EXAMINERS' ATTITUDE TOWARDS KNOWLEDGE OF MALPRACTICE INDICATORS: CONSTRUCTION AND VALIDATION OF A MEASUREMENT INSTRUMENT

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Abstract. Examination malpractice has invaded Nigeria and has only increased in tempo despite measures intended to curb it. It is therefore not in doubt that some stakeholders and policy makers in the educational sector today including teachers who combine public examining duties may not be knowledgeable enough to track the "menace" while marking. In this study, the authors constructed and validated instrument to measure examiners' disposition towards knowledge of examination malpractice indicators of West African Examinations Council (WAEC). Consequently, scale development research type of single subject design was employed. The sample for the two phases consisted of nine hundred and sixty (960) WAEC mathematics examiners from 9 marking centres, which were drawn randomly from Osun, Ogun and Ondo State, Nigeria. Instrument used for data collection was Examiners' Attitude Towards Knowledge of Malpractice Indicators Scale (EAKMIS). Data were analysed using Principal Component Analysis (PCA), Exploratory Factor Analysis (EFA),

Confirmatory Factor Analysis (CFA) and Ordinal Alpha. The results showed that the scale was reduced from twenty (20) to eleven (11) items across three (3) dimensions. Final compliance indices were: χ^2 = 457.54, p = 0.01, RMSEA= 0.03, GFI = 0.96, AGFI = 0.96, TLI = 0.94, NFI = 0.90, SRMR= 0.01, CFI= 0.91 and IFI= 0.91. The ordinal alpha reliability index for the three (3) factors of EAKMIS was 0.79, while the reliability index for each of the subscale of the EAKMIS ranged from 0.85 to 0.93. It was recommended that there should be intensive training and re-training for all the examiners by the examining body where issues related to detection of examination malpractice cases while marking would be discussed.

Keywords: exploratory factor analysis (EFA), confirmatory factor analysis (CFA), ordinal alpha reliability, examination malpractice indicators

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Introduction

The poor quality of school leavers from the different tiers of our educational system has become a very worrisome trend. Concerned stakeholders, patriotic to the course of our country (Nigeria) are not relenting in their effort at ensuring that things turn around for the better. The minutest details of possible causes are sought and attempts at providing solutions has become the concern of most researchers. If curriculum provisions are adequate and the criteria for passing candidates are adhered to by those charged with the responsibility to do so (examiners), then persons holding academic certificates should be able to defend them functionally or otherwise (Ayanwale, 2014). Examinations may not be the true test of knowledge, but persons who had passed examinations genuinely by a dint of hard work should have so much to flaunt in that regard. If examination malpractice is controlled for, then the success of any incompetent student in an examination will be an indictment on one person - the examiner, who may have been compromised or simply not fit for the job (Ayanwale, 2014). Examiners mark to a common standard and a common interpretation of

marking scheme to avoid putting some students in advantaged or disadvantaged position. In addition to disadvantage or benefiting those sitting for an examination, aberrant marking can also affect the integrity of an awarded certificate. Much as the problem of poor quality of graduates caused by incompetence or inadequacies on the part of examiners is receiving technological attention, it is difficult if not impossible to completely do away with humans in the marking of examinees examination scripts. This is what made this study very imperative.

Examination malpractice is an illegal and unethical activity in which a candidate consciously involves alongside agents of examining bodies, in order for the candidate to obtain a result or score capable of ranking him/her a high achiever of academics or getting an outstanding result beyond his/her academic capability (Fasasi, 2006). Most available records pointed to the fact that examination leakages are very old practice in Nigeria. Adeyegbe (2005) reported that examination malpractice was first reported in Nigeria in 1914 (incidentally the year Nigeria's North and South were amalgamated) when the questions of the Senior Cambridge Local Examinations were obtained before the examinations were taken. Examination leakages have featured regularly since then. The examination malpractice still persists despite public campaigns and enlightenment programmes embarked on by public examining bodies such as WAEC and non-governmental organization on the need for eradication of examination malpractice. It also seems that our society is now accustomed to and comfortable with examination malpractice, reasons being that the campaign against examination malpractice was not aggressive as it should be and insignificant number of persons are genuinely involved in the campaign against it. Although, indicators have recently shown that examining bodies have improved on securing examination papers, which reduces leakages. However, as observed by Cizek (1999), students continue to devise new methods of cheating, some of these methods include; smuggling of prepared scripts into examination halls, impersonation, swapping of answer scripts, scribbling on blades of ceiling fans, shirts, trousers, skirts and of recent, text messages on cell phones.

Also, is a moral issue which must be viewed from an ethical theory. Ethics according to Omoregbe (1993) is a branch of philosophy which deals with human action. Meanwhile, Hornby (2002) asserted that ethics could comprise normative principles which not only control but also influence the behaviour of individuals. A common aspect of ethics is morality which deals with good or bad conduct although emphasis is laid on what ought to be done. Examination malpractice thus, falls within this ethical theory. In WAEC, examiners were told what ought to be done and the consequences that may arise in case of any form of violation in reporting cases of malpractices during marking exercise. Such concern with solution to any ethical violation is grounded in Thomas Hobbes' (1946) theory of State of Nature which explains that before the formation of an organized society, human beings did not have any set of laws, or any sense of authority or morality (David & Jennifer, 2002). Also, Hobbes believed that in man's natural state, moral ideas do not exist. Thus, speaking of human nature, he explained good simply as that which people desire and evil as that which they avoid, at least in the state of nature. In education, morality is about the conduct of teachers (examiners), parents, and law enforcement agents who need to be positively involved in discouraging candidates from any form of examination malpractice (Odia, 2011). And any involvement in this vice is a clear reflection of the moral decadence.

Nevertheless, Suto & Greatorex (2006), suggested that General Certificate of Secondary Education (GCSE) examination marking is a diverse activity, encompassing a wide range of subjects with a variety of question styles and marking schemes. GCSE plays a crucial role in secondary education and the process of marking it should be taking seriously. It is a key determinant feature in the lives of children within eighteen (18) years old and above, this age serves as the prime (youthful) age of every child because it is crucial age for human development because children transit to adulthood at this age. Academic decisions reached on their behalf by examiners could have far reaching implications on their future. The judgment and decision-making process involved in the

marking of some other kind of examination have received some serious consideration among researchers such as: Cumming (1990), Laming (2004), Webster et al (2000). More so, the workability of this study is an inclination towards positive or negative thinking or behaviour of an examiner saddle with the responsibility of marking candidates script. As observed by Meadows & Billington (2007), any attempt to use measures of attitude in selection of examiner with knowledge of malpractice would be flawed since applicants would "fake good". Moreover, examiners attitude towards detection cases of malpractice during marking predicted marking reliability. Two public examiners interviewee cited in Powell-Howard (2009) agreed with Meadows & Billington (2007) as they testified in an interview segment on a study carried out on Junior Secondary Certificate (JSC) Mathematics examination marking; when asked of their feelings about public examinations, they responded that they were more lenient in public examinations marking (overlooked indicators of malpractice) than school examinations. Thus, National Examination and Assessment Bodies require dependable markers/examiners to achieve this feat of detecting malpractice cases during marking exercise.

Based on aforementioned, the researchers have decided to embark on constructing and validating measurement instrument on examiners' attitude towards knowledge of malpractice indicators in the external examination with respect to West African Examinations Council (WAEC). More importantly, in sub-Sahara Africa such as Nigeria, where examination malpractice is almost going scientific. It would require examiners' who are very knowledgeable in the act of examination malpractice to deliver valid judgment. This fact had not been sufficiently considered in deciding who is qualified to mark candidates' scripts perhaps because available empirical evidence to support this position is scarce.

Research questions and purpose

The main purpose of this study was to construct and validate measurement instrument using apt and modern statistical tools with the right technique

during validation process. More so, the following research questions were advanced. These include: (i) how many dimensions underlie Examiners' Attitude Towards Knowledge of Malpractice Indicators Scale (EAKMIS); (ii) are the fit indices explaining the model of EAKMIS; and how reliable are the subscales of EAKMIS.

Significance of the study

It was a known fact that examiners were inevitable tools used by public examining bodies during marking process and also in detecting and reporting cases of examination malpractice to appropriate quarters for further action. The scale will enable public examining bodies to understand well, the need to only use examiners with positive attitude towards marking and who could properly identify cases of malpractice while marking candidate's scripts. Putting it properly, examiners can leverage on their knowledge of examination malpractice indicators to assist in eradicating or curbing the menace.

Methodology

Data source, participants, and measures

Scale development research type of single subject design was used. The population for the study consisted of examiners marking in the West African Examinations Council (WAEC) Examination in the South-West States, Nigeria. The Sampling technique was carried out in two phases and two sets of samples were obtained. In each phase, multi-stage sampling procedures was used. First, south-west has six (6) States; four States (4) were selected through simple random sampling namely; Oyo, Ogun, Osun and Ondo States respectively. Next, selection of the marking centres were drawn randomly, in which four (4) centres were selected from each State making sixteen (16) centres in all for the sample. In each centre, purposive sampling technique was used to select sixty (60) examiners in the field of Mathematics from each of the centre for equal representation, bringing the total number of examiners that participated in the study to

nine hundred and sixty examiners (960). In phase one (N1), initial item pool of EAKMIS was administered while in phase two (N2), the extracted items were re- administered to a larger population. Consequently, sample with N1 = 345 was used to conduct the principal component analysis (PCA) and exploratory factor analysis (EFA) while sample with N2 = 615 was used to validate sample for the confirmatory factor analysis (CFA). Among the 960 sampled participants for the two phases, 649 (67.6%) were men and 311 (32.4%) were women.

The researchers constructed the instrument used, called Examiner's Attitude towards Knowledge of Malpractice Indicators Scale (EAKMIS). The scale consisted of drafted twenty-seven (27) items and after reviewed by the experts in scale development, with content validity index (CVI) of 0.85, the scale was reduced to twenty (20) items with 4-point Lkert scale where, 4= Strongly agree, 3= agree, 2= Disagree, strongly disagree = 1. Scores on negative items were reversed before the analysis. Also, data missingness was verified using expectation maximization (EM) method of single imputation technique with Little's missing completely at random (MCAR) test with; Chi-Square = 2305.23, Sig. = 0.00. Since the p-value was significant, this suggested that the missing is ignorable and percentage of missingness was not exceed 5%. Data obtained were analysed using principal Component Analysis (PCA), Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) and Ordinal Alpha.

Statistical data analysis

Data analysis was performed to determine the reliability and structural validity of EAKMIS. Principal Component Analysis (PCA), Exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and Ordinal alpha reliability were performed to ascertain the structural validity of the scale. SPSS version 23 was used for EFA in order to see interaction between the scale items and their dimensions. The independent model Chi-square analysis was conducted using maximum likelihood estimates which depicts that variables contained in the

study were correlated and fit for further analysis. Principal component analysis extraction method with orthogonal rotation were used to establish components structure of the scale, and scree plot analysis was further conducted to verify actual number of scale dimensions. Analysis of Moment Structure (AMOS) version 2.3.0 package program was used to establish confirmatory factor analysis (CFA), and substantiate the appropriateness of the model that was built in the exploratory factor analysis (EFA). However, in order to assess the stability of this model, values of chi-square ($\chi 2 \geq 1$), Probability level ($p \geq 0.05$), degree of freedom ($df \geq 1$), Tucker-Lewis index ($TLI \geq 0.95$), adjusted goodness of fit index ($AGFI \approx 1$), goodness of fit index ($GFI < 0.95$), Normed fit index ($NFI \geq 0.95$), incremental fit index ($IFI \geq 0.90$) comparative fit index ($CFI \geq 0.90$), Root mean square residual ($SRMR \leq 0.08$) and root-mean-square error of approximation ($RMSEA \leq 0.06$) were determined (Kline, 2005). Consequently, eleven (11) items conclusively formed EAKMIS. Furthermore, internal consistency of the scale and subscales were established using ordinal alpha reliability coefficient.

Results and discussion

How many dimensions embedded in the Examiners Attitude towards Knowledge of Malpractice Indicators scale (EAKMIS)?

To answer this question, exploratory factor analysis was carried out on the examiners' responses to attitudinal scale of malpractice indicators in order to determine how valid the items are and items less than 0.32 were removed totaling the number of items used in this study to be eleven (11) out of twenty (20). Adequacy of the data input was confirmed by means of Bartlett's sphericity test which showed that the result of the independence model chi-square test statistic was statistically significant ($\chi 2 = 4528.187$, $df = 55$, $p < 0.05$) and the Kaiser-Meyer-Olkin (KMO) index was 0.879 respectively. This depicts that items in the study are correlated and the source data perfectly fits the number of

factors specified. Also, from total variance explained three eigenvalues were greater than 1 which depicts that items of the scale were gathered under three components. The three components are mutually explained 82.45% of the variance with factor 1 contributing 59.79%, factor 2 contributing 12.88% and factor 3 contributing 9.78%. In the same vein, scree plot was also employed to further confirm the number of components structure embedded in the scale. Thus, the eigenvalues from exploratory factor analysis (EFA) are shown below. Table 1 and Fig. 1 present the total variance explained and scree plot analysis of the items.

Table 1. Total variance explained of the scale items

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.577	59.792	59.792	6.577	59.792	59.792	5.648
2	1.417	12.880	72.672	1.417	12.880	72.672	5.032
3	1.076	9.779	82.451	1.076	9.779	82.451	3.945
4	.514	4.670	87.121				
5	.338	3.071	90.192				
6	.329	2.994	93.186				
7	.206	1.877	95.063				
8	.173	1.568	96.632				
9	.138	1.250	97.882				
10	.129	1.173	99.055				
11	.104	.945	100.000				

*Extraction Method: Principal Component Analysis.

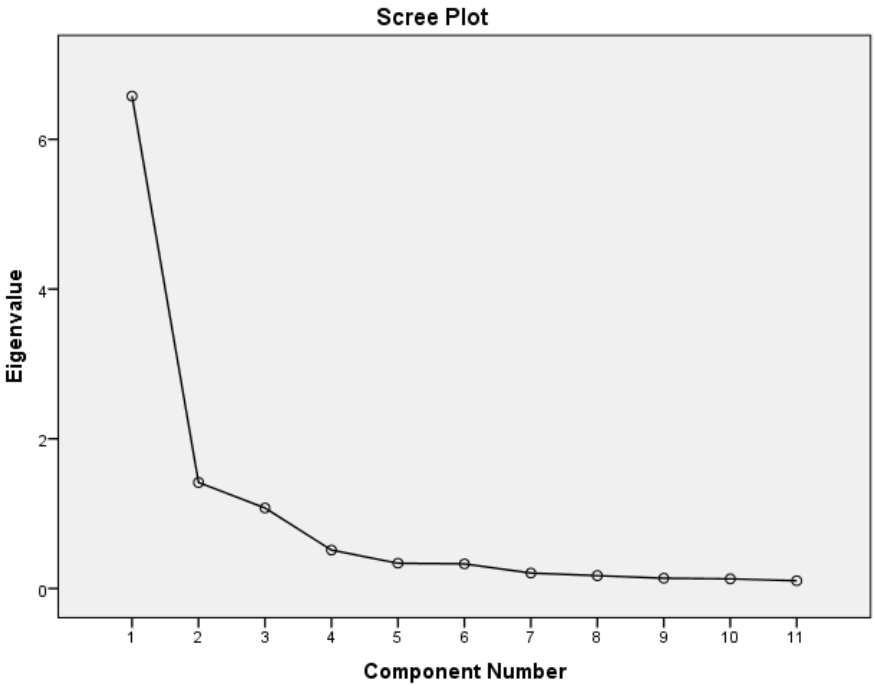


Figure 1. Scree plot analysis of the scale items

More importantly, factor structure of the scale was assessed using principal component analysis method of extraction procedure and oblique method of promax rotation respectively. Promax oblique rotation was used, because prior analysis indicated that the dimensions of examiners' attitude towards knowledge of malpractice indicators are correlated and items loading less than 0.32 were suppressed. These items were removed from the scale. Table 2 presents how remaining items of the scale were loaded under each component.

Thus, the results of exploratory factor analysis and scree plot analysis for structural validity shows evident of three dimensions embedded in the scale. About 82.45% of the total variance accounted for the observed three-factors. This implies that the scale is multidimensional in nature.

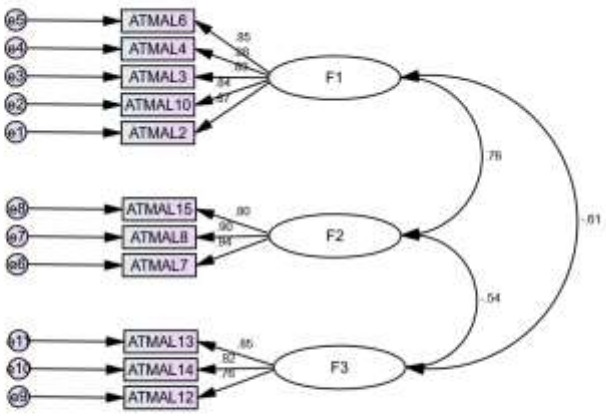
Table 2. Items loading under each component

Items	Component			Commu-nality
	1	2	3	
If better incentive is promised I will be reporting cases of exam malpractice henceforth	1.040			0.880
Poor incentive giving for reporting cases of examination malpractice discourages me	0.968			0.894
I don't involve myself in reporting cases of examination malpractice because it waste examiners' time	0.760			0.823
I don't involve myself in reporting cases of examination malpractice because it waste examiners' time	0.703			0.755
I overlook cases of examination malpractice to allow smooth marking	0.650			0.833
I will continue to persuade my fellow examiners to be reporting cases of exam malpractice		0.998		0.817
Even if no incentive is giving for reporting cases of exam malpractices, I will still continue to report		0.875		0.861
I will be a corrupt examiner if I fail to report cases of exam malpractice		0.866		0.884
I believe that if I overlook cases of exam malpractice while marking, god also will overlook my mistakes.			0.897	0.812
Students are in need of results; I think I need to overlook cases of malpractice I come across while marking			0.864	0.784
The time giving for marking is always short, I cannot add investigation of exam malpractice to my burden			0.807	0.727
Eigenvalue	**6.577**	**1.417**	**1.076**	**9.780**
%Variance	**59.792**	**12.880**	**9.779**	**82.451**

*****Extraction Method: Principal Component Analysis.
*Rotation Method: Promax with Kaiser Normalization.

Are the fit indices explaining the model of EAKMIS

Confirmatory factor analysis (CFA) implemented in AMOS was used to confirm test result obtained from EFA. Figure 2 presents the outline factor distributions and loading values for the CFA

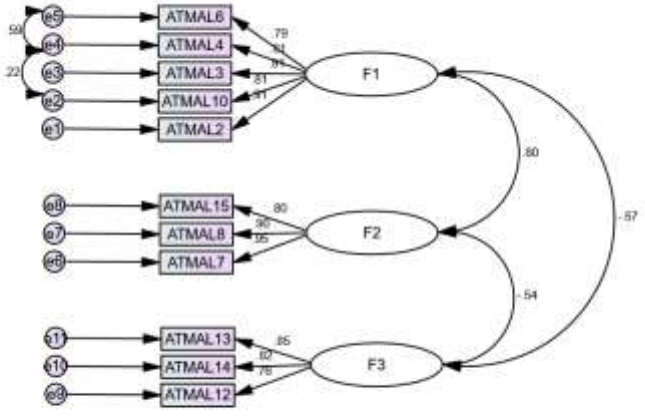


Chi-square = 641.559, p-value = 0.000, RMSEA = 0.061

Figure 2. Factor distribution and CFA values

It was observed from Fig. 2 that correlation coefficient values between the components and related items varied between 0.76 and 0.94. The covariance between the first factor and the second factor was 0.76, covariance between the first factor and the third factor was -0.61 and the covariance between the second factor and the third factor was -0.54. These values show that the items in the scale are appropriate to represent the proposed structure. In addition, the chi-square, degree of freedom and compliance index values of this model were calculated as follows: $\chi 2 = 641.559$, $p = 0.000$, RMSEA = 0.061, GFI = 0.89, AGFI =0.86, NFI = 0.89, CFI = 0.88 and IFI= 0.87. However, critical examination of index values obtained from the above model (figure IV), it can be remarked that the proposed model is not in agreement with the observed data. More importantly, modification indices need to be assessed to know which of the items with error of variance had outlier values so as to suppress them from the model.

Therefore, this was done to some of the items in order to take into account the level of relationship between item errors and the proposed model. The relationship between items 4 to 6, and 4 to 10 were released. After these corrections, the model in Fig. 3 was obtained as follows.



Chi-square = 457.542, p-value = 0.010, RMSEA = 0.037

Figure 3. CFA values after items modification

Fig. 3 depicts that model obtained after items modification was consistent with the observed data. Consequently, the final compliance index values obtained were as follows: $\chi 2 = 457.542$, $p = 0.001$, RMSEA = 0.037, GFI = 0.960, AGFI = 0.962, NFI = 0.908, CFI = 0.917 and IFI= 0.919. Also, when the covariance between the factors was considered, the first factor had 0.80 relationship with the second factor, the relationship between the first factor and the third factor was -0.57 and the relationship between the second factor and the third factor was -0.54. Concisely, confirmatory factor analysis was conducted

to test earlier result gotten from EFA, and the review of EFA and CFA analyses brought to the conclusion that the three factors scale is tenable and valid.

How reliable are the sub-scales of EAKMIS

Ordinal alpha reliability coefficient of scale (that is EAKMIS) was assessed using R- programming software, version 3.4.0. The Ordinal Alpha coefficient for the original scale was 0.791, and the first component of scale was 0.930, the second component was 0.914, and the third component was 0.850. This implies that the scale and sub-scales were very reliable.

Conclusion

Examiners are veritable tools used by public examining bodies such as WAEC to mark examinees work scripts. Their attitude towards knowledge of malpractice indicators should be considered serious as is very imperative to examinees and the integrity of the awarded certificate by the examining bodies. However, having taking disposition towards knowledge of malpractice indicators with levity hand, can really affect the certificate awarded by the body. Therefore, it was recommended that all hands must be on deck to enroll examiners in different training and re-training so as to put more interest and have grasp knowledge of the job. Also, if there are no formal ways of detecting malpractice cases, certificate awarded by the examining bodies such as WAEC will have to be questionable though students want certificate without dint of hard-working.

Limitations of the study

Like other studies, this study also has its own limitations. One of the limitations of this study was lack of resources to cover the remaining five geo-political zones in country. Even though the results from the selected geo-political zone might have suggested a trend of attitude of public examining examiners towards detection of malpractice cases during marking in other zones.

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