Staff Perception of the Adoption of ICT for the Management of Data on Examination Malpractice

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ABSTRACT

Examination boards often prescribe severe sanctions for engagement in examination malpractice because such actions undermine the integrity and validity of assessment. Errors in the data on examination malpractice would therefore have serious consequences for any candidate that may be inadvertently listed among those who committed breaches. The examination board would also be exposed to litigations and loss of credibility. The West African Examinations Council (WAEC) conducts the West African Senior School Certificate Examination (WASSCE) in the English speaking West African states and attaches a lot of importance to the proper handling of the data on malpractice. In Nigeria, high prevalence of malpractice in WASSCE, coupled with the attendant challenges of manually processing the voluminuous data relating to the cases detected, prompted WAEC (Nigeria) from 2011 onwards to adopt ICT-driven approaches to handling malpractice cases in order to improve data quality and efficiency of processing. Using staff perception as a quality and service improvement tool, this paper sought to provide valid and reliable information on the impact of the initiative and what needs to be changed, in order to achieve fully its objectives and also enable staff to have a clearer and shared vision of it. A set of questionnaire was designed, developed and used in conjunction with focus group discussion to collect data for the study. The respondents were 25 staffs of the department that handles reports on malpractice and 275 staffs of other departments who participated in examination administration and detected malpractice cases. The data collected were analyzed quantitatively and qualitatively. The findings were discussed and various recommendation were made to enrich the system and achieve positive shifts in the opinions and attitudes of staff.

Keywords: Validity; reliability; examination integrity; staff perceptions; technological innovations

1.   INTRODUCTION

High performing organisations leverage Information and Communication Technology (ICT) and perception studies for process improvements and product/solution development. The power of ICT to drive innovations, support sustainable development and facilitate quality assurance in business and other fields of human endeavour has been acknowledged globally. The findings of a survey on the applications of ICT by Statistics New Zealand (2007) and the report on a joint project on the impact of ICT use in business by UNCTAD & NSO, Thailand (2008) indicate among other things that ICT is being increasing deployed in business for streamlining, optimising and automating various internal processes in order to reduce delays, human error or the complexity of certain processes. In most cases, such interventions not only enhance operational efficiency and productivity, they also reduce costs.

There is no doubt that the use of ICT in business is innovative. According to a report on innovation which was published by the UK National Audit Office (2009) and prepared by Ipsos MORI, a leading market research company in the UK and Ireland, outcomes of innovation can be conceptualised as improved efficiency, cost saving, improved procedures and services for the users. The report also indicated that apart from investment in ICT and other resources, two other factors that are crucial for successfully implementing and sustaining innovation are communication and staff buy-in. The level of staff buy-in on innovations and other strategic changes in an organisation is often gauged by perception studies. Wikipedia (nd), in an article on *Change Management* stressed that the critical aspect of an organizational change is a company's ability to win the buy-in of its employees on the change.

Perception study has become one of the tools used in corporate settings for getting valuable feedback from stakeholders on the levels of understanding of, support for, determination of outcomes of and impediments to the smooth implementation of various interventions aimed at enhancing efficiency, enriching service or product portfolio and ensuring sustainability. Cambridge Dictionaries Online defines perception as " a belief or opinion, often held by many people and based on how things seem". Perception is said to be made up of three elements namely the perceiver, the stimulus or target and the situation. Evolutionary Psychologists such as Alan and Gary (2011) asserted that the primary purpose of perception is to guide action by gauging the impact of the effort and identifying actionable strategies. Consequently, studies of perceptions of stakeholders allow insightful feedback without fear of intimidation (particularly when the stakeholders are staffs), on the level to which an innovation is meeting its objectives and the barriers to effective implementation. Getting staff perceptions also generates ideas for improvements.

Alan and Gary (2011) further posited that the opinions of the perceiver can be influenced by experience, motivational state and emotional state while ambiguity, inadequate information about the stimulus and different situations may call for additional information. Nzuve (1999) illustrated how factors in the perceiver (such as expectations, novelty, attitudes, experience), factors in the target (for example similarity, size, motives, background) and factors in the situation (time, work setting and social setting) can influence perception. For instance,

departing from familiar approaches demand transformation in perceptions and attitudes in order to understand and implement changes.

The West African Examinations Council (WAEC), which conducts the West African Senior School Certificate Examination to about 2 million candidates in Nigeria, Ghana, Sierra Leone and The Gambia, has over the years, been applying technology/ICT to various aspects of its operations, to enhance the efficiency of its service delivery and to assure quality. Recent applications of ICT by WAEC in Nigeria include e-marking of essay scripts and management of data on examination malpractice. Uwadiae and Oke (2014) carried out a study on examiners' perception of the e-marking initiative of WAEC. That study's findings provided insightful information on the expectations of the stakeholders, the benefits of the e-marking initiative, the challenges encountered and the way forward. WAEC (2013) has also used perception studies to investigate the opinions of various stakeholders about its activities in Nigeria, with a view to addressing the issues raised.

WASSCE is a high stake, high candidature examination and the greatest threat to its credibility is examination malpractice. Cheating in examinations calls into question the validity of assessment outcomes. WAEC adopts several measures for curbing examination malpractice and these include enlightenment campaigns, preventive actions, monitoring of the conduct of examinations and enforcement of the extant rules. These measures are in line with the three approaches proposed by Hinman (2000) for addressing cheating and plagiarism namely the virtues approach, the prevention approach and the policeman approach. The approaches have also been summed up as the three "Es" standing for "Ethics or Enlightenment, Engineering and Enforcement".

In Nigeria, the prevalence of malpractice in WASSCE has risen to 8.4% in the school diet and 15% in the private candidates' diet, as deduced from data collated on cases detected before, during and after the conduct of examinations. In accordamce with the enforcement approach, WAEC prescribes various sanctions for engaging in malpractice in WASSCE, ranging from cancellation of results or barring for some years to reporting the culprits to the appropriate authorities for stiffer penalties. The need to ensure the validity of test scores by curbing malpractice, the serious consequences for those involved in confirmed cases of examination malpractice, the voluminous data on the malaise in Nigeria and the need for quality assurance in the handling of cases of examination malpractice prompted the Nigeria Office of WAEC to deploy ICT to the management of the data with effect from 2011.

The ICT solutions for handling malpractice which the Nigeria Office of WAEC has adopted are for supporting traditional approaches to curbing examination malpractice. The first ICT-driven strategy for managing data on malpractice in WASSCE focussed on the automation of the documentation and categorization of the cases detected at examination centres and marking venues by staff, supervisors, examiners and other officials on examination duty. The programme was developed in-house and it required the use of specially designed Optical Mark Reader (OMR) forms for data capture. Since the Post Examinations Department (PED) of the Test Development Division makes use of the output from the system, the programme was named the PED Sub-system. Awareness was created about the need for the change from manual processing of the cases and members of staff were briefed on the proper completion of the malpractice OMR form. Manuals were produced for the user

department, to facilitate understanding. Further to this, in 2014, another ICT- based strategy was adopted in response to concerns about the quality of the attendance record of candidates coupled with the challenges encountered in documenting cases of examination malpractice under some delicate circumstances. The system was named CIVAMPEMS (Candidates' Identity Verification, Attendance, Malpractice and Post Examinations Management System). It works using a battery operated mobile handheld terminal and Radio Frequency Identification Device (RFID) chips containing data captured during biometric registration and embedded in smartcards. The handheld device is capable of reading, querying and confirming centre specific information regarding candidates' data in addition to capturing information about the supervisor, recording real time daily processes relating to WASSCE and transmitting same to WAEC database in a secure manner. Supervisors and selected Staff were trained on how to operate the device before they were deployed for use. The objective of this study is therefore to explore staff perceptions of the two innovations in order to assess their impact and provide baseline data against which future efforts could be focussed.

2. STATEMENT OF PROBLEM

Positive perception of stakeholders on any innovation is critical to the success of implementation. The adoption of ICT by WAEC in Nigeria to manage data on examination malpractice is aimed at enhancing the efficiency, precision and accuracy of the reporting process. Manual processing of voluminuous data has significant potential for error and loss of data. Hence, a shift to ICT-driven management of data is a step in the right direction as the benefits include improved data quality, which is crucial for validity, reliabilty, credibility and lower risk of litigation that could result from application of sanctions in error on innocent candidates. However, there may be various issues that need to be addressed in order to derive the full benefits of the initiatives. Moreover, the greater the understanding and support of the initiatives by staff, the more successful their implementation would be. This study therefore investigated the perceptions of staff on the innovations in order to provide reliable feedback on the impact, identify what needs to be refined and highlight the lessons that have been learnt, to enable WAEC consolidate on the gains.

3. RESEARCH QUESTIONS

The study sought to answer the following questions:

(1) What are the perceptions of WAEC staff on examination malpractice?

(2) How do WAEC staff perceive the processes involved in the implementation of the use of ICT to manage data on malpractice in WASSCE?

(3) How do WAEC staff perceive the effectiveness and efficiency of the ICT tools being used to manage data on malpractice in WASSCE in terms of:
    (a) Data capture and output;
    (b) User satisfaction;
    (c) Adaptability;
    (d) Cost savings?

(4) What are the perceived benefits of the adoption of ICT to manage data on malpractice in WASSCE?

(5) What are the perceptions of WAEC staff on the barriers to the effective implementation of the:
(a) PED Sub-system;
(b) CIVAMPEMS mobile application system?

4.   METHODOLOGY

(1) Research Design

The study employed a survey design. Focus group discussion (FGD) was also used to provide additional qualitative data.

(2) Population

The population consisted of the 1,986 WAEC staff on permanent employment in the Nigeria National Office as at the time this study was undertaken.

(3) Sample and Sampling Procedure

A total of 275 WAEC staff that had put in at least 5 years of service were purposively sampled nationwide while they were servicing the 91 venues (including 2 for e-marking) at which scripts for the May/June 2015 WASSCE were marked. The sample was made up of 218 senior staff and 57 junior staff.

(4) Instrument and Instrumentation

A Questionnaire, which was validated through peer critique, was used to obtain information from the respondents. The questionnaire consisted of three parts. Part A consisted of 34 items with responses on a 4-point Likert scale of "Strongly Agree", "Agree", "Disagree", and "Strongly Disagree". Part B consisted of nine open-ended items while Part C sought information on the respondents' demographic data.

(5) Data Collection

The questionnaire was administered during the marking of scripts for the May/June 2015 WASSCE. Two sets of FGDs were held with PED staffs.

(6) Data Analysis

The quantitative data were analysed using frequency counts and percentages. The qualitative data were collated and interpreted thematically using content analysis.

5.   RESULTS AND DISCUSSION

The results of the study are presented and discussed in order of the research questions as follows:

(1) Research Question 1

What are the perceptions of WAEC staff on examination malpractice?

Table 1 contains information about the opinions and attitudes of WAEC staff with respect to examination malpractice.

Table 1: WAEC staff perceptions on examination malpractice and the handling of the cases

	A	D
WAEC creates sufficient awareness about examination malpractice, to sensitise all members of staff to its ills.	257 (93.45%)	18 (6.55%)
WAEC staff members have a clear understanding of the effect of exam. malpractice on the validity of assessment outcomes.	246 (89.45%)	29 (10.55%)
Generally, members of staff are earnest about reporting all the cases of malpractice detected in WASSCE.	170 (61.82%)	105 (38.18%)
Some staff could be discouraged from reporting all the cases of malpractice detected in WASSCE because of the amount of documentation involved.	169 (61.45%)	106 (38.55%)
Accurate collation of data on malpractice should be regarded as a shared responsibility of all the personnel involved in the conduct of WASSCE.	233 (84.73%)	42 (15.27%)
Assignment of codes to the various types of cases that could be encountered has increased the level of understanding of staff about what constitutes malpractice	211 (76.73%)	64 (23.27%)

N = 275, A represents "Agreed"; D represents "Disagreed"

Table 1 shows that majority of staff have a clear understanding of examination malpractice and its consequences for WAEC as an examination body, for the candidates that are involved and for their collaborators when apprehended.   According to 76.73% of the respondents, coding of specific types of malpractice, which the ICT approach demanded, also contributed to better understanding of the breaches regarded as examination malpractice. However, 38.18% of the respondents are of the opinion that not all the cases of malpractice detected by staff are reported. This view was reinforced by 38.55% of the respondents who opined that some staff could be discouraged from reporting all the cases of malpractice they detected because of the volume of documentation involved. Analysis of the qualitative data indicated that failure to report all the cases detected could also be due to intimidation, situational factors such as rowdy examination halls, time constraints, loss of data, lax attitudes, insufficient evidence and lack of ethical values. The introduction of the CIVAMPEMS handheld device for on-the spot capture of information on malpractice and prompt transmission of same to the database is aimed at addressing majority of the identified comcerns. There is no doubt that the readiness of staff to regard examination malpractice as a serious problem is key to the success of the efforts of WAEC to ensure that the larger society no longer perceives examination malpractice as an acceptable phenomenon.

(2) Research Question 2

How do WAEC staff perceive the processes involved in the implementation of the use of ICT to manage data on malpractice in WASSCE?

Table 2 provides information on WAEC staff perceptions of the change management processes relating to the deployment of ICT to the management of data on malpractice.

Table 2: Effectiveness of the management of the process of changing to ICT for the handling of malpractice data relating to WASSCE, as perceived by staff

	A	D
There was effective internal communication to create awareness about the need to use malpractice OMR forms.	176 (64%)	99 (36%)
Adequate steps were taken to create awareness about the use of CIVAMPEMS hand held device at exam centres.	201 (73.09%)	74 (26.91%)
All members of staff are regularly briefed on the proper completion of the malpractice malpractice OMR form.	174 (63.27%)	101 (36.73%)
Compared to when the use of the form started, I now find the OMR form easier to complete.	212 (77.09%)	63 (22.91%)
All Supervisors display familiarity with the manipulation of the CIVAMPEMS handheld device.	102 (37.09%)	173 (62.91%)
All WAEC staff know how to use the CIVAMPEMS handheld device.	68 (24.73%)	207 (75.27%)

The deduction that could be made from Table 2 is that the level of awareness among staff prior to implementation was not as high as expected. The view was echoed during the FGDs and the perceived communication gap was attributed to the fact that the initial focus was on the user department or the first level target group. This finding is in tune with the report on the perception of frontline staff on innovation (National Audit Office, 2009) that effective communication is critical to the successful implementation of innovations and staff support for the initiative. The use of malpractice OMR forms enjoys the buy-in of staff of PED (the user department) as they were sensitised to the need for the change right from the outset and were involved in the design of the form and training during the sub-system development. Manuals were also developed for their guidance. However, other staff members confirmed that the ease with which they complete the malpractice OMR form has improved with experience and continuous briefing.

Analysis of both the quantitative and qualitative data indicate that the proportion of users deemed to be familiar with the use of the CIVAMPEMS handheld device is currently inadequate although table 2 shows that it is higher for supervisors (37.09%) who were the initial target group, than for staff (24.73%). Moreover, lack of familiarity is partly due to the novelty of the initiative as it was introduced in the May/June 2014 WASSCE mainly for the use of Supervisors. In June 2015, its use was extended to staff that handled the malpractice cases that were detected at marking venues. With additional training, there is bound to be greater familiarity with the device, leading to more effective uses as the years go by.

(3) Research Question 3
How do WAEC staff perceive the effectiveness and efficiency of the ICT tools being used to manage data on examination malpractice in terms of:
(a) Data capture and output;
(b) User satisfaction;
(c) Adaptability;
(d) Cost savings?

Staff perceptions of the effectiveness and efficiency of the PED Sub-system and the CIVAMPEMS mobile application system which are being used as ICT tools to manage data on malpractice in WASSCE can be deduced from Table 3.

Table 3: WAEC staff perceptions of the effectiveness and efficiency of the ICT tools being used to manage data on malpractice in WASSCE

	A	D
The instructions for completing the malpractice OMR form are easy to understand.	213 (77.45%)	62 (22.55%)
The coding of types of malpractice and shading of same on OMR forms are easily carried out.	204 (74.18%)	71 (25.82%)
The completion of the malpractice OMR forms is more time consuming than manual recording.	117 (42.55%)	158 (57.45%)
The coding of malpractice for shading on OMR forms can be applied to all possible types of malpractice.	195 (70.91%)	80 (29.09%)
The design of the malpractice OMR form meets all the needs and expectations of staff.	163 (59.27%)	112 (40.73%)
It is difficult to adhere strictly to all the instructions for completing the malpractice OMR form.	67 (24.36%)	208 (75.64%)
The malpractice OMR form contains some unnecessary information that would hinder quick completion.	52 (18.91%)	223 (81.09%)
There is the need to redesign the malpractice OMR form for the purpose of capturing further crucial information on some types of malpractice.	141 (51.27%)	134 (48.73%)
The use of OMR form for capturing data on malpractice can be applied to all types of tests conducted or to be conducted by WAEC including Computer Based Testing.	200 (72.73%)	75 (27.27%)

From table 3, it can be deduced that the instructions for completing the malpractice OMR form are considered easy to understand by 77.45% of respondents while 75.64% further indicated that the instructions for completing the form are also easy to adhere to, making it user friendly. Majority (72.73%) are of the opinion that the use of the form is adaptable. However, 42.55% consider the completion of the malpractice OMR form more time consuming than manual recording although its capability to capture data on malpractice is more effective. Only 59.27% concluded that the form as currently designed is adequately suited to the needs and expectations of staff. Analysis of qualitative data on the layout of the output and the prospects for cost savings indicated positive responses. At the FGDs, respondents from the user department expressed satisfaction with the levels of access, arrangements for system security and for audit trails. Areas for improvement in the OMR malpractice form and in the software for the CIVAMPEMS mobile application system were highlighted by some respondents who also made suggestions to that end.

(4) **Research Question 4**

What are the perceived benefits of the adoption of ICT to manage data on malpractice in WASSCE?

Table 4 indicates what staff perceive to be the benefits of adopting ICT approaches to manage data on malpractice in WASSCE using the OMR form-supported PED Subsystem and the CIVAMPEMS mobile application system.
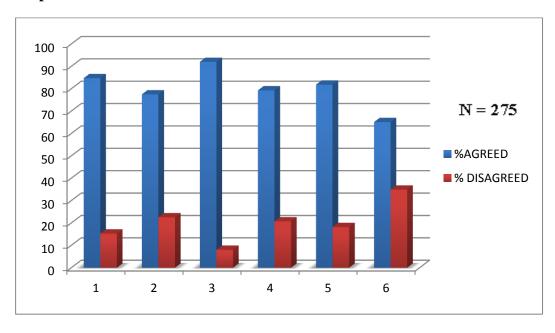
Figure 1 provides in a graphical format, the same information contained in Table 4.

Table 4: WAEC staff perceptions of the benefits of adopting ICT to manage data on malpractice in WASSCE

		A	D
1.	The adoption of ICT by WAEC to capture data on examination malpractice has numerous advantages over manual collation of such data.	233 (84.73%)	42 (15.27%)
2.	The use of the OMR form has minimised the possibility of cancelling the results of innocent candidates in error.	213 (77.45%)	62 (22.55%)
3.	The deployment of ICT to the collation of data on examination malpractice is innovative.	253 (92%)	22 (8%)
4.	The use of ICT for the processing of data on malpractice ensures fairness in applying the prescribed rules.	218 (79.27%)	57 (20.73%)
5.	The use of ICT for the processing of data on malpractice cases has improved the quality of the data, leading to enhanced validity of assessment.	225 (81.82%)	50 (18.18%)
6.	With ICT processing of malpractice data, it is easier to hold staff accountable for the correctness of information on candidates involved than with manual processing.	179 (65.09%)	96 (34.91%)

The results in table 4 are in agreement with qualitative data. For instance, table 4 shows that 84.73% of respondents acknowledge that the ICT approach is better than the manual approach while all of those who participated in the FGD urged that the ICT approach to data management should be sustained. The benefits according to the results shown in table 4 include enhanced validity of assessment (81.82%) and by extensiom higher reliability of data,, reduction in errors/minimal data loss (77.45%) resulting in lower risk of litigation, fairness in the application of sanctions (79.27%), accountability (65.09%) and the competitive advantage which the innovation confers on WAEC (92%). Figure 1 is a graphical transformation of the data in table 4.

Figure 1: WAEC staff perceptions of the benefits of adopting ICT to manage data on malpractice in WASSCE

Other benefits mentioned by the participants in the FGD were improved work flow leading to cost efficiency and processing efficiency, higher productivity, reduction in human interference with data capture, minimal fear of assault by the culprits, faster and better access to data on malpractice and improved layout of the output to be considered for adjudication. These are in line with findings in various studies on the benefits of ICT.

(5) <u>Research Question5</u>

What are the perceptions of WAEC staff on the barriers to the effective implementation of the:
(a) PED Sub-system;
(b) CIVAMPEMS mobile application system?

Table 5 shows what, in the opinion of staff, could constitute barriers to the effective implementation of the PED Sub-system and the CIVAMPEMS mobile application system.

Table 5: WAEC staff perceptions of the barriers to the effective implementation of the ICT tools for managing data on malpractice in WASSCE

	A	D
Members of staff who have inadequate computer skills would encounter difficulty in completing the OMR form.	237 (86.18%)	38 (13.82%)
The administrative procedures for submitting completed OMR forms to PED along with the exhibits are more cumbersome than before the adoption of the OMR form.	107 (38.91%)	168 (61.09%)
The likehood of criticism would discourage me from pointing out areas that should be improved upon in the collation of data on malpractice.	167 (60.73%)	108 (39.27%)
Supervisors, Examiners and Ministry Official who carry out examination duties should also be trained on the use of malpractice OMR form for submitting their reports.	240 (87.27%)	35 (12.73%)
There should be feedback to staff who make mistakes in the completion of the OMR form, in order to guard against reoccurrence in the future.	69 (25.09%)	206 (74.91%)
Supervisory support should be given to staff completing the form for the first time, to enhance correctness.	233 (84.73%)	42 (15.27%)
The deployment of ICT to the handling of data on examination malpractice is in line with the Council's Strategic Plans.	240 (87.27%)	35 (12.73%)

Table 5 indicates that majority of respondents perceive that fear of criticism (60.73%), restriction of the use of malpractice OMR form to staff (87.27%),non-provision of supervisory support for staff filling the form for the first time (84.73%) could constitute barriers to effective implementation of the PED subsystem. Other barriers which were brought to light during the FGDs include unpleasant workplace experiences, administrative bottleneck associated with the submission of completed forms, inadequate motivation for the staff of the departments implementing the change, using feedback (on the quality of completion of the OMR form) for punitive actions rather than for improvement. Although qualitative data indicated that computer skill does not correlate with ability to shade the OMR form properly, 86.18% of those who responded to the questionnaire perceive inadequate computer skills to be a barrier, probably in the general sense. The level of staff buy-in is unlikely to be a barrier to the use of the ICT tools in view of the fact that 87.27% perceive the development as part of the strategic plans of WAEC for sustainability.

Concerning barriers to the effective implementation of the CIVAMPEMS mobile application system, analysis of the qualitative data shows that the commonly identified barriers to its effective implementation were inadequate training on its operation, unwillingness of supervisors and other persons on examination duty to use the device unless when under monitoring, difficulty of batching and validating data at the input stage, the battery charging system, the burden of proof of cheating due to non-availability of exhibits at the point of transmitting data from examination halls and difficulty of retriving transmitted data for amendment.

6. RECOMMENDATIONS

The following recommendations were made by the respondents:

(1) Training on the effective use of the CIVAMPEMS handheld device should be organised for all the persons involved in the conduct of WASSCE;
(2) There should be more effective internal communications about changes to the processes, systems and policies of the organisation.
(3) The malpractice OMR form should be modified in design, to reduce the tedium of repetitive coding as much as possible;
(4) The possibility of using solar energy to power the CIVAMPEMS handheld device should be explored;
(5) The staff in charge of the running of the applications on which the ICT approaches are based should be adequately motivated to further invest time and efforts positively on the initiatives;
(6) Supervisors' perception of the use of the CIVAMPEMS mobile application system should also be investigated.
(7) The software for the CIVAMPEMS mobile application system should be upgraded to address the issues raised.

7. CONCLUSION

The results of the study indicate that the use of ICT to manage the data on malpractice in WASSCE enhances validity, reliability and credibility of assessment outcomes. The approach is also important for efficiency, credibility and productivity. It also buttresses the fact that organisations that do not invest in ICT are almost certain to find themselves at a disadvantage in the market.

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