federal College of Education, Okene and Federal College of Education, Kontagora, this was shown by the means of 3.5000 and 3.5217 respectively. College of Education, Ilorin and College of Education, Akwanga that have the means of 3.2750 and 3.3261 respectively indicating that computer-based result computation has impact on computation of students' result at colleges of education, in North-Central, Nigeria. However, College of Education, Ilorin that is still using manual computation perceived computer-based result computation to be impactful having an average response of 3.2750. This is in line with the opinion of Steven (2012) who stated that the role of technology in education has been emphasized since the potential of computer technology to transform manual way of computation has changed many aspects of people's way of life. Robert and Nicholas (2017) also opined that an appropriately configured and maintained computer infrastructure, along with suitable training and acceptable policies, will minimize the risk of such incidents as delay in result computation, result forgery and waste of stationery occurring.

Research question 3: What is the perception of the respondents on adoption of internet enhanced computer-based result computation?

Table 3: Adoption of internet enhanced computer-based result computation

Institution		Computed results are uploaded to the internet	Computed students results should be uploaded to the internet
FCE Okene	Mean	3.4231	3.6538
	N	26	26
	Std. Deviation	.57779	.48516
	% of Total Sum	25.1%	25.9%
COE Ilorin	Mean	3.1000	3.0000
	N	40	40
	Std. Deviation	.90014	.93370
	% of Total Sum	35.0%	32.7%
COE Akwanga	Mean	3.5217	3.4348
	N	23	23
	Std. Deviation	.66535	.78775
	% of Total Sum	22.9%	21.5%
FCE Kontagora	Mean	2.6087	3.1739
	N	23	23
	Std. Deviation	.83878	.71682
	% of Total Sum	16.9%	19.9%
Total	Mean	3.1607	3.2768
	N	112	112
	Std. Deviation	.83346	.80773
	% of Total Sum	100.0%	100.0%

Source: Researchers' Study, 2017

The findings of this study also revealed that all the sampled Colleges of Educations agreed that computed students' results should be uploaded and are uploaded on the internet. Thisis shown by mean responses greater than 3. College of Education, Akwanga however, has a mean less than 3 which means it disagreed that results were not uploaded on the internet. This result depicts a false representation of what is really in existence because most of the Colleges of Education do not upload their results on the internet for easy accessibility by students.

Hypotheses

H01: There is no significant difference in the level of adoption of computer-based result computation among colleges of education in North-Central, Nigeria.

Test of Homogeneity of Variances

Table 4a: Homogeneity of variances on Mode of computation

Levene Statistic	df1	df2	Sig.
7.589	3	108	.000

Source: Researchers' Study, 2017 Significance at 5%

ANOVA

Table 4b: ANOVA on Mode of computation

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.771	3	4.924	41.200	.000
Within Groups	12.907	108	.120		
Total	27.679	111			

Source: Researchers' Study, 2017 Significance at 5

Table 4c: Welch's adjustment on Mode of computation

	Statistic[a]	df1	df2	Sig.
Welch	53.827	3	50.697	.000

Source: Researchers' Study, 2017 Significance at 5%

In order to test the diversity in responses to the research question 1, a research hypothesis was developed and tested using Analysis of Variance (ANOVA) at 0.05 level of significance since we have more than two institutions that were considered in this research. The Levene statistic was significant (i.e. Homogeneity of variance assumption was violated in table 4a), so we used the Welch Robust test of equality and the result showed in table 4b and 4c, that there was a statistically significant difference between groups as determined by one-way ANOVA Welch's adjustment on mode of computation (3, 50.697) = 53.827, p = .000, so we reject the null hypothesis because the probability of t-statistic of 0.000 is less than the significance value of 0.05.

H02: There is no significant difference in the level of impact of computer-based result computation among the colleges of education in North-Central, Nigeria.

Test of Homogeneity of Variances

Table 5a: Test of homogeneity of variances effect of computer-based result computation

Levene Statistic	df1	df2	Sig.
4.167	3	108	.008

Source: Researchers' Study, 2017 Significance at 5%

ANOVA

Table 5b: ANOVA on effect of computer-based result computation

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.336	3	.445	1.249	.296
Within Groups	38.518	108	.357		
Total	39.855	111			

Source: Researchers' Study 2017 Significance at 5%

To test whether or not there exist a difference in the views of respondents in institutions sampled on the level of impact of computer-based results computation in research question 2, Analysis of Variance (ANOVA) at 0.05 level of significance was used and presented in tables 5a and 5b. There was a statistically no significant difference between and within the groups as determined by one-way ANOVA F (3, 108) = 1.249, p = .296. So, we accept the null hypothesis that there exists no statistical difference in the views of Academics in the sampled institutions on the impact of computer-based result computation on the academic system.

Ho3: There is no significant difference in the perception of respondents on the adoption of internet enhanced computer-based result computation in colleges of education in North Central, Nigeria.

Test of Homogeneity of Variances

Table 6a: Homogeneity of variances on internet enhanced computer-based result computation

Levene Statistic	df1	df2	Sig.
4.327	3	108	.006

Source: Researchers'' Study, 2017 Significance at 5%

ANOVA

Table 6b: ANOVA on Computed students results should be uploaded to the internet

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.579	3	2.526	4.208	.007
Within Groups	64.841	108	.600		
Total	72.420	111			

Source: Researchers' Study, 2017 Significance at 5%

Robust Tests of Equality of Means

Table 6c: Welch's Test on Computed students results should be uploaded to the internet

	Statistic[a]	df1	df2	Sig.
Welch	5.464	3	55.190	.002

Source: Researchers' Study, 2017 Significance at 5%

To test whether or not there exist variance in the perception of respondents among the groups sampled in this research, Analysis of Variance (ANOVA) at 0.05 level of significance was used and presented in tables 6a and 6b. The Levene statistic was significant (i.e. Homogeneity of variance assumption is violated see table 6a) so we used the Welch Robust test of equality. The result showed in table 6c, that there was a statistically significant difference between groups as determined by one-way ANOVA Welch's $F(3, 55.2) = 5.464$, $p = .002$ so we reject the null hypothesis because the probability of 0.002 is less than 0.05 that is the level of significance.

Conclusion

From the findings of this study it is obvious that certain factors impacted the computation of students' results at the colleges of education in North Central, Nigeria. Some of the factors identified include: inadequate computer facilities (software and hardware); inadequate funding; lack of a centralized ICT centers to collate results in some colleges and inadequate knowledge of computing electronically by some academic staff. It is a laudable development for the establishment of colleges of education in Nigeria to provide middle level manpower at Junior Secondary School (JSS) level. If adequate facilities are put in place and adequate funds are provided, the aim of establishing colleges of education could be fully achieved.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Adequate infrastructures and facilities in terms of computers and software for results computation should be provided in each department of all the colleges of education so as to minimize errors and time wasted on manual processing of results.
2. The chief executive (provost) of each college of education should pursue vigorously changing from manual computation of results to computer-based computation, and the colleges of education already using computer-based result computation should improve on the software and hardware packages used for computation of results as this will impact positively on academic system.
3. All the academic staff at the colleges of education should be trained specifically on results processing, using electronic media as this will enhance the quality of results produced at the end of every academic semester.
4. Computed students' results should be uploaded on the internet as this will enable students access their results on time and wherever they maybe, not necessarily travelling a long distance to access their results.
5. Information and communication technology (ICT) center should be established in each college of education as this will allow for a unit to collate results of various

departments for easy processing and production of final results. The ICT center would serve as a storage facility where results could be retrieved at any time the need arises.

6. Software packages should be upgraded from time to time as this would enhance performance and ensure guarantee.

Limitation of the Current Study

The study was limited to one region out of six geo-political zones of Nigeria that the authors understand better. Nevertheless, the study cohort was representative enough to predict some information that this study was aimed at.

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