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Moderating Influence of Personal Attributes on the Relationship between Institutional Factors and Use of Student Management Information System in Teacher Education Programme by Distance Learning in Selected Universities in Kenya

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ABSTRACT

Student management information systems (SMIS) are used in educational institutions to enhance efficiency, effectiveness, and quality by providing easy access to students' biodata, administrative and academic information. About 80 per cent of Universities in Kenya offering teacher education programmes by distance learning still perform manual administrative tasks, with student records stored in filing cabinets, causing dust accumulation and difficulty in retrieval. Numerous studies have been conducted, but there is insufficient scientific research on the issues and challenges faced by distance learning students using SMIS. This study investigated the influence of personal attributes of learners on the use of student management information system in teacher education programme by distance learning. The indicators of personal attributes were identified as age, gender and level of education. Universities in Kenya are among the leading users of information systems that value high quality SMIS to support teacher education programme. The objective of this study was to determine the moderating influence of personal attributes on the use of SMIS in teacher education programme by distance learning in selected universities in Kenya. The study was based on Adaptive Structuration Theory, and cross-sectional survey design was used to guide the processes. Data was collected from 445 participants from selected Universities in Kenya that use SMIS in the management of teacher education programs by distance learning. A mixed approach for data collection was used that comprised structured questionnaires, interview guides and personal observation. For data analysis, Chi-square technique, Pearson correlation and regression analyses were used to test the relationships between the moderating and dependent variables. Research hypothesis was tested at α=0.05 level of significance and the null hypothesis (H_0) which stated that "There is no significant moderating influence of personal attributes on use of SMIS in teacher education programme by distance learning in selected Universities in Kenya" was rejected since p=0.000<0.05. The study concluded that personal attributes of learners have a significant moderating influence on the use of SMIS in teacher education programme by distance learning in selected Universities in Kenya. The finding will be useful to development planners and education policy makers by providing evidence-based information for interventions that promote ICT infrastructure in universities. The study recommended that all universities in Kenya should adopt SMIS to support their administrative and academic functions and that learners should be given continual training on the use of SMIS. The government should also fast track rural electrification and laying of high speed internet cables to support the use of SMIS.

KEYWORDS:

ICT, Institution personal attributes distance learning, SMIS, teacher education.

1. Introduction

Universities have been forced to automate their technology due to digitalization and customer demands for a one-stop shop. At the same time, an overwhelming amount of information systems have emerged, making it simpler to access information, which has increased production, efficiency, and reliability (Laudon & Laudon, 2009). Student Management Information System (SMIS) is a system that collects, stores, analyzes, and reports student-related data to enhance decision-making in higher education institutions. It manages personal data like birth, address, marital status, housing, and academic progress, including admission and registration processes. (Kavuta, & Nyamanga, 2018).

Students need to be provided with sufficient training on SMIS during registration-orientation week to assist them get off to the perfect start to university life and education. Wausi (2009) states that student management information system includes student's portal which contains students' biodata with all personal information. Consequently it deserves to be kept away from unauthorized users because the privacy and confidentiality of the student information must be assured at all times and only be used for intended purposes. SMIS is also explicitly designated and governed by a number of information communication technology policies (Ndede-Amadi, 2013). Students must comply with the set SMIS policies when using the system, its information content and information derived from its content. Students must also take the initiative to safeguard their password for accessing the system.

The goal of a student management information system is to deliver high-quality services to users. SMIS use has revolutionized processes across many industries, especially in processing student biodata in higher education institutions (Kirii, 2016). SMIS cannot be applied by simply importing and using it. Instead, it depends on a specific level of application because using the tools and software effectively requires a certain level of students' awareness, knowledge, and talents (Laudon & Laudon, 2010). The system uses a networked personal computer on a web-deployed portal, which makes the application easy to use. Students are also able to communicate with system administrators, view all information uploaded in the system such as timetables, results, provisional transcripts, fee statements and admissions information (Wausi, 2009). Students can access their records and other personal information through the use of SMIS from a computer and in any location as long as the computer has an internet connection (Laudon & Laudon, 2010).

Universities in Kenya adopted the use of SMIS to enhance, communicate and connect with staff, students on potential students and the institutional community. However, personal attributes such as age, gender, educational level, information technology competencies and personal attributes have brought about a digital divide and mixed feelings on the convenience and reliability on the use of SMIS in institutions. Teacher education programme by distance learning students' information technology (IT) competence as well as their personal attributes should be seen as critical factors in the educational sector (Buabeng-Andoh, 2012; Danner, & Pessu, 2013).

The use of SMIS in universities has been on the increase over the years, its use summarizes elements like the software and hardware made available. Rieber (2005) noted and observed that in many developing countries like Kenya, educators often give accounts for the systems available in their institutions, but the extent to which they are actually used by the students and even the faculty remains uncertain. Hence, student perception of the use of SMIS and experience is based on computer usage and is determined by the level of acceptance in their skills and confidence on use of SMIS to accomplish tasks (Smith, 2001).

Overview of studies has shown that there are specific factors responsible for the gaps that exist between the expected and the actual level of students' computer competence (Saleh, 2008; Mc Cade, 2001). Amongst the factors are age, gender, computer anxiety, inadequate instructor's training and support. Students' computer competence does not just involve knowing how to use the computer but using the system as a mechanism for creating, processing, storing, problem solving and transfer of information and communication. In relation to students' SMIS/IT competence, studies have shown that the level of experience a user has with an information technology system will influence their perception of the level of effort they need and ease of using any information system in their respective institutions (Smith, 2001).

A student with prior experience of using IT system would perceive SMIS as being easy to use. In measuring students' ICT self-efficacy, student's prior experience with technology should be of importance. The role of education in creating differences based on some personal attributes has been the source of considerable controversy in higher learning institutions. Gender has been identified to be a strong predictor of attitudes and behavior in electronic information seeking and a major personal attribute that strongly influences information behavior (Ray & Chi, 2003).

Problem statement

A student management information system is built with data on a platform that defines the data attributes in a system to capture, store, access, and use and has links with other systems. The data consists of entities like family, background, schools attended, and courses studied. These links relate to assertions regarding the actions, processes, and activities that take place within a system. The term SMIS refers to a group of procedures, duties, and tasks for gathering, conserving, processing, and using student data for a specific goal or objective. The interaction and coordination of the operations, activities, and processes of the entity and data characteristics in a system are designed for the purpose of making decisions or reaching common goals (Magara, 2006).

In order to collect and retrieve student information more quickly and easily, as well as to oversee operations and administer student biodata, higher education institutions frequently adopt SMIS (Ndede-Amadi, 2013). The SMIS is an efficient and effective approach for students in universities and other educational institutions to manage their various workloads and assignments. The goal of the present generation of students is to improve personal lifestyles and the manual system is currently viewed as outmoded. Promoters of SMIS must completely commit to reaching all universities in Kenya. Therefore, the current research aimed at determining why SMIS was not being fully utilized by teacher education programme by distance learning, despite the expectation that those who did so reaped numerous benefits. As a result, this study concentrated on examining how personal attributes influenced use of SMIS in teacher education programme by distance learning in selected universities in Kenya.

Personal attributes and use of student management information system

There are certain elements that account for the discrepancies between students' expected and actual levels of computer proficiency that are related to personal attributes such as computer phobia, inadequate instructor preparation and assistance, and gender (Wambiri & Ndani, 2016). In order for students to be considered computer competent, they must be able to create, process, store, solve problems, transfer information, and communicate using computers. The amount of experience a user has with an information technology system will influence their opinion of the work they need to put in and the ease with which they may utilize any information system in their universities (Oinas-Kukkonen & Harjumaa, 2009).

Studies on computer proficiency in general have also shown that men generally exhibit higher levels of self-efficacy than women though these findings are not always conclusive (Stolk, & Martello, 2015). Thus, gender and other personal aspects of a learner are equally pertinent when evaluating students' skill on the use of SMIS. Chaka and Govender (2017) also revealed that students' perceptions toward the utility of computers in academic studies are significantly influenced by their course of study. Students in educational technology use computers more frequently for a larger range of purposes, and for more hours each week than students in teacher education programme by distance learning.

This study is based on the theoretical dimensions of Adaptive Structuration Theory (AST) of DeSanctis and Poole (1994) and Anthony Giddens (1984). According to Giddens (1984), users, particularly students adapt to the use of student management information system to meet their specific work needs, or they resist or do not use them at all. Generally, there has been lack of understanding of SMIS by teacher education programme by distance learning students and other users of the system (Giddens, 1984). Nevertheless, SMIS can be used in higher education institutions to combat human flaws like fraud, long queues, and excessive paperwork while saving time and money (DeSanctis & Poole, 1994).

It is believed that this theory allows an extended notion of agency beyond human beings, which enriches representation and understanding of the real settings that make SMIS a valuable system that interacts with users. Therefore, teacher education programme by distance learning and the use of student management information system is inseparable. In its effort to overcome the long-standing separation between the SMIS, learners and institutions, the theory considers users and SMIS as two faces of the same coin, two entities connected to one another in a circular way. The current study specifically addressed the use of SMIS and its relationship with the factor with the potential to influence its use. The adaptive saturation theory therefore provides a framework for understanding the influence of institutional factors and learners' personal attributes on the use of student management information system in the teacher education programme by distance learning in selected universities in Kenya.

Universities in Kenya invest greatly in SMIS to ensure that teacher education programme by distance learning use SMIS by making the system available and accessible but the actual impact of learner's personal attributes as a moderating factor in these efforts has not been clearly understood (Felman & March 1981). Therefore, this study was set out to uncover the moderating role of personal attributes in the use of student management information system in teacher education programme by distance learning in selected universities in Kenya.

Methodology

This study sought to determine the moderating influence of personal attributes of learners on the relationship between institutional factors and the use of student management information system in teacher education programme by distance learning in selected universities in Kenya. Cross-sectional survey research design was used to gather data from a sample of respondents in the selected universities in Kenya that use student management information system in teacher education programme by distance learning. The design allowed the researcher to establish whether learner's personal attributes had a significant moderating influence on institutional factors regarding the use of SMIS.

This approach has been employed in numerous studies such as those by Omito (2016) and Omallah, Maina & Wamalwa (2016). The target population comprised a total of 9,936 lecturers, system administrators, second and third year students drawn from three (3) purposively selected universities in Kenya that were certified by the Commission for University Education (CUE, 2018). They comprised the University of Nairobi which had a population of 4,697, Maseno University with a population of 3,399 and Mount Kenya University with a population of 1,840.

Purposive sampling procedure was engaged to select three (3) universities out of forty six (46). The three selected universities were fully chartered, with defined structures and legal mandate to operate in the Republic of Kenya. They also had high student populations, exhibited elaborate similarities of the teacher education programme under study and engaged in the use of SMIS.

The sample of the study comprised 445 respondents drawn from the target population of 9,936 respondents using the formula proposed by Saunders, Lewis and Thornhill (2003); Cooper and Emory (1995) and Sekaran (1992), namely:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= Sample size, N= Population size, e= Level of Precision at 95 per cent level of confidence (p = 0.05)

In order to achieve representative samples from the respondents, purposive and random sampling techniques were used. Purposive sampling was used to select second and third year students from the three universities because they were at an active stage of their studies where they were neither too new to the university systems and operations, nor were they too old and predisposed to taking matters for granted. Once this category of students were selected, random sampling was used to select respondents for the questionnaire tool while purposive sampling was used to select respondents for the interview guide and focus group discussions.

Analysis of findings

The study engaged descriptive and inferential statistical techniques to analyze the data collected. Research participants were asked to provide information about age to ascertain that information obtained from them represented views across all age groups. The findings of age category in terms of frequency and percentage are provided in Table 1.

Table 1: Distribution of respondents by Age

Age(years)	Frequency	Percentage	Minimum age	Maximum age	Mean	Standard deviation
19-25	80	18.2	**19**	**56**	**31.02**	**6.275**
26-35	150	33.9				
36-45	100	22.6				
46-50	42	9.5				
51+	30	6.7				

Unanswered	40	9.1
Total	**442**	**100**

Table 1 shows that 100 (22.6%) of the respondents were aged 36-45 years, whereas those aged 26-35 years were 150 (33.9%). In addition, less than 80 (18.2%) of the respondents were aged 19-25 years, 42 (9.5%) were aged 46-50 years, while 30 (1.9%) were aged 46-50 years. It can also be noted that 40 (9.1%) of those probed, did not respond to the question about age. Further, the youngest learner was 19 years old and the oldest 56 years old while the mean age was 31.02 years (M= 31, SD =6.275). The findings revealed that there was no age restriction in teacher education programme by distance learning.

When questioned further, during focus group discussions, it was discovered that the older respondents were enrolled in teacher education programme by distance learning in order to advance in their careers and retire with a better pension. Others wanted to put their teacher education programme experience to use or acquire a degree qualification.

Enquiries were also made concerning the gender of the respondents to establish this characteristic of the learners in the teacher education programme. The results are presented in Table 2.

Table 2: Distribution of respondents by gender (n=442)

Gender	Frequency (f)	Percent (%)
Male	195	44.1
Female	243	55.0
Non-response	4	0.9
Total	**442**	**100**

It was established that the majority of the respondents (243; 55%) were female learners, 195 (44.1%) were male learners while 4 (0.9%) did not respond. Thus, gender balance was in favour of the female learners in the distance learning programme.

The marital status of the study participants was also probed to establish this characteristic about the learners. The results are presented in Table 3.

Table 3: Distribution of respondents by marital status (n=442)

Marital status	Frequency (f)	Percentage (%)
Single	166	37.6
Married	261	59.0
Divorced	9	2.0

Widowed	3	.7
Total	439	99.3
Non-response	3	.7
Total	**442**	**100.0**

Table 3 shows that majority of respondents were married (261; 59%) while 166 (37.6%) were single. Another nine respondents (9; 2.0%) were divorced, three (3; 0.7%) were widowed while three (3; 0.7%) never responded to this question. Thus, the majority of learners registered in the teacher education programme by distance learning were married, practicing teachers. The results are consistent with findings reported by Krishan (2004) that marriage commitments take away study time from the majority of distance learners. During the focus group discussions the learners also reported that they lived with their families or relatives and attended classes daily during the residential session periods.

Analysis of moderating influence of personal attributes on the relationship between institutional factors and use of students management information system

Regression analysis was used to test the following hypothesis:

H_0: Personal attributes do not have a significant moderating influence on the relationship between institutional factors and use of SMIS.

H_1: Personal attributes have a significant moderating influence on the relationship between institutional factors and use of SMIS.

Stepwise multiple linear regression analysis model advanced by Baron and Kenny (1986) was adopted to investigate the relationship as follows:

$$\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 M + \beta_m X_1 M_{int.}$$

Where; $\hat{Y}$= Dependent variable (use of Students Management Information System)

β_0 = Constant of the equation

β_1 = Constant of the independent variable (Institutional factors)

β_2 = Constant of the Interaction term

$X_1 M_{int}$ = Interaction term between Institutional factors and students personal attributes.

If $p>0.5$, do not reject H_0 and if $p\leq 0.5$, reject H_0

According Baron & Kenny (1986) moderation is tested through 4 regression model steps namely: Model 1; estimating the relationship between the predictor and outcome, Model 2; Estimating the relationship between the predictor and the moderator, Model 3; Estimating the relationship between

the outcome and the moderator, and Model 4; estimating the relationship between the interaction of predictor and moderator on the outcome. The models should be statistically significant.

In the first step (Model 1) only institutional factors (predictor) and use of students management information system was included and in the second step institutional factors (predictor) and personal attributes (moderator) was included (Model 2). In the third step, use of students management information system (outcome) and personal attributes (moderator) was included (Model 3), and in Model 4, the interaction of institutional factors (predictor) and personal attributes (moderator) towards use of students management information system was determined. The results are shown in Table

Table 4: Regression output for moderation influence of personal attributes on the relationship between institutional factors and use of students management information system

Model Summary

Model	R	R^2	Adj.R^2	Std. error of estimate	R^2 Change	F-change	df 1	df 2
1	0.369	0.136	0.134	0.427	0.136	69.138	1,440	
2	0.355	0.126	0.124	0.828	0.010	0.237	1,440	
3	0.341	0.116	0.114	0.248	0.020	11.271	1.440	
4	0.401	0.161	0.155	0.422	0.025	25.113	3,.438	

ANOVA

	Sum of squares		Df	Mean square	F	Sig.
	Regression	12.595	1	12.595	69.138	0.000
	Residual	18.341	440	0.182		
	Total	30.936	441			
	Regression	43.604	1	43.604	63.575	0.000
	Residual	301.781	440	0.686		
	Total	345.585	441			
	Regression	3.555	1	3.555	57.867	0.000
	Residual	26.381	440	0.061		
	Total	30.936	441			
	Regression	14.936	3	4.979	28.025	0.000
	Residual	77.811	438	0.178		

	Total	**92.747**	**441**		
Model	**Unstandardized Coefficients**		**Standardized coefficients**	**T**	**Sig.**
	B	**Std. error**			
Constant	1.550	0.325		4.763	0.000
Institutional factors/DV	0.638	0.077	0.369	8.315	0.000
Constant	-1.102	0.631		-1.746	0.082
Institutional factors/ Personal attribute	1.187	0.149	0.355	7.973	0.000
Constant	3.582	0.054		71.819	0.000
Personal attribute/DV	0.101	0.013	0.341	7.607	0.000
Constant	1.448	0.326		4.450	0.000
Institutional factors	0.736	0.081	0.423	9.071	0.000
Personal attributes	0.083	0.024	0.160	3.421	0.001
Institutional factors × Personal attributes	0.921	0.322	0.532	2.858	0.004

The model summary shows a coefficient of determination of R^2=0.161 for Model 4 when the moderating influence of personal attributes is added to the relationship between institutional factors and use of students management information system. Model 1 without the moderating influence of personal attributes predicted up to 13.6 per cent of the variance in the use of SMIS whereas Model 4 with moderating influence of personal attributes term predicted up to 16.1 per cent. The R^2 change in Model 4 is 0.025 showing an additional effect of 2.5 per cent to the model. The adjusted R-square indicated that the model with the moderating effect of personal attributes as a new term improves the model fit more than expected by chance alone implying that it was actually a better model in terms of goodness-of-fit for the regression model.

From the ANOVA Table, Model 1, F (1, 440) = 69.138; Model 2, F (1, 440) = 63.575; Model 3, F (1, 440) = 57.867 and Model 4, F (3, 438) = 28.025. All the models were statistically significant, with,

p=0.000< 0.05, indicating that the models significantly improve the ability to predict the outcome variable, use of students management information system.

Thus, the null hypothesis was rejected and the alternative accepted that personal attributes have a significant moderating influence on the use of student management information system. The regression equation for the relationship can be expressed as:

$$\hat{Y} = 1.448 + 0.736X_1 + 0.083M + 0.921X_1M_{int.}$$

Summary of the findings and Discussion

The objective of the study was to determine the moderating influence of personal attributes of learners on the relationship between institutional factors and use of SMIS. It was established that personal attributes have a significant moderation influence on the use of student management information system. Thus, learner characteristics such as gender, age and marital status are important components that moderate the use of SMIS even when the institution has adopted and made the system accessible to students.

Conclusions and recommendations

The study concluded that learners' personal attributes are important determinants of the use of SMIS. Thus, it is not enough for universities to install and provide access to SMIS. Learners also need to be trained on the use of the system. It was, therefore, recommended that a policy framework should be formulated on the use of SMIS in all universities in Kenya offering teacher education programme by distance learning. The policy should make it a requirement for teachers and learners in the teacher education programme to go through training organized by the ICT departments in respective universities in order to acquire competency in the use of SMIS.

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