

Original Research Article

Statistical Analysis of Misfiling Causes in Higher Education: A Test Construction

ABSTRACT

Introduction: Misfiling remains a substantial challenge in data management in various institutions of higher learning. It has been asserted that one in every ten documents or files stored becomes immediately lost forever, due to inadequate filing techniques and practices. The results of this canker primarily are a high-profile failure in accountability and a retrogression in the development of the institution. There is paucity in scales developed for measuring misfiling. This study developed a scale called the data misfiling assessment scale (DMAS) to measure the various factors responsible for misfiling in institutions of higher learning and assessed them in terms of other relevant variables.

Methodology: A questionnaire was designed and administered in a cross-sectional study conducted among all administrative assistants who were tasked with the utmost responsibility for filing in the offices of the University of Health and Allied Sciences (UHAS), Ho in the Volta Region of Ghana. The various components of the causes of the misfiling scale were found using factor analysis and were confirmed with confirmatory factor analysis.

Results: The study revealed a highly reliable scale (Cronbach's alpha of 0.85) of thirteen misfiling items sub-classified into four factors of misfiling namely; internal factors of misfiling, misfiling due to methods and tools, external factors of misfiling, and other factors of misfiling, with Cronbach's alpha of 0.85, 0.77, 0.62, and 0.60, respectively. The four-factor structure of the DMAS was confirmed with CFA. A strong positive relationship was observed between internal and external factors of misfiling (p -value = 0.015) and between internal and other factors of misfiling (p -value = 0.032). External factors of misfiling also strongly correlated positively with other factors of misfiling (p -value = 0.025). Per the scale, participants who have file references in their offices were less likely to face other factors of misfiling (p -value = 0.008). Also, those working in offices with filing policies were less likely to experience internal and external factors of misfiling.

Conclusion: With the help of this scale, factors responsible for misfiling and by extension, challenges with data management can be investigated and appropriate actions are taken for accurate data management in institutions of higher learning.

Keywords: Misfiling causes, Confirmatory factor modelling, Cronbach alpha, Scales Reliability and Validity.

1. INTRODUCTION

Higher education institutions vis-a-vis the colleges of education and the universities have remained centers for data generation and by extension record keeping and management (Attiah *et al.*, 2017; Nwankwo, 1985). Indeed, proper management of an institution largely depends on the personnel manning the institution as well as proper keeping of records. Considering the increasing complexity of

programmes of our higher education institutions, it has concomitantly become important to correctly keep records for purposes of the longevity of quality data and easy retrieval to third parties when required. One of the significant components of proper and effective record management is filing. While Leffingwell (1917) referred to the practice as a means of preserving the records of business transactions comprising processes of arranging and sorting original records or copies of them that they can be readily located when required, Quible (1984) defined it as one of the activities in records management programme, which involves systematically classifying, coding, arranging and placing records in storage (My MBA Guide, 2021). The act of filing records for future utility is not restricted to only institutions of higher learning. The practice spans all public and private sectors such as the government institutions, security agencies, judiciary, health facilities, financial sectors, etc. In the absence of proper filing of records, the most challenging drawback of misfiling ensues.

The managerial shortfalls imposed on organizations development due to cases of misfiling can be undoubtedly damning so much so that misfiling of even one important letter may cause serious inconvenience to an executive, financial loss to a business, and considerable embarrassment to the person who misfiled the letter. For instance, loss of information due to misfiling possess the propensity to plunge the institution into serious legal cases that could have been used in the defense of the institution in the event of a legal battle in a competent court of jurisdiction. One in every ten documents or files stored becomes immediately lost forever, due to inadequate filing techniques and practices (Obeng –Amoako, 2016). This must be a wake-up call to every university and college of education considering the significant retrogressive effect the loss of one key information might pose to these institutions. In the institutions of higher learning, for example, the misfiling of books or other relevant documents in the libraries hinders easy access to the needed study materials by students, lecturers and researchers. At the administrative level such as the departmental level and the university management level, misfiling can cause serious delays in acquiring accreditations for programmes run by the institution, loss of valuable student's or staff records and critical administrative records containing key policy documents for the running of the institution. In the area of health, misfiling has been shown to affect clients and facilities negatively (Teviu *et al.*, 2012).

Indeed, misfiling has been reported to hamper doctors' services towards patients as no appropriate information of patient's previous illnesses is available and hence affecting medical record data continuity in the hospital (Swari *et al.*, 2021). There is therefore the need to periodically investigate the root cause of misfiling in our educational institutions to bring to bear the lapses and loopholes that fuels such shortfalls as misfiling of documents to aid improve upon the institution's record management systems. As a human institution, it is a fact that accuracy in the filing of documents may not always be absolute. Therefore, there is a need to put in measures and strategies to aid reduce factors that fuel misfiling to the barest minimum. As important as cases of misfiling are to various levels of management in educational institutions, there exist a paucity of studies concerned with misfiling as well as test construction in this area. This study sought to develop a scale (see Appendix A) to measure the various factors responsible for misfiling in institutions of higher learning and assess them in terms of other relevant variables.

1.1 Research Questions

Understanding the factor structure of causes of misfiling in higher education is very important. This study aims to develop a scale to measure causes of misfiling in the education of higher learning and to assess differences in the latent factors of misfiling in higher education by other variables. The scale developed should contribute to other studies in the field of filing. To achieve these research objectives, the following research questions need to be answered:

1. What is the factor structure of the data misfiling assessment scale (DMAS)?
2. What is the validity and reliability of the data misfiling assessment scale (DMAS)?
3. Do the latent factors of the data misfiling assessment scale (DMAS) vary with variables: age, gender, file reference, category of staff, filing policy and number of cabinets?

2. Material and Methods

2.1 Study Site and Design

A cross-sectional study was conducted among administrative assistants who undertake to file at the University of Health and Allied Sciences (UHAS) in the Volta Region of Ghana. The University was established by an Act of Parliament (Act 828 in December 2011) with the vision of becoming pre-eminent research and practically oriented health educational institution dedicated to community service. The institution practices a multi-campus system with the main campus including the Central Administration located in Ho and the second campus in Hohoe both in the Volta Region of Ghana. The University started operations in September 2012 with 154 students. The students' population currently stands at 3,752 comprising 3,727 undergraduates and 25 postgraduates with a staff strength of 611 and a student-staff ratio of 17:1. UHAS is the first public university to be established in the Volta Region of Ghana and is so far the only state University wholly dedicated to the training of healthcare professionals in Ghana. Currently, the University runs eighteen (18) undergraduate programmes in seven (7) schools and one (1) institute, namely, School of Allied Health Sciences, School of Basic and Biomedical Sciences, School of Medicine, School of Nursing and Midwifery, School of Public Health, School of Pharmacy, School of Sports and Exercise Medicine and Institute of Health Research. Others yet to be established include the School of Dentistry, Institute of Medical Education and Institute of Traditional and Alternate Medicine (University of Health and Allied Sciences, 2021).

2.2 Data Collection

This study recruited 50 Administrative Assistants to the rank of Chief Administrative Assistants who are taxed with the utmost responsibility for filing in the various relevant offices of the University. The needed permissions for data collection were obtained from the participants in the form of informed consent, after which the study's objectives, as well as data collection procedures, were well explained to the participants. A structured self-designed and easy to comprehend questionnaire was employed to collect required data on misfiling in the University from the study population. Data gathered included respondent's demographic details, administrative information and other relevant information required to unravel causes of misfiling in the University.

2.3 Statistical Data Analysis

The sampling adequacy was assessed with a Kaiser-Meyer-Olkin (KMO) coefficient being greater than 0.6, whilst the appropriateness of the correlation matrix of the data was determined with a significant Bartlett's test (Al-Mughamis *et al.*, 2020). Factor analysis with principal component analysis for extraction and varimax rotation was used to find the various components of the causes of misfiling. With the help of the amount of variance explained and the criterion by Kaiser-Guttman, the principal components with eigenvalues greater than one (1) were returned. Confirmatory factor analysis (CFA) was used to confirm the various factors and model the relationship between them using maximum likelihood estimation due to its ability to handle small samples (Adedia *et al.*, 2020; 2021). Fit indices such as comparative fit index (CFI), Tucker-Lewis Index (TLI), root mean square error of approximation (RMSEA), root mean residual (RMR), incremental fit index (IFI), and relative non-centrality index (RNI) as well as the likelihood ratio test statistic were used to assess the CFA model (Adedia *et al.*, 2020). All fit indices except the likelihood ratio test statistic assumed values between zero (0) and one (1). The RMSEA and RMR referred to as badness of fit indices, assumed acceptable values of less than 0.08, since the smaller their values the better the model. The CFA, TLI, IFI and RNI values of 0.95 and above show that the model is good. Non-parametric hypothesis testing via Mann-Whitney rank sum and Kruskal Wallis tests were performed to compare groups and various components of causes of misfiling.

3. Results

3.1 Factor analysis of components of misfiling

The KMO test reported a coefficient value of 0.753 with a significant Bartlett's test results (283.997, p -value < 0.001), implying adequacy of sample size and acceptable correlation matrix for the analysis, respectively. All items of misfiling have good reliability by reporting a Cronbach's alpha of 0.85. The first four factors with eigenvalues 4.703, 2.281, 1.272, and 1.066, accounting for approximately 72% of the total variance in the data were maintained. Table 1 presents detailed results of the factor analysis.

Table 1: Principal component analysis of factors of misfiling

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.703	36.175	36.175	4.703	36.175	36.175	3.398	26.142	26.142
2	2.281	17.543	53.718	2.281	17.543	53.718	2.442	18.785	44.927
3	1.272	9.788	63.505	1.272	9.788	63.505	1.773	13.636	58.563
4	1.066	8.197	71.703	1.066	8.197	71.703	1.708	13.140	71.703
5	.842	6.481	78.183						
6	.556	4.273	82.457						
7	.531	4.085	86.542						
8	.444	3.419	89.961						
9	.361	2.776	92.737						
10	.326	2.507	95.245						
11	.267	2.056	97.300						
12	.195	1.503	98.803						
13	.156	1.197	100.000						

Four misfiling components as shown in Table 2 were identified, namely, internal factors of misfiling (1), misfiling due to methods and tools (2), external factors of misfiling (3) and other factors of misfiling (4). The internal factors of misfiling comprised of items related to internal causes of misfiling. Five items were loaded on the first component, and these are lack of concentration from administrative staff, inadequate training on filing techniques, an improper delegation of filing to national service/attachment personnel, lack of supervision, and internal environmental factors. The second component included four items linked to methods and tools for filing. The four items loaded on this second component are not fit-for-purpose filing cabinet, methods of filing used, types of folders used, and type of treasury tag used. The remaining two components had relatively few items loading on them. The third component named “external factors of misfiling”, included items such as institutional policy and external environmental factors. The last component was labelled as “other factors of misfiling”, and it was linked to inadequate filing space and high workload on staff. The reliability of the items related to internal factors of misfiling, misfiling due to methods and tools, external factors of misfiling and other factors of misfiling were satisfactory with Cronbach’s alpha of 0.85, 0.77, 0.62 and 0.60, respectively.

Table 2: Components of causes of misfiling identified

Items	Components			
	1	2	3	4
Internal factors of misfiling				
Lack of concentration from administrative staff	0.566			
Inadequate training on filing	0.824			
Improper delegation of filing to national service/attachment personnel	0.697			
Lack of supervision	0.839			
Internal environmental factors	0.775			
Misfiling due to methods and tools				

Not fit-for-purpose filing cabinet		0.705		
Methods of filing used		0.582		
Types of folders used		0.742		
Type of treasury tag used		0.867		
External factors of misfiling				
Institutional policy			0.793	
External environmental factors			0.695	
Other factors of misfiling				
Inadequate filing space				0.785
High workload on staff				0.619

3.2 Confirmatory factor modelling of causes of misfiling

The fit indices from the CFA results (Table 3) show that the confirmatory factor model fitted well to the data. The CFI, TLI, IFI and RNI values are more than 0.95 with RMSEA and RMR values less than 0.08 and a non-significant likelihood ratio test (p -value = 0.344), which are required. This implies that the four (4) factors derived by the factor analysis were confirmed by the CFA. The causes of misfiling items significantly measured their respective latent variables. The *internal factors of misfiling* were significantly measured by lack of concentration from administrative staff, inadequate training on filing, an improper delegation of filing to national service/attachment personnel, lack of supervision and internal environmental factors. Moreover, lack of supervision contributed the most to internal factors of misfiling and was followed by inadequate training on filing whilst lack of concentration from administrative staff contributed the least. *Misfiling due to methods and tools* of filing was significantly determined by methods of filing used, types of folders used, type of treasury tag used and not a fit-for-purpose filing cabinet. Type of treasury tag used contributed the most, followed by types of folders used, whilst methods of filing used contributed the least to misfiling due to methods and tools of filing. *External factors of misfiling* were also measured significantly by external environmental factors and institutional policy. External environmental factors contributed the highest to external factors of misfiling, followed by institutional policy and not fit-for-purpose filing cabinet which cross-loaded. Lastly, *other factors of misfiling* were significantly measured by the high workload on staff before inadequate filing space. The scales developed have acceptable Chronbach alpha as well as alpha and omega values with minimum alpha and omega values of 0.60 and 0.66, respectively, reported by other factors of misfiling. The construct validity of the developed scales was assessed using discriminant and convergent validities. The scales have a good discriminant validity since the correlations between the constructs are less than 0.85. Also, the factor loadings of the items are 0.50 or above except for the item “not fit for a purpose filing cabinet”, which cross loaded on two factors. This confirms the convergent validity of the scales.

Table 3: Fit indices for confirmatory factor modelling

Test statistic (p -value)	CFI	TLI	IFI	RNI	RMSEA (p -value)	RMR
56.551 (0.344)	0.985	0.979	0.987	0.985	0.037 (0.582)	0.076

The results of confirmatory factor modelling of causes of misfiling are further provided in Figure 1. Internal factors of misfiling showed a strong positive relationship with external factors (p -value = 0.015) and other factors of misfiling (p -value = 0.032), whilst others did not report any significant relationships, except external factors and other factors of misfiling (p -value = 0.025).

Full-time staff	28.61	0.089	28.14	0.148	24.50	0.584	26.11	0.740
National								
Service								
Personnel/Inter	21.55		22.14		26.77		24.73	
n/								
Attachment								
File Reference								
Yes	25.40	0.900	25.51	1.000	25.60	0.900	23.76	0.008
No	26.40		25.40		24.60		41.20	
Filing Policy								
Yes	20.81	0.004	25.19	0.849	21.23	0.008	25.71	0.897
No	33.16		26.00		32.47		25.16	
Number of cabinets								
1-3	23.21 ^{ac}	0.036	23.68	0.372	24.82	0.704	26.64	0.399
4-7	34.23 ^b		30.38		28.31		27.15	
8 & above	20.00 ^{ac}		24.11		23.56		19.56	

MR-Mean Rank.

4. Discussion

Record keeping which is primarily achieved by proper filing systems occupies a core and strategic position in the efficient and effective management of institutions of higher learning anywhere in the world. An unforeseen break in the accurate record-keeping system possesses the propensity to plunge the administrative root of the institution into a state of chaos that may be difficult to recover from. Misfiling remains a substantial challenge in data management in most formal sectors. In our colleges of education and universities, a quantum of work is almost always required to ensure accurate data or record-keeping for which reason knowledge on potential circumstances leading to or resulting in misfiling is important to aid abate or bring cases of misfiling to the barest minimum if not eliminate. Owing to the paucity of existing data on the subject matter, comparative analysis with other similar studies was highly hampered. Therefore, this study may serve as baseline data for both further studies and guidance to record-keeping and data management in our institutions of higher learning.

This study subjected various potential factors of misfiling to vigorous statistical scrutiny to develop a data misfiling assessment scale (DMAS) (see Appendix A) that could be employed to assess factors of misfiling in institutions of higher learning. Reliability and construct validity of the scales were assessed using the reliability measures as well as convergent and discriminant validity measures (Mustapha, 2018). The analytical outcome revealed a highly reliable scale (Cronbach's alpha of 0.85) (Akay & Toraman, 2015) of thirteen misfiling items classified into four factors of misfiling, namely: (1) internal factors of misfiling which comprised factors largely emanating from internal or administrative sources, (2) misfiling due to methods and tools defined by equipment availability and systems or approaches of filing employed by the institution, (3) external factors of misfiling referred to as influences stemming from general institutional and environmental sources and (4) other factors of misfiling due to managerial shortcomings of the institution. These categories of misfiling support the assertion by Swari *et al.*, (2021) that factors that cause misfiling can be identified from several aspects, including officers, material, funds, methods, and tools. This four-factor structure of the DMAS was confirmed with a CFI, TLI, RMSEA, RMR, IFI and RNI goodness of fit indices of 0.985, 0.979, 0.037, 0.076, 0.987 and 0.985, respectively.

We observed significant relationships between internal, external, and other factors of misfiling. This infers that the more external and other factors of misfiling an institution is confronted with, the more the institution suffers internal factors of misfiling and vice versa. Nonetheless, more external factors of misfiling result in other factors of misfiling and vice versa. For purposes of easy comprehensibility, this

finding suggests that except for misfiling due to the methods and tools factor of misfiling, the presence of one factor is a risk factor for the other.

As clearly outlined in the results in Table 2, the findings present significant information not only on factors of misfiling but also to a large extent on record keeping and data management in the universities in general. This is particularly so per the findings of a related study by Mohammed *et al.* (2018) in Sunyani Technical University, which found that inadequate professionally trained records managers, inadequate resources to facilitate proper records management practices in the institution, insufficient space for records management, inadequate computer terminals, lack of record-keeping policy, among other factors were challenges associated with record management in the institution. In the University for Development Studies (UDS), some responses given to the question of adherence to prescribed regulations of public record management included: (1) there are no laid down procedures on how records should be kept, (2) the university has no records management policy to guide and protect the use of records and (3) records are still kept in only hard copies and managed by staff who have no adequate knowledge on proper records keeping which eventually leads to loss of most valuable information (Attiah *et al.*, 2017). Comparatively, it can be inferred that the above observations are measured or explained by the various factors of misfiling as observed in this study even though the findings of these studies were not specific to misfiling as a single challenge to data management. For instance, inadequate professionally trained records managers as observed in the Sunyani Technical University parallels inadequate training on filing under internal causes of misfiling observed in this study whereas the absence of laid down procedures on how records should be kept in the case of UDS could be an issue of institutional policy under external factors of misfiling. This scale may therefore be assessed in further studies to determine its ability to assess or investigate other challenges of record-keeping and data management in the universities. This study showed that gender, age and category of staff did not have any effects on any of the four factors of misfiling. Those who have file references in their offices were less likely to face other factors of misfiling (p -value =0.008). The people working in offices with filing policies are less likely to experience internal and external factors of misfiling.

5. Conclusion

The scale developed have acceptable Chronbach alpha as well as alpha and omega values, implying reliability of the scale and can be used for misfiling studies. The reliability of the items related to internal factors of misfiling, misfiling due to methods and tools, external factors of misfiling and other factors of misfiling were satisfactory with Cronbach's alpha values of 0.85, 0.77, 0.62 and 0.60, respectively. The results of the confirmatory factor modelling showed that the data misfiling assessment scale has construct validity. With the help of this scale, factors responsible for misfiling and by extension, challenges with data management can be investigated and appropriate actions are taken for accurate data management in our institutions of higher learning. The dataset used for this study was collected from one University of higher learning, which is a limitation of the study. Hence, further research work could be conducted using the data misfiling assessment scale (DMAS) with data from multi-centers. Also, using the DMAS (see Appendix A) in further studies will improve the properties of the scale.

Declarations

Data Availability

The dataset is available on request.

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Appendix A: Data misfiling assessment scale (DMAS)

		Strongly disagree	Disagree	Agree	Strongly agree
1	Lack of concentration from administrative staff				
2	Inadequate training on filing				
3	Improper delegation of filing to national service/ attachment personnel				
4	High workload on staff				
5	Lack of supervision				
6	Internal environmental factors				
7	External environmental factors				
8	Not fit for purpose filing cabinet				
9	Inadequate filing space				
10	Methods of filing used				
11	Types of folders used				
12	Type of treasury tag used				
13	Institutional policy				