US-China Education Review A 3 (2011) 331-338
Earlier title: US-China Education Review, ISSN 1548-6613

Organizational Characteristics and Use of Personal Computer Software by Graduate Students in Makerere University*

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This paper reports a survey that sought to establish levels of use of PC (personal computer) software by graduate students in Makerere University and to link the same to organizational characteristics, related to a given respondent's "unit", that is school, faculty or institute, namely its ability to absorb change, its ICT (Information and Communication Technology) culture, size and leader's ICT change management style. The correlational and cross-sectional survey involved 175 students who filled a questionnaire. Data analysis, involving summary statistics (e.g., means and standard deviations) and multiple regression, indicated low levels of use of PC software, and only unit ICT culture was a significantly positive correlate of the same. It was thus recommended that stakeholders, such as the Makerere University directorate of ICT support, encouraged respective units to build and continually enhance their ICT cultures as a possible means of enhancing the use of PC software by graduate students therein.

Keywords: organizational characteristics, change management, higher education, personal computers, software, Makerere

Introduction

Balunywa (2000) observed that technology had changed the way we lived and worked. It is the primary enabler and driver of change in the environment. It has enabled us to communicate quickly and instantly through phone, fax, Internet and satellite. The benefits of technology are thus in form of new and better products, new uses of old products, new or improved processes and faster methods of doing things. It has cut time to package products, increased efficiency and reduced cost of production. One technology that was particularly important for academicians these days was the computer, given its innumerable benefits such as enhancing speed, efficiency and effectiveness of the user (Mullins, 2002).

Unfortunately, however, use of computers by students in Makerere University has consistently been reported to be very low (Makerere University, 2000; Nassanga, 2001). This failure to make optimal use of computers by students in the university led to several undesirable outcomes, such as wastage of funds by the

* **Acknowledgements:** The authors gratefully acknowledge graduate students in Makerere University who served as respondents in the study. They were from the Faculties of Agriculture, Veterinary Medicine, Law, Education, Institute of Statistics And Applied Economics, Technology, Medicine, Science, Computing and Information Technology. They also thank data collection assistants, Mr. Matia Kabuye of Faculty of Law, Mr Haruna Kawooya formerly of Institute of Statistics & Applied Economics and Ms. Maria Nankya (B. Lib. & Info. Sc.), a librarian in the Main Library in Makerere University for entering the data.

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university and donors had sank on underutilized or even unutilized facilities (Njiraine, 2000). It was therefore appropriate to isolate the reasons why students in Makerere University are slow to embrace use of computers. While there could be several contributory factors, theorists on use of innovations (Kibera, 1997; Rogers, 2003), suggested that organizational characteristics might explain differentials in use of PC (personal computer) software. Hence, the study reported in this paper on the use of PC software by graduate students in Makerere University. It was carried out with the purpose of establishing levels of use and how they linked with organizational characteristics, related to a given respondent's "unit" (which was a school, a faculty or an institute). These include its ability to absorb change, its ICT (Information and Communication Technology) culture, size and leader's ICT change management style.

Literature Review

Organizational Ability to Absorb Change and Use of Innovations

Organizational ability to absorb change, which could also be termed organizational innovativeness or organizational readiness for change, was the extent to which an organization feels the need for change (Magala, 2001). Mullins (2002) observed that although organizations had to adapt to their environments in order to survive, they tended to feel comfortable operating within the structure, policies and procedures, which have been formulated to deal with present situations. They, thus, set up defenses or resistance against changes, and prefer to concentrate on routine things that they perform well.

According to Nassejje (2001), resistance might take a number of forms, such as persistent reduction in output and the expression that there were a host of reasons why the change would fail. Mullins (2002) attributed the resistance to change to organizational culture, the need to maintain stability, the investment in the status quo, the fear to disrupt past contracts or agreements and the threats to power or influence that the proposed change implied. Several authors (Kizza, 2003; Magala, 2001; Nassejje, 2001) prescribed measures to curb organizational resistance to change. For example, Nassejje (2001) advised that a manager could reduce this resistance by creating dissatisfaction in the organization with the status quo, reducing the fear of change in the organization, encouraging participation of all in the change effort and trying to compensate those affected by the change.

Organizational Culture and Use of Innovations

Culture, a concept developed from anthropology, is difficult to be defined or explained precisely (Mullins, 2002; Sentamu, 2001). Nevertheless, quite a few suggestions have come up. It has variously been conceptualized as "how things are done around here", "underlying assumptions about the way work is performed", "what is acceptable and not acceptable" and "what behavior and actions are encouraged and discouraged" (Mullins, 2002, p. 802). Kizza (2003) observed that if change was to succeed in an organization, one needed to understand the culture that was to be changed. If the proposed changes contradicted cultural biases and traditions, the changes would be difficult to embed in the organization. Since cultures were difficult to change, organizational culture was among the sources of resistance to change (Kizza, 2003; Rogers, 2003). Kizza (2003) discussed several cultural values that facilitated change in organizations. They included: (1) a manager adopting a management style that allowed for devolution of power from the top to the bottom; (2) convincing employees that there were more benefits in accepting changes; (3) achieving commitment to organizational goals through making employees participate in the change process; (4) ensuring team work

where a leader encouraged increased participation, information sharing and collective decision-making. He also advocated for: (5) valuing each employee's contribution to change; (6) empowerment of employees to release their creativity, thereby promoting change; and (7) ensuring continuous learning, which will ensure organizational survival as it enhanced ability to adapt to the environment.

Organizational Size and Use of Innovations

According to Mullins (2002), organizational size could be defined and measured in different ways, although the most common indicator of size was the number of persons employed by the organization. The size of an organization might be an important factor in the ability of the organization to respond to changes in the environment, one of the reasons being that larger organizations had more slack resources set aside to cope with unexpected contingencies (Koberg, 1986; Rogers, 2003). La Rovere (1996) contended that large firms had clear advantages in use of innovations, since they tended to have a smaller rate of indebtedness and hence ability to spend on innovations. He added that large organizations also had more access to technological information, and thus might be more prone to use of innovations. However, there is an opposing view, which considers large organizations as overly bureaucratic and hence more resistant to use of innovations. In summary, "There is a continuing debate on the comparative advantages of large and small organizations on whether 'bigger is best' or 'small is beautiful'" (Mullins, 2002, p. 56) with respect to use of innovations.

Organizational Leader's Change Management Style and Use of Innovations

Leading change was one of the most important and difficult leadership responsibilities (Yukl, 2002). It was important for managers to understand the reasons for, and nature of, resistance and to adopt a clearly defined strategy for the initiation of change (Mullins, 2002). Rwamukaaga (2001) pointed out that the change of management could be subdivided into two approaches: planned change and emergency or unplanned change approaches. Planned change is a deliberate pre-meditated move to alter the organizational status. It is initiated and implemented by changing leaders to either solve problems, to adapt to changes or to influence future changes. On the other hand, unplanned or emergency change is not a sequential process. It is chaotic and often involves shifting of goals, discontinuation of activities and making of unexpected combinations of changes. For any change process to be successful, however, it must be properly managed (Magala, 2001). Mullins (2002) stressed the need for a change manager to use a participatory change style if the change was to succeed, arguing that while in certain situations, it might be necessary to use hierarchical authority to impose change through an autocratic (theory X) style of leadership. In most cases, change was more effective with a participative (theory Y) style of leadership (Nwankwo, 1982), where staff were kept fully informed of proposals, and were encouraged to adopt a positive attitude and had personal involvement in the implementation of change.

Hypotheses

According to the reviewed literature, the study hypothesized that:

(1) Unit ability to absorb change positively correlated with the use of PC software;

(2) Unit ICT culture positively correlated with use of PC software;

(3) Unit size positively correlated with use of PC software;

(4) Unit leader's ICT change management style positively correlated with use of PC software.

Method

According to a quantitative and co-relational survey design, data were collected using a self-administered

questionnaire with questions or items on four organizational characteristics of relevance in this study, namely unit ability to absorb change (four questions, α = 0.8801), unit ICT culture (five questions, α = 0.8838), unit size (five questions, α = 0.7035) and unit leader's ICT change management style (five questions, α = 0.9009). The questionnaire had six questions on the use of PC software (six questions, α = 0.8485). According to Cronbach's Alpha Coefficient Test (Cronbach, 1971), the questionnaire was reliable for the study, as all alpha coefficients were above 0.5. Using the said questionnaire, data were collected from a sample of 175 graduate students out of the population of 1,700 in the university. The intended sample size as per Krejcie and Morgan (1970) table of determining minimum sample was 265. Thus, the attained 175 participants were 64% of the intended sample size. Data were analyzed using summary statistics (means and standard deviations) and multiple regressions.

Findings

Other details about the 175 respondents were as follows: (1) In terms of age, 48.5% were below 30 years, followed by those between 30 and 40 years (40.5%), and the rest (11.0%) were above 40 years of age; (2) In terms of sex, males (72.2%) dominated the sample, leaving only 27.8% of females; (3) Regarding perceived income level, the medium income (54.2%) took a lion's share, followed by 43.4% of low income and only four (2.4%) were of high income; (4) With regards to possession of qualifications in ICT, the majority (60.2%) held none versus 39.8% with one; and (5) With respect to level of study, the majority (75.1%) were Masters, followed by the postgraduate diploma category (21.9%) and the rest (3.0%) being Ph.D. certificate holders.

The Use of PC Software

The use of PC software was conceptualized as six questions. Each question or item was scaled in such a way that 1 = "Very rarely or never, including Never heard of it"; 2 = "Rarely use"; 3 = "Neither rarely nor regularly"; 4 = "Regularly"; and 5 = "Very regularly". Table 1 gives pertinent summary statistics.

Table 1

Summary Statistics on Use of Personal Computer Software

Indicator of use of PC software	Mean	Standard deviation	Overall
Word processing software	3.68	1.38	
Spread sheet software	2.83	1.49	
Database management software	2.15	1.29	Mean = 2.41
Graphics software	2.23	1.25	Standard deviation = 0.98
Desktop publishing	1.62	1.02	
Statistical or data analysis software	1.98	1.33	

According to Table 1, only word processing recorded an outstanding level of use. An overall use of PC software index ("PCsw") from the six questions or items in Table 1 had an overall mean of 2.41, which as per the scale used, suggested that overall, the majority of respondents were rare users of PC software.

Organizational Characteristics

Organizational characteristics of relevance in the study were unit ability to absorb change (four questions), unit ICT culture (five questions), unit size (five questions) and unit leader's ICT change management style (five questions). All items or questions were Likert-scaled in such a way that 1 = "Strongly disagree"; 2 = "Disagree"; 3 = "Neither disagree nor agree"; 4 = "Disagree"; and 5 = "Strongly agree". Table Tables 2, 3, 4 and 5 give pertinent summary statistics.

Table 2

Descriptive Statistics on Unit Ability to Absorb Change

Indicators of unit ability to absorb change	Mean	Standard deviation	Overall
Unit is change-oriented	2.82	1.31	Mean = 2.98 Standard deviation = 1.08
Unit is innovative	3.11	1.24	
Unit is progressive	3.18	1.26	
Unit is technologically developed	2.78	1.24	

Table 3

Descriptive Statistics on Unit ICT Culture

Indicators of unit ICT culture	Mean	Standard deviation	Overall
Unit shares power on ICT matters	2.72	1.22	Mean = 2.75 Standard deviation = 1.01
Unit is ICT change-oriented	2.96	1.20	
Unit ensures participation of all on ICT matters	2.70	1.23	
Unit acknowledges individuals' ICT contribution	2.43	1.19	
Unit ensures ICT organizational learning	2.75	1.29	

Table 4

Descriptive Statistics on Indicators of Unit Size

Indicators of unit size	Mean	Standard deviation	Overall
Unit is big in terms of number of staff	3.22	1.27	Mean = 2.72 Standard deviation = 0.79
Unit is big in terms of premises	2.53	1.22	
Unit is big in terms of income	2.79	1.03	
Unit is big in terms of clients	3.08	1.20	
Unit is big in terms of number of personal computers	2.12	1.19	

Table 5

Descriptive Statistics on Indicator of Unit Leader's Change Management Style

Indicator of unit leader's change management style	Mean	Standard deviation	Overall
Unit head regularly assesses the ICT situation in the unit	2.44	1.28	Mean = 2.33 Standard deviation = 1.06
Unit head ensures ICT feedback for all	2.04	1.14	
Unit head makes ICT adoption look urgent for all	2.46	1.32	
Unit head ensures participation of all, in ICT matters	2.32	1.24	
Unit head constantly monitors ICT progress in the unit	2.38	1.29	

From Tables 2 to 5, overall aggregates ("innovation", "culture", "size" and "leader") were computed and found to have means that suggested that graduate students rated their respective units best in terms of ability to absorb change (mean = 2.98), followed by ICT culture (mean = 2.75), size (mean = 2.72) and lastly leaders' change management style (mean = 2.33). However, overall, graduate students in Makerere University had only a fair perception of their units in terms of the four organizational characteristics (mean = 2.68; standard deviation = 0.78).

Organizational Characteristics as Correlates of Use of Personal Computer Software

Multiple regression analysis of the average use of PC software index ("PCsw" from Table 1) on the four organizational characteristics ("Innovation", "Culture", "Size" and "Leader" from Tables 2 to 5), yielded the results in Table 6, suggesting that the four organizational characteristics considered, were collectively very good explanatory variables (F = 5.426, p = 0.000) of use of PC software at the significance level of 1% (p =

0.000 < 0.01), accounting for over 12% of the variation in the aggregate use of PC software index (adjusted *R*-square = 0.122).

Table 6

Regression of Use of PC Software on Organizational Characteristics

Organizational characteristic	*B* (beta)	*P* (significance level)
Unit readiness to absorb change	-0.028	0.823
Unit ICT culture	0.303	0.026
Unit size	0.028	0.760
Unit leader's change management style	0.123	0.286

Note. The term **"**adjusted R-square" is a number between zero and one. It is used to explain the variation in the DV (dependent variable) accounted for by all IVs (independent variables) in a multiple regression analysis.

P (significances) in Table 6 led to acceptance of only one of the four research hypotheses, namely that unit ICT culture positively correlated with use of PC software at the significance level of 5% ($P < 0.05$).

Discussion, Conclusions and Recommendations

The study suggested that the use of PC software by graduate students in Makerere University was low, thus corroborating earlier researchers who got the same result. For example, Nassanga (2001) found that students in the university hardly participated in usage and management of ICT. Now the discussion, conclusions and recommendations turn to the respective hypotheses.

Organizational Ability to Absorb Change and Use of PC Software

The first hypothesis of the study that unit ability to absorb change positively correlated with the use of PC software by graduate students in Makerere University was not supported. This was against several earlier studies (Nassejje, 2001; Rwamukaaga, 2001; Sentamu, 2001), which all found inability to absorb change (i.e., resistance to change) as a factor inhibiting change in different contexts. The result was anomalous as it put into question the assertion by Mullins (2002) to the effect that although organizations had to adapt to their environments in order to survive, they tended to feel comfortable operating within the structure, policies and procedures, which have been formulated to deal with present situations, thus setting up defenses or resistance against change, and preferred to concentrate on routine things they perform well. Could it be that the conceptualization of unit ability to absorb change (see Table 2) was inadequate? This is food for thought for future researchers.

Organizational Culture and Use of PC Software

The study set out to test whether unit ICT culture was a positive correlate of the use of PC software by graduate students in Makerere University, whose hypothesis was supported by the findings. This result, though inconsistent with a few past studies (Korpella, 1996), was in tandem with a host of others (Ssentamu, 2001; Mugweri, 2000). The result strengthens the theoretical assertion that organizational culture was among the sources of resistance to change (Kizza, 2003), and hence, the recommendation by Kizza (2003) that if change was to succeed in an organization, one needed to understand the culture that was to be changed. If the proposed changes contradict cultural biases and traditions, the changes will be difficult to embed in the organization. Since cultures were difficult to change, organizational culture was among the sources of resistance to change (Kizza, 2003; Rogers, 2003). Thus, on the basis of the result, these studies find it logical to conclude and hence

recommend that if use of PCs by graduate students is to take root in Makerere University, then the respective units in the university should enhance their ICT cultures by (Kizza, 2003): (1) sharing power regarding ICT from the top to the bottom; (2) convincing "Makerereans" that there are more benefits in accepting change; (3) enhancing employee commitment to ICT goals through their participation in the ICT change process; (4) encouraging ICT team work; and (5) ensuring continuing ICT learning, among others.

Organizational Size and Use of PC Software

The research result disagreed with the initial hypothesis that organizational or unit size was positively related with the use of PC software by graduate students in Makerere University, which was at par with some past studies (e.g., Kanungo & Chouthoy, 1996). Otherwise, the study was at odds with several other studies (e.g., Fedoromicz & Gelinas, 1998; Koberg, 1986). The explanation for unit size not being a positive significant factor affecting use of PC software by graduates in Makerere University could be that while large units (e.g., faculties and schools) may have more slack resources (Koberg, 1986; Rogers, 2003) to buy ICT facilities. It is these large units that have more people to share these ICTs, hence, the likelihood of these ICTs being few compared to the surging number of staff and students. Another possible explanation could be inadequacy of conceptualization of unit size given that organizational size can be defined and measured in different ways (Mullins, 2002). Maybe the one used in Table 4 is different from that used by several earlier researchers, which will be food for thought for future researchers. In the meantime, the current finding has added to the contention that "There is a continuing debate about the comparative advantages of large and small organizations; or whether 'bigger is best' or 'small is beautiful'" (Mullins, 2002, p. 566) in regard to the use of ICT. Resolution of whether "bigger is better" or otherwise as far as innovation adoption is concerned, calls for further research.

Organizational Leader's ICT Change Management Style and Use of PC Software

Inconsistent with the hypothesis, the study established that goodness of unit leaders' ICT change of management style never significantly enhanced the use of PC software by graduate students in Makerere University, a finding at variance with such studies as Kanungo and Chouthoy (1996), Nassejje (2001), and Rwamukaaga (2001), in different contexts. The study thus challenged the assertion that if any change process was to be successful, it must be properly managed or led (Magala, 2001; Mullins, 2002; Nassejje, 2001; Rwamukaaga, 2001), which was surprising. Could the surprising result be due to inadequate conceptualization of unit leader's change management style (see Table 5)? Future researchers should provide an answer to this question.

Conclusion

This study led to a major conclusion that unit ICT culture is a significantly positive correlate of the use of PC software by graduate students in the university, implying that those in charge of fostering computers used in the university, such as the directorate of ICT support, should encourage respective units, which is schools, faculties and institutes to build and continually enhance unit ICT cultures as an avenue to facilitate the use of computers by graduate students therein.

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