

and their managers, both nationally and internationally. It explains why different groups of people perceive and do things differently (Mullins, 2002). Indeed, Kizza (2003) argues that organizational culture is pivotal to understanding the reasons as to why some organizations succeed while others fail. As a concept, however, culture is defined as the shared values, beliefs, and norms that guide the behavior of members of an organization (Ndibalekera, 2002; Ssentamu, 2001). It has variously been conceptualized as; “how things are done around here” (Mullins, 2002: 802; Ndibalekera, 2002: 14); the “underlying assumptions about the way work is performed”; “what is acceptable and not acceptable”; “what behavior and actions are encouraged and discouraged” (Mullins, 2002: 802); and the “collective programming of the mind that distinguishes the members of one organization from those of another” (Ndibalekera, 2002: 14-15).

Kizza (2003: 15) observes that if change is to succeed in an organization, its initiator or promoter needs to understand the culture of the organization (that is to be changed), adding that if the proposed changes contradict the organization’s cultural biases and assumptions, change is unlikely to occur. Culture is among the sources of resistance to change (Kizza, 2003; Rogers, 2003). Kizza (2003) discusses several cultural values that facilitate change in organizations including: power (managers should adopt management styles that allow for the devolution of power from the top to the bottom); job security (employees need to be convinced that there are no layoffs); communication (employees should be encouraged to share information); organizational goals (this can be achieved through making employees participate in the change process); team work (the leader should encourage increased participation, information sharing and collective decision making). He also advocates equal respect for employees (each employee’s contribution to change should be valued); employee empowerment (this releases the creativity of the employee, thereby promoting change); and continuing learning (to ensure

organizational survival whilst enhancing the ability to adapt to changes in the environment). However, Opondo & Ongaga (2001 June 11-17) in their short article; “forget the mission statement, let’s build an ICT culture,” decried that “we have purchased computers in organizations but have not worked hard enough to instill an information technology culture centered on continued learning.” This is in agreement with the conclusions of Ssempebwa et al. (2007) in their examination of the Total Cost of Owning a functional computer network in Rwandan higher education.

Organizational Size and the Adoption of Innovations

As a contingency variable, the size of an organization is a significant factor in the adoption of innovations. Perhaps one of the reasons organizational size is related to organizational innovativeness is that large organizations usually have slack resources set aside for coping with change (Koberg, 1986; Rogers, 2003). According to Mullins (2002), the commonest indicator of organizational size is the number of employees. Large organizations have more resources available for change and are more likely to adopt innovations. Small organizations, on the other hand, have limited resources and are more likely to resist change. The size of an organization also affects the rate of change. Large organizations have a slower rate of change, while small organizations have a faster rate of change. This is because large organizations have a more complex structure and a longer decision-making process. Small organizations, on the other hand, have a simpler structure and a shorter decision-making process. The size of an organization also affects the type of change that is adopted. Large organizations are more likely to adopt incremental change, while small organizations are more likely to adopt radical change. This is because large organizations have more resources available for change and are more likely to have a change management process in place. Small organizations, on the other hand, have limited resources and are more likely to adopt change as a response to a crisis. The size of an organization also affects the success of change. Large organizations are more likely to succeed in change, while small organizations are more likely to fail. This is because large organizations have more resources available for change and are more likely to have a change management process in place. Small organizations, on the other hand, have limited resources and are more likely to fail in change.

2005 January 18; Lwanga, 2005 January 18; Yukl, 2002) note that leading change is one of the most

In understanding the adoption of innovations in organizations, therefore, questions relating to the effectiveness of their leaders as change agents are relevant. It is important for managers to understand the nature of, and reasons for, resistance to change (Mullins, 2002), hence the need to probe the extent to which the leaders at Makerere understand these variables. Rwamukaaga (2001) points out that change can be divided into two: planned and unplanned. Planned change, he observes, is a pre-meditated, move to alter an organization's status. It is change initiated and implemented by change leaders to changes. On the other hand, unplanned change is not sequential. It is chaotic and often involves the shifting of goals, discontinuation of activities and making of unexpected combinations of change. For any change process to be successful, however, it must be properly managed (Magala, 2001).

A host of sources (Echaku, 2003; Kinobe, 1996; Magala, 2001; Nassejje, 2001; Nassolo, 1997; Rwamukaaga, 2001) recommend the use of Organizational Development (OD) as a model for the OD as a long-range approach to change, involving the whole organization, or a major part of it, aimed at improving its processes and culture as a contribution towards the attainment of its objectives. Magala (2001) looks at OD as involving four major phases: diagnosis, planning, implementation, monitoring and evaluation. Other researchers (e.g. Echaku, 2003; Kinobe, 1996; Nassolo, 1997; Rwamukaaga, 2001) have described the process of OD under models that are slightly different from Magala (2001)'s. For example, Nassolo (1997) looked at it as involving three major steps namely; (i) diagnosis of the goals, technology, structure, policies, procedures, products and services of an organization; (ii) action, that is,

putting change in motion, collaboratively accompanied by change in human relationships, including skills development, role analysis and team building; and (iii) process maintenance, that is, the consolidation of the newly acquired skills. In both cases, however, it is apparent that there is need for a leader that is capable of presiding over the innovation adoption process.

Mullins (2002) stresses the need for a change manager to use a participatory change management style if the change that they promote is to succeed, arguing that even though it is sometimes necessary to use hierarchical authority to impose change autocratically, in most cases, the adoption of change is more effective when a participatory leadership style is adopted and staff are informed about the change, encouraged to adopt a positive attitude towards it and involved in implementing it. In concurrence, Nkata (1996) observes that: (i) by participating, people gain more knowledge, learn better practices, become more aware of the problems that exist, know the causes underlying the problems and devise solutions; (ii) psychologically, and pride, and a sense of inclusion, accountability and responsibility; (iii) through participation, communities gain greater control over information; and (iv) at societal level, participation lowers the costs of innovation, since those concerned are kept in the know about the suggested innovation. Indeed, even though he enumerated some limitations associated with the participatory approach, these pertain to political, rather than organizational, participation. Indeed, taking the case of innovations in the area of ICTs, Ngotho (2000 May 15-21) contends that the worst thing to happen when implementing an ICT solution is to let staff get the feeling that, "Oh, that's an ICT project. It does not concern me".

Research Hypotheses

Grounded on the foregoing, the study was guided by the following hypotheses:

1. The ability of units to absorb change is positively correlated with the adoption of ICT in Makerere University;
2. The ICT culture of units is positively correlated with the adoption of ICT in Makerere University
3. The size of units is positively correlated with the adoption of ICT in Makerere University; and
4. The ICT change management style of the leaders of units is positively correlated with the adoption of ICT in Makerere University.

Method

The study was conducted following a quantitative correlation survey design. Data were collected through administering questionnaires to a sample of 145 lecturers, 124 senior administrators and 175 postgraduate students, who were chosen from all the units in the University. The questionnaires had 26 questions eliciting information on the respondents' knowledge, and use, of ICT (that is, 12 on knowledge and 14 on use) and 12 on communication facilities). They also elicited information on the units' ability to absorb change; ICT culture; size; and leaders' ICT change management styles. The data collected were edited, coded and entered after which summary statistics were generated and Factor and Multiple Regression analyses were conducted.

Findings

The dependent variable in this study was ICT adoption, conceptualized as knowledge of, and use of ICT (Rogers & Shoemaker, 1971) among staff and students of Makerere University. Thus a section of the instrument was devoted to this variable, with 27

questions on knowledge and 27 questions on use of basic ICT facilities. In each case, the respondent was asked to rate oneself in terms of knowledge and/ or use of a particular ICT facility, using a scale ranging from a minimum of one (for little or no knowledge or use). For purposes of correlating ICT adoption with the independent variables, the researchers aggregated all the 27 questions on ICT knowledge and the 27 questions on ICT use into one index, hereafter referred to as the "aggregate ICT adoption index", and came up with a median of three (3), an arithmetic mean of 2.8 and a standard deviation of .85. These results suggest that ICT adoption in the University is low, given that the arithmetic mean (2.8) is below the median (3). However, the distribution of the aggregate ICT adoption index was normal, which allowed for the use of the index in the study. to linear regression analyses (Sweet & Grace-Martin, 2003). Now the aggregate ICT adoption index is related to the respective independent variables in the study.

Ability of Units to Absorb Change and the Adoption of ICT

The study found that the ability of given unit's (i.e. school's, faculty's, institute's or administrative department's) ability to absorb change (or innovativeness) on ICT adoption in Makerere, conceptualizing the ability to absorb change as the dependent variable, was positively correlated with the aggregate ICT adoption index. The results of the regression analysis are presented in Table 1. The aggregate ICT adoption index was measured on a scale ranging from a minimum of one (for very slowly) to a maximum of five (for very quickly). The resulting descriptive statistics.

Table 1: Descriptive Statistics on the Ability of Units to Absorb Change

Indicator	Number of respondents (n)	Arithmetic mean (\bar{x})	Standard deviation (s)
Unit's speed of adopting the			

Table 1 reveals that eight of the ten ICT items recorded mean attitude scores above the median score (3), which suggests that, in as far as these items are concerned, the ability of units to absorb change was acknowledged by the respondents. However, the means of the last two constructs suggest prevalence of bureaucracy in the University ($\bar{x} = 2.8$) and general slack in the adoption of the African Virtual University ($\bar{x} = 2.7$).

Analysis to reduce the number, or dimensionality, of the 10 indicator variables of the units' ability to absorb change (Table 1) to two factors accounting for over 62% (i.e. over 50% and almost 12% respectively) of the variation among the variables, and on rotation, the (rotated) component matrix using Kaiser (1958)'s Varimax Rotation as recommended by Foster (1998) and Manly (1994). The results are summarized in Table 2.

Table 2: Rotated Component Matrix for Factors on Unit Ability to Absorb Change

Taking only high factor loadings in Table 2, that is, those above 0.5 (Foster, 1998; Manly, 1994), the indicator which seems to be the “ICT innovativeness of unit” while the other indicators loaded highly on a second component which seems to be the “general

innovativeness of a unit”. To get a provisional idea about how the ability of units to absorb change affects the adoption of ICT, these two factors were correlated with the aggregate ICT adoption index. The results of the correlation test are shown in Table 3.

Table 3: Correlation of Factors on Ability of Units to Absorb Change and the Adoption of ICT

		Aggregate ICT adoption index	ICT innovativeness of unit	General innovativeness of unit
Aggregate ICT adoption index	Pearson’s corr. (2-tailed)			
	Number of pairs			
ICT innovativeness of unit	Pearson’s (2-tailed)	(**) 0.000		
	Number of pairs	381		
General innovativeness of unit	(**) (2-tailed)		0.000	
	Number of pairs	381	382	

0.000) may be positively correlated with the adoption of ICT in the University.

ICT Culture of Units and the Adoption of ICT

To understand the impact of ICT culture on the

adoption of ICT in the University, the researchers examined the ICT culture of the units, conceptualizing it as the extent to which the respondent agreed that the unit shared power, knowledge, responsibility and using a scale ranging from a minimum of one (for agree). In Table 4, the resulting descriptive statistics are presented in descending order of the mean scores.

Table 4: Descriptive Statistics on Unit ICT Culture

Indicator	Number of respondents (n)	Arithmetic mean (\bar{x})	Standard deviation (s)
Unit is ICT change-oriented	432	3.18	1.19
Unit shares power on ICT matters	424	2.93	1.22
Unit ensures participation of all in ICT matters	423	2.92	1.24
Unit ensures ICT organizational learning	433	2.91	1.29
Unit acknowledges individual ICT contribution	430	2.67	1.22

From Table 4, it is noteworthy that only one of
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
attitude score above three (i.e. median score), which
suggests that, in as far as these items are concerned,
the ICT culture in the respective units was

Table 9: Unrotated Component Matrix for the Factor on Unit Leader's ICT Change Management Style

	Component
Head regularly assesses the ICT situation in the unit	0.825
Head ensures ICT feedback for all	0.882
Head makes ICT adoption look urgent for all	0.873
Head ensures participation of all in ICT matters	0.883
Head constantly monitors ICT progress in the unit	

high factor loadings, that were above 0.5 (Foster, 1998; Manly, 1994) on the said one component which seems to be "goodness of unit leader's ICT change management style". On correlating this component with the aggregate ICT adoption index, at the one

was obtained. This suggests that the better the ICT change management style of the leader of the unit in Makerere a respondent was in, the higher the expected level of ICT adoption of that respondent.

Regression of ICT Adoption on Organizational Characteristics

While the bivariate analyses suggested that all the

organizational (or unit) characteristics above were potential correlates of the adoption of ICT in the University, to establish the real correlates, Multiple Regression Analysis, a more powerful multivariate tool, that took the simultaneous relationships among the many variables into account, was used, thus documenting collective effects and accounting for potentially spurious factors (Sweet & Grace-Martin, 2003). The factors, namely, "ICT innovativeness of units" and "general innovativeness of units" (Tables 2 and 3); "goodness of units' ICT culture" (Table 5); size of unit (Table 7); and "goodness of unit leader's ICT change management style" (Table 9), being continuous variables, were used in the model as explanatory variables of the aggregative ICT adoption index. Hence the multiple regression model in Table 10.

Table 10: Regression Results of ICT Adoption on Unit Characteristics

	Standardized coefficient	F Statistic	Significance, p	Adjusted R square
		26.00	0.000	.290
Constant	Beta, 2.72		p 0.000	
Unit ability to absorb change				
ICT innovativeness of unit	0.41		0.000	
General innovativeness of Unit	0.06		0.435	
Goodness of unit ICT culture	0.04		0.589	
Unit size	0.05		0.357	
Goodness of unit leader's ICT change management style	0.17		0.021	

Table 10 suggests that the organizational characteristics considered were, collectively, good explanatory variables of ICT adoption in Makerere University (F of the variation in the aggregate ICT adoption index in order of priority were “ICT innovativeness of 0.01); and “goodness of unit leader’s ICT change

Discussion, Conclusions and Recommendations

The study found that, by and large, the adoption of ICTs in the University is low, since the mean score on the ICT adoption index (.28) was below the median Nakaye (1998), Agaba (2003), Niwe (2000) and Nyakoojo (2002) who report that the utilization of ICTs in managing students’ information; conducting research; and instruction of students at the university is low. In the next subsections, the contribution, to this anomaly, of the university’s ability to absorb change, size, ICT culture and leaders’ change management style is discussed, whilst drawing conclusions and recommendations.

Ability to Absorb Change and the Adoption of ICTs

The hypothesis that the ability of units to absorb change is positively correlated with the adoption of ICT in Makerere University was supported by the data collected, especially in so far as ICT innovativeness of the University’s units was concerned (Table 10

Bigirwa (2004), Echaku (2003), Rwamukaaga (2001), Ssentamu (2001) and Nassejje (2001) that, in many cases, resistance to change inhibits the adoption of innovations. In this way, the study suggests that, to enhance the adoption of ICT, the managers of the university should mitigate resistance to change among of Nassejje (2001) to the adoption of ICT in Makerere University, since the resistance to change could

be mitigated through creating dissatisfaction with the status quo and reducing the fear of change, by eliciting the participation of all the key stakeholders in the implementation of ICT, as she recommended in the case of Uganda Electricity Board.

ICT Culture of Units and the Adoption of ICTs

The data collected supported the hypothesis that the ICT culture of units is positively correlated with the adoption of ICT in Makerere University albeit partially; although the correlation between

0.589). This means that the ICT culture of units is of some past studies, like Korpella (1996), it is also at variance with a host of others, including Ssentamu (2001), Mugweri (2000) and Dawa (2004). The culture is among the

2004). 2004). 2004).

Sseguya (2000), who quotes Van de Ban & Hawkins (1996) as reporting that, in reviewing 227 sources, they found that 33% of the sources did not support the hypothesis that there is relationship between organizational size and the adoption of innovations. of the contentions of Matovu (2003), Koberg (1986), Kisolo (1998), Sseguya (2000) and Fedorowicz & between organizational size and the adoption of of the adoption of ICTs; the enormity must confer economies of scale in the availability of facilities if it is to facilitate the adoption of ICTs. Upon critical do not necessarily depart from the proposition of Matovu (2003), Koberg (1986), Kisolo (1998), Sseguya (2000) and Fedorowicz & Gelinas (1998). Rather, when interpreted in terms of the results in Table 6, showing that the large units of the university had more claimants upon their ICT facilities than the latter could satisfy, it is apparent that the study only adds to the proposition that size is directly related to the adoption of ICT the dimension that this is so only when size is matched with the necessary facilities.

Organizational Leader's ICT Change Management Style and the Adoption of ICT

The study established that the ICT change management style of the leaders of the university's Nassolo (1997), Bakka-Male (2000), Matovu (2003), Nassejje (2001), Kyewalabye (2001), Rwamukaaga (2001), Echaku (2003), Mwanja (2001), Kanungo & Chouthoy (1996) and Odoy-Asoka (1998). This way, the study supports the view of Magala (2001), who argues that change processes must be well managed if they are to succeed. This suggests that the implementation of ICT in Makerere University should be properly planned, following such models as Organizational Development just as recommended by Echaku (2003), Kinobe (1996), Nassejje (2001) and Nassolo (1997). In addition, the management of ICT change should be participatory as this will (i)

and (iii) mitigate any feelings of ICT marginalization and powerlessness; and (iv) lead to greater control over information and the technologies, among 15-21). Nevertheless, the leaders of the University's units should beware of the shortcomings of the participatory approach (Nkata, 1996).

References

- Agaba, D. (2003). *Utilization of Makerere University Library electronic information resources by academic staff: Challenges and the way forward*. Unpublished masters (of Sc in info Sc) dissertation, Makerere University, Kampala, Uganda.
- Bakka-Male, P. (2000). *Headteachers' planning and utilization of computers in the learning process in Uganda secondary schools*. Unpublished masters (of Educ. Admin. & Planning) dissertation, Makerere University, Kampala, Uganda.
- Bigirwa, D. (2004). *Change management, IT adaptation and OCB: A case study of URA*. Unpublished masters (of Bus. Adm.) dissertation, Makerere University, Kampala, Uganda.
- Cohen, D. K. (1983). *Educational technology, policy and practice*. Educational Evaluation and Policy Analysis, 9 (2), 153-170.
- Cole, G. A. (1995). *Organisational behavior*. London: Continuum.
- Dawa, S. (2004). *Information technology personnel competencies and computer-based information system usability in Uganda*. Unpublished master (of bus. Adm.) dissertation, Makerere University, Kampala, Uganda.
- Echaku, G. M. O. (2003). *Change process, psychological contract, organizational social capital and OCBs: A case study of National Water and Sewerage Corporation*. Unpublished masters (of business adm.) dissertation, Makerere University, Kampala, Uganda.
- Fedorowicz, J. & Gelinas, U. J. Jr. (1998). *Adoption and usage patterns of COBIT: Results from a survey of COBIT purchases*. [Information systems] IS Audit & Control Journal, 6, 45-51.
- Foster, J. J. (1998). *Data analysis using SPSS for Windows*. London: Sage.
- Hawkins, B. L. (1989). *Managing a revolution - turning a paradox into a paradigm*. In Hawkins,

B.L.(Ed.). Organising and managing information resources on campus: EDUCOM strategy series on IT (pp.1-14). Texas: Academic Computing Publications, Inc.

Kaija, M. (2005 January 18). *New roles for the human resource professional*. Monitor, p.18.

Kanungo, S. & Chouthoy, M. (1996). IT planning in India: Implications for IT effectiveness. *Information Technology for Development*, 8(2), 71-87.

Kasozi, A. B. K. (2003). *African Universities' capacity to participate in global higher education supply and production: A case of Uganda*. Uganda Journal of Education (UJE), 4, 45-63.

Kibera, F. N. (1997). *Critical review of theories of adoption of innovations*. *Malawi Journal of Education*, 2(2), 1-10.

Makoto B. S. (2016). *ICT in Education: A Case Study of the University of Botswana*. Botswana Journal of Education, 1(1), 1-10.

- Namakula, M. (2001). *Restructuring as an organization development effort in National Water and Sewage Corporation – Uganda*. Unpublished master's (of business adm.) dissertation, Makerere University, Kampala, Uganda.
- Nassejje, S. (2001). *Introduction and management of UEB clocking system: An organizational development model: A case study of Uganda Electricity Board*. Unpublished masters (of business adm.) dissertation, Makerere University, Kampala, Uganda.
- Nassolo, F. (1997). Introduction and management of private programs budgets: an organizational development perspective: A case study of Makerere University. Unpublished masters (of business adm.) dissertation, Makerere University, Kampala, Uganda.
- Ngotho, P. (2000 May 15-21). Why IT managers should get users on board. *East African*, p.25.
- Niwe, M. (2000). Assessing the potential of using the Internet as a tool for meeting information needs of academic staff in Makerere University. Unpublished masters (of Sc in info Sc) dissertation, Makerere University, Kampala, Uganda.
- Nkata, J.L. (1996). *Changing patterns of parent participation in primary school management in Mpigi District*. Unpublished PhD (in Education management) thesis, Makerere University, Kampala, Uganda.
- Nyakoojo, S. A. (2002). *Training and individual learning at Makerere University Business School*. Unpublished masters (of business adm.) dissertation, Makerere University, Kampala, Uganda.
- Odoy-Asoka, M. C. (1998). *Managing planned change in Uganda parastatals : a case study of national Water and Sewage Corporation*. Unpublished masters (of Arts, Public Adm. & Mgt.) dissertation, Makerere University, Kampala, Uganda.
- O'Mahoney, C. (2005). *Reaping ITEM [Information technology in education management] benefits Link between staff ICT access, ability and use*. In Tatnall, A., Osorio, J. & Visscher, A. (Eds.). *Information technology in education management in the knowledge society* (pp.23-36), IFIP TC3 WG 3.7, 6th International Working Conference on ITEM, held July 11 to 15, 2004 at Las Palmas de Gran Canaria. Spain. NY: Springer.
- Opondo, J. & Ongaga, F. (2001 June 11-17). *Forget the mission statement, let's build an IT culture*. *East African*, p.27.
- Rogers, E. M. & Shoemaker, F. (1971). *Communication of innovations: a cross-cultural approach*. NY: Free Press.
- Rwamukaaga, G. (2001). *Management of planned change: a case study of the restructuring of UCB limited*. Unpublished masters (of business adm.) dissertation, Makerere University, Kampala, Uganda.
- Sentamu, F.X. (2001). *Information technology, organizational culture and the performance of National Water and Sewerage Corporation*. Unpublished master (of Business Adm.) dissertation, Makerere University, Kampala, Uganda.
- Sseguya, H. (2000). *Factors that affect adoption of soil fertility management technologies in banana-based agriculture of L..Victoria Basin*. Unpublished masters (of Sc. Agric Ext. /Educ.) dissertation, Makerere University, Kampala, Uganda.
- Ssekamwa, J. C. (1997). *Prelude to private students sponsorship and the implication of its progress in Makerere University*. *Uganda Education Journal*, 1, 1-22.
- Ssempebwa, J., Canene, A. P. & Mugabe, M. (2007) *ICT investment in Rwandan higher education: highlighting the cost of downtime and end-users' operations*. *Kampala International University Research Digest*, 1, 19—30.
- Sweet, S. A. & Grace-martin, K. (2003). *Data analysis*

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