Organizational Management Support Structures and ICT Integration in National Teacher Training Colleges in Uganda: A Case of National Teachers' College, Kaliro

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Abstract

The study assesses the contribution of organisational management support structures, to ICT integration at National Teachers' College, Kaliro. The study was guided by the research question: what is the contribution of organisational management support structures to ICT integration at National Teachers' College, Kaliro? A survey of staff based on a selected set of characteristics related to organisational management support structures, revealed that 44.4% supported the view that there was supervisory support for ICT literacy, while 38.9% agreed there is supervisory support for peer group related activities. The study, within the framework of theory of Diffusion of Innovations (Rogers, 2003), examines ICT integration in National Teachers' College, Kaliro. The content scope of this study was limited to National teachers' Colleges, and examined the contribution of organisational management support structures to ICT integration in National Teachers' College, Kaliro.

The study engaged participants to respond to likert-type statements dealing with computer attitude, Computer attributes, computer competence and computer skills. The findings indicate, the major factor contributing to the moderate ICT integration was attitude towards computers with mean score 4.07 (Standard Deviation 0.43) followed by perception towards computer attributes with mean score 3.81 (Standard Deviation 0.34).

Keywords: Management structures, System resources, ICT integration, supervisory support, ICT literacy.

Introduction

Management of ICT has emerged as a critical issue for educational institutions and one that is impacting significantly on the work of principals and other senior staff. This study conceptualises organisational management support structures as supervisory support and peer support which are critical to ICT integration. Phelps (2002), argues that engaging educational leaders in constructivist learning enables them to reach greater understandings of the potential of technology in challenging and enhancing traditional pedagogy. Schiller (2003)'s studies related to the elementary school principal as a change facilitator for ICT, conclude that principals who take an active approach to innovation can foster an environment that has greater benefits for their students and staff. Hence, principals' awareness, understanding, and use of ICT are essential for effective use of computers in the school (Smeets et al., 1999). Indeed, Fullan (2003) says no successful large-scale change or school reform effort has advanced very far without the support of the school leaders. A school administrator needs to be familiar with ICT and know what to look for in the classroom if effective supervision, evaluation, or support for a classroom teacher is to be made (Williams, 1998). This view is supported by Hope, Kelly and Guyden (2000) who noted that school leaders should use technology themselves, developing an awareness of how technology can be used and modelling the practice to the school staff. Similarly, Stegall (1998) opines that it is important for principals to use computers, to seek assistance and advice from experts, from a technology committee, visit other schools, brainstorm ideas, and hire and train technology 'savvy' teachers.

The school management and senior staff must clearly demonstrate leadership by example and personal involvement in any new and major ICT initiatives. To augment this leadership, principals ought to note, whole-school approaches have positive effects: the entire school benefits instead of a few individuals, involves all stakeholders in the process of ICT

integration, and provides an opportunity for pooling of skills and resources (Hayes, 2007). Incentives are an element of this involvement and may include certification, professional advancement, financial benefits, paid time off for research, or training and formal or informal recognition at the school or local community.

Peer support can have a significant bearing on ICT integration. The conclusion is drawn from a study concerning Thai in-service teachers' attitudes toward the use of ICT (Waitayangkoon, 2004). The study, reported that an effective way to develop teachers' positive attitudes toward the use of ICT was a "buddy" system approach. The study points out the effectiveness of peer collaboration, where ICT novice teachers worked together with ICT expert teachers in implementing educational technologies into classroom projects. This ultimately translated into students' improvements and achievements. The study is in consonance with that of Thai teachers' attitudes when implementing ICT, and how it is related to the teachers' performance and ability to use the computer (Stamper, 2002, as cited in Monsakul, et al 2006). Since the computer could be utilized as an integral part of teaching and learning, ICT integration in relation to organizational management ought to stimulate concern, since attitudes might have an effect on teachers' performance, ability, and interest (Zhang, & Espinosa, 1997). These aspects are undeniably significant and were addressed in this study, to answer questions like what is the effect of organizational management structures on ICT integration in National Teachers' College, Kaliro? What support do teaching staff of National Teachers' College, Kaliro get in diffusing ICT in the curriculum?

In line with the diffusion of innovation theory (Rogers, 2003), organizational management capacity of a school determines its ability to accept and commit to change (Newman, & Wehlage, 1995, cited in Newhouse, et al 2002). Importantly, this capacity is enhanced when schools are shaped into professional social systems. The relevance of this issue to schools struggling with the process of change inherent in ICT integration is of value. School-wide

teacher professional social systems affect the levels of classroom pedagogy, social support for student learning, and affect student performance and ICT integration (Newhouse, et al 2002). Therefore if the management support structures at National Teachers' College, Kaliro do not facilitate change, ICT integration in education will remain low, which does not augur well with teacher training.

This study attempted, within the framework of theory of Diffusion of Innovations, to examine the contribution of institutional management structures to ICT diffusion in National Teachers' College, Kaliro using teaching staff as a unit of adoption. Rogers'(2003) theory was founded on a meta-analysis of 2,585 empirical studies published in 1981 in nine disciplines. Diffusion is the process by which an innovation is communicated through certain channels over time among members of a social system (Abirini, 2004). Diffusion is therefore, governed by four main interacting elements through which the innovation is communicated: the innovation itself, communication channels, time, and social system. These four components explain the process of change as determined by individuals, decision-makers, or whole institutions. In the field of education, the key individuals are teaching staff who are viewed as heterogeneous agents interacting with their near peers in the school social systems (Huang, & Kapur, 2007). Rogers (2003) describes an innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption. In specific reference to technological innovations, a technology is a device that helps to solve an individual's perceived problem. However, it may create uncertainty when little is known about its consequences (Abirini, 2006).

The diffusion of innovation theory, predicts that media as well as interpersonal contacts provide information and influences opinion and judgement. The communication channels and the roles opinion leaders play in them will determine the likelihood that the innovation will be adopted (Cartwright, & Hammond, 2007). In the case of an educational institution, the

opinion leaders are those who are capable of providing policy and management support. This requires shifting the focus from developing teachers' ICT skills and putting ICT in schools, towards enhancing teachers' capacities to innovate with ICT, to engage in inquiry into their own daily work practises, and to create institution-level and larger level innovation systems (Markauskaite, & Reimann, 2008). According to Rogers (2003) a Social System denotes the 'bounded' community in which the innovation diffuses. It involves a group of interrelated units with a common goal. These 'units' represent potential adopters and can be individuals, groups of individuals or institutions. In this study which is focused on ICT up-take in National Teachers' college, Kaliro, the specific innovation is teaching staff's use of computers in preparing schemes of work, lesson plans, and conducting lessons in a digitally-enhanced environment. The College represents the social system and the teaching staff, management staff, and students the units within the social system.

Bringing together the main premises discussed above, this study employs the Diffusion of Innovation framework to understand the contribution of organizational management structures in line with the attitudes towards computers, perception towards computer attributes, ICT competencies, and skills of teaching staff in National Teachers' College, Kaliro within an education institutional setting. Due to the presence of computers in the College, it was expected that the teaching staff already had some degree of ICT up-take. In a recent survey, out of the eight management staff of National Teachers' college, Kaliro, only two had functional email addresses and a desktop at their desks. They largely depended on written text communication and office secretaries. Considering that leaders ought to lead opinion, the leadership of National Teachers' college, Kaliro, should ideally be computer savvy. This situation if not addressed, cannot model good practise to other stakeholders and will maintain the low levels of ICT integration, which results into teachers who are unable to facilitate the diffusion of ICT into schools, and the curriculum.

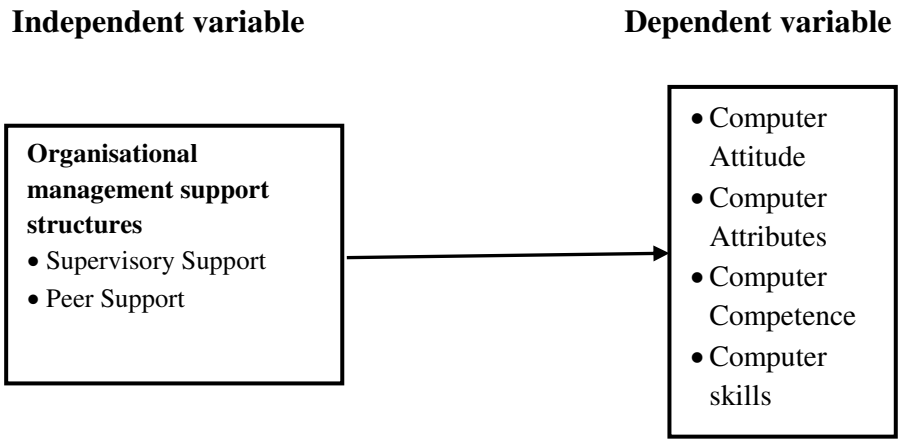

Fig. (i) Conceptual Framework

Adapted from Newhouse, Trinidad, & Clarkson (2002).

Methodology

This study employed a case study design and correlational research focusing on National Teachers' College, Kaliro as a case. ICT integration in education is facilitated by a number of factors, but management support structures formed the focus of this study in an effort to assess how management structures explain the level of ICT diffusion in National Teachers' College, Kaliro.

A mixed methods of data collection and analysis were used. The quantitative results are analysed together with the qualitative results. The target population was obtained by stratification whereby the population was taken from the different strata of management, and teaching staff from four departments namely: Science, Vocational, Professionals, and Arts. The study took into consideration the heterogeneous nature of the strata that form the population. The strata were done along the lines of the various departments. Strata was sampled separately in order to maintain internal homogeneity unique to each individual stratum. Using stratified random sampling, 48 teaching staff were engaged in the study. Purposive sampling was used to sample all the eight management staff. Six student representatives from the Vocational department were also purposively selected from a

population of six. From the Science and Arts departments, a sample of 36 using simple random sampling was taken from a population of student representatives.

A triangulation of methods was used to collect both qualitative and quantitative data as a means towards establishing the relationship between organizational management structures and ICT integration in National Teachers' College, Kaliro. The questions focused on issues of the dependent, and independent variables which were measured using a five-likert scale of coding. The interview method took the form of personal interviews with persons believed to have critical information related to the objective of the study. Since this was a work-based research, actual observation of what happens came in handy to capture any information that was not got from interviews and use of the questionnaire.

The tools that were used in the study included: self-administered questionnaire, interview guide, and observation checklist. In order to capture quantitative data, questionnaires were administered to management and the teaching staff. The questionnaire had questions on the independent variable and dependent variable. The independent variables were measured using a Likert type Scale System, since the researcher was interested in finding out the opinions and views (Mugenda, & Mugenda, 1999) of the respondents on management support structures and their relationship with ICT integration. The dependent variable had questions that were measured using a five-point likert scale for the dimensions on: computer attitude, Computer attributes, computer competence and computer skills ranging from strongly disagree to strongly agree. For interviews the Researcher used two structured interview guides, which were administered to management and to student representatives. A set of predetermined questions and standardised recording was used. This instrument was preferred for these categories as a means to support or check the questionnaire instrument.

In order to ensure reliability, a test-retest procedure of the questionnaire was conducted. The test-retest results yielded an overall Cronbach's coefficient alpha of 0.876. The Researcher

gave the questionnaire to experts who assessed the content and face validity of the instrument to ensure it is capable of capturing the required data. Responses from the questionnaires were analysed using Spearman's rank correlation coefficient.

In the case of qualitative data, interviews were transcribed verbatim and arranged in some order. In doing the arrangement, the first step was to systematically read and group the respondents' transcribed responses according to the research questions. Afterwards, content analysis was done manually, where key questions formed the basis for grouping. Lastly relationships amongst groups was sought and assembled into themes that were used to augment the analysis of quantitative data.

Results

Reporting the findings of the Study, the analysis is both qualitative and quantitative based on the major variables: management support structures and ICT integration and their dimensions. The results from the quantitative sources are compared with the relationships that emerged from qualitative data (interviews). The main subject of analysis (unit of ICT integration) was the teaching staff.

The respondents were required to indicate their age in the research instrument. The majority of the respondents 47.2% were within the 40 – 49 age range, 41.7% were within the 50 – 59 age range, 5.6% were 60 and above. The least number was in the 20 – 29 and 30 – 39 age range represented by 2.8% each. With this kind of age distribution, the study sample could most likely provide non-biased and accurate information. Additionally, when this data are seen in light of teaching experience presented below, the target population was able to relate issues of ICT in tertiary education well.

The Researcher considered teaching experience of the respondents as an important factor in relation to the dynamics of ICT innovations in teaching and their implications.

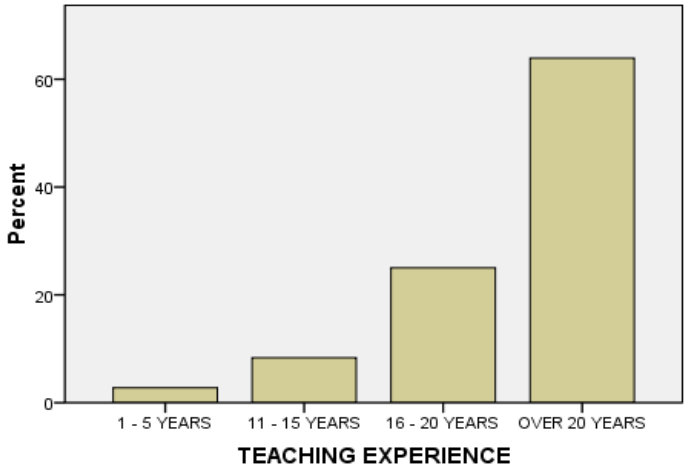

Fig. (ii) Teaching experience
(Source: Primary data)

In order to gauge the level of ICT integration at National Teachers' College, Kaliro, the Researcher gave the respondents a set of questions related to this aspect. Participants responded to likert-type statements dealing with computer attitude, Computer attributes, computer competence and computer skills. The major factor contributing to this moderate ICT integration was attitude towards computers with mean score 4.07 (Standard Deviation 0.43) followed by perception towards computer attributes with mean score 3.81 (Standard Deviation 0.34).

In order to find out the contribution of organisational management support structures to ICT integration in National Teachers' College, Kaliro, the Researcher gave the respondents a set of questions related to this aspect of institutional factors. Participants responded to Likert-type statements dealing with the kind of support provided by management towards ICT integration. A percentage of 44.4 respondents supported the view, that there was supervisory support for ICT literacy. This implies that the majority of respondents believe the College management provides supervisory support for ICT literacy. On whether management ensures a safe and conducive college and classroom environment for effective ICT learning 63.8% supported the view, while on the other hand 55.6% disagreed, that management ensures there

is sufficient staff to manage ICT literacy and development. This implies the majority of respondents believe the College provides a safe and conducive environment for effective ICT learning, but does little towards providing staff. On average this indicates fair organisational management support structures towards ICT integration. In accordance with the conceptual framework, the findings are discussed under the factors of supervisory support and peer support. In line with the organisational management support structures dimension, the researcher gave out a set of statements on supervisory support.

The findings revealed the majority of respondents (44.4%) agreed that there is supervisory support for ICT literacy. About 47.2% of the respondents agreed that management supports guidance and counselling regarding staff career development, while 38.9% agreed there is supervisory support for peer group related activities. Additionally, 63.8% of respondents agreed that Management ensures a safe and conducive college and classroom environment for effective ICT learning. Following interviews with the college management however, it was revealed that the college has not provided enough computers, overhead projectors, and other related educational ICTs, majorly because of financial constraints. Hence the findings indicate, while management provides supervisory support, it has not adequately provided educational ICTs for effective ICT learning. A correlation analysis of the same results gave the following:

Table 7. Correlation between supervisory support and ICT integration

Correlations

			ICT integration	Supervisory support
Spearman's rho	ICT integration	Correlation Coefficient	1.000	
		Sig. (2-tailed)	.	
		N	197	
	Supervisory support	Correlation Coefficient	.249**	1.000
		Sig. (2-tailed)	.000	.
		N	197	197

Correlations

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Spearman's rho	ICT integration	Correlation Coefficient	1.000	
		Sig. (2-tailed)	.	
		N	197	
	Supervisory support	Correlation Coefficient	.249**	1.000
		Sig. (2-tailed)	.000	.
		N	197	197

**. Correlation is significant at the 0.01 level (2-tailed).
(Source: Primary data)

The correlation results in table seven indicate that supervisory support was significantly and positively related to ICT integration (r=0.249**; p<0.01). This implies that supervisory support contributes to ICT integration in the college.

Peer support was measured using four items to solicit respondents' opinions. The findings showed that most of the respondents (55.6%) disagreed that management ensures there is sufficient staff to manage ICT literacy and development. Interviews with management and student representatives brought out issues like lack of sufficient staff and weak continuous professional development (CPD) programs at both college and departmental levels. A summary of the opinions of the interviewees is further captured in the College Secretary's statement that: *"If it was not for lack of funds, development of staff ICT skills is critical because if not done, it ultimately limits the abilities of the staff to infuse ICT in their teaching/learning."* About 50% asserted that management does not provide sufficient technical support to maintain and repair ICT facilities. Additionally, most respondents (52.8%) disagreed that management provides supervisory support for teamwork to develop ICT literacy. When asked whether there is management support for peer group activities on a regular basis the majority of respondents (50%) disagreed. Interviews with management and students revealed that there are no particular strategies/policies to target the ICT concerns of

the various departments in the college. The only department with a policy on both the teaching and examinations is that of physics. These findings suggest that there is general lack of peer support in National Teachers' College, Kaliro, which in essence does not contribute to ICT integration. A correlation analysis of the same results between peer support and ICT integration gave the following:

Table 9. Correlations between peer support and ICT integration

Correlations

			ICT integration	Peer support
Spearman's rho	ICT integration	Correlation Coefficient	1.000	
		Sig. (2-tailed)	.	
		N	197	
	Peer support	Correlation Coefficient	.211**	1.000
		Sig. (2-tailed)	.003	.
		N	197	197

**. Correlation is significant at the 0.01 level (2-tailed).
(Source: primary data)

The correlated results on peer support and ICT as shown in table nine above indicates that there is a positive and significant relationship between peer support and ICT integration ($r=0.211^{**}$; $p<0.01$). Interviews with students revealed that there is peer support though the major limitation is the high computer to student ratio. Puwata Peter a student of Fine Art year two summarises the opinion of the students when he said that: *"A number of times I have wanted to access the ICT resource centre, but I usually find a large population."* Additionally, the student respondents revealed that the students, who know about ICT, guide those who do not know in the ICT resource centre. Overall, the hypothesis that organisational management support structures has a significant contribution on ICT integration at National Teachers' College, Kaliro was accepted.

Discussion

The items used to characterize the respondents were gender, age, teaching experience, and details about ICT training. The respondents were of advanced age and had vast experience, which helped in that they gave non-biased accurate information. ICT training of respondents was limited on average and though this was not part of the main theme of study, it emerged as a critical aspect.

The educational changes that have resulted from the integration of ICT have created both advantages and challenges for most educational institutions. On one hand ICT is a promising mechanism for instructional approaches, and on the other, it demands institutional capacity building and investment in human resources. This demand calls for a more involving role from educational managers. The unfortunate thing however, is while the Managers are extremely eager to implement ICT in schools as is also the case in National Teachers' College, Kaliro, they have not seriously considered the "initiation stage" (Rogers 2003), which demands information gathering, institutional capacity building, and planning.

The main objective of the study sought to assess the contribution of organisational management support structures to ICT integration at National Teachers' College, Kaliro. Findings from the study indicate fair contribution of organisational management support structures to ICT integration. By the factor of supervisory support, the college contributes to ICT integration. This agrees with Phelps, (2002) who has pointed to organisational management support structures as a critical issue for schools, though theory and even ideas relating specifically to ICT management in school contexts is not yet readily available. The results from the qualitative data pointed to the fact that staff are encouraged by management to seek Continuous Professional Development (CPD). The major impediments were limited training budget, and the high student to computer ratio. The high student to computer ratio limits access by staff who would otherwise engage in self-study.

Peer support as a factor of organisational management support structure, was found to have a positive relationship with ICT integration. This finding complies with Monsakul, et al (2006) who acknowledges that peer support has found favour as an important factor for the success of ICT integration. The more in-depth interview procedure in this study revealed that students who know about ICT, guide those who do not know. This agrees with Unwin (2005) who asserts that while students can learn from themselves, they can also adapt to technologies much quicker than teachers can, and teachers need to consider learning new skills from the learners. Similarly, Waitayangkoun (2004) also indicates the effectiveness of peer collaboration where ICT novice teachers worked with ICT expert teachers in implementing educational technologies.

Conclusions

From the results of this study, supervisory support was found to be the major contributory factor as a dimension of organisational management support structures. Management of an institution has a role to play in enhancing ICT integration. Managers should acquaint themselves with use of ICTs in education so that they are able to mentor and encourage their staff to be more proactive in the integration of ICT in education. Peer support was found to be the less contributory factor.

Recommendations

With the ever-increasing digital globalization, teacher education institutions must take the necessary action to infuse ICT into teacher pedagogical processes. This study makes the following recommendations:

On the basis of the study's purpose and the emerging results, it is recommended that National Teachers' College, Kaliro and other teacher training institutions must give attention to management support structures because of their value in fostering ICT integration. The

Ministry of Education should ensure Staff is trained in ICT led instructional approaches, resourced, and appropriate policies put in place.

The study recommends that the leadership of National Teachers' College, Kaliro should acquaint itself with the use of ICT to stimulate the implementation of ICT in education. In order for the staff to adopt computers, there is need for a perception generated by the professional guidance of the principal and others in the college leadership that ICT integration is now an inevitable requirement.

The role of the ICT coordinator(s) should be central in as far as peer support is concerned. It is true staff who are satisfied with their computer coordinator(s), are found to make more use of ICT and to encounter fewer problems with ICT in their lessons. The coordinator(s) should however, be compensated for the work they do in terms of payment or time off. By empowering the staff, the students will ultimately be the beneficiaries.

Since this study is one of a kind in National Teachers' Colleges of Uganda, more studies can be undertaken to produce more knowledge in the area. Such studies may consider changing the setting, population, sampling procedures, or data collection methods. Management support structures are just one among many factors. Other studies could consider other factors not taken into consideration in this study.

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