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Supporting University ICT Developments: The Makerere University Experience

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Abstract

The integration of information and communication technology (ICT) services and systems into the functions of an enterprise will be easier when there is a clearly identified strategic need, with ICT responding to the vision and strategic priorities. The experience of Makerere University is used to highlight best practice approaches to addressing the key challenges of: lack of awareness; mindset and fear; the process; and sustainability. It is argued that a good ICT policy and master plan developed with the full participation of the stakeholders is a key ingredient for success.

Résumé

L'intégration des services et systèmes TIC au sein d'une entreprise peut être grandement facilitée, une fois que l'on a clairement identifié un besoin stratégique spécifique, et que l'on fait appel aux TIC pour réaliser une vision et des priorités stratégiques précises. L'expérience de l'Université Makerere est mise en avant pour présenter les pratiques exemplaires, permettant de relever les défis liés au faible niveau de conscientisation, aux conceptions établies, au processus en question et à la viabilité d'une telle opération. Ce texte soutient qu'une bonne politique, ainsi qu'une stratégie globale en matière de TIC, définies en collaboration avec l'ensemble des parties concernées demeurent la clé du succès pour une telle opération.

Introduction

Makerere University is an institution in a continuous state of transformation. One of the adopted strategies in this transformation is the integration of information and communication technology (ICT) in all the university academic and administrative functions. The planning phase of this project started during the early part 2000. The integration of ICT in any enterprise, especially a university the size of Makerere, presents multiple challenges.

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See also <http://www.makerere.ac.ug/dicts/team/tusubira.htm>

This paper uses this ongoing exercise as a vehicle to highlight lessons and demonstrate what should be a winning strategy.

The paper starts by addressing the genesis of change that led Makerere to the strategic decision to use ICT as a vehicle for transformation. The challenges and the process, especially the formulation of the ICT Policy and Master Plan, and implementation with the support of development partners, are also discussed.

The genesis of change

It is the view of the author that the poor governance that Uganda experienced from the late 1960s to the mid-1980s, with all the repression, atrocities, deprivation, and suffering, was a blessing for the Ugandans who survived. Survival became a daily challenge that exercised one's wits and abilities to the extreme. Darwinian theory was experienced in a span of just two decades: It was not the strongest, nor the most intelligent that survived, but those most responsive to change.

Uganda therefore started the late-1980s with a crop of people used to getting along in the most adverse circumstances. Improvement in governance and sensible macro-economic policies are all that was required to ignite the creativity of people used to surviving under worse circumstances. Yes, there has been a lot of foreign investment, but that alone would not have resulted in Uganda's continuing recovery.

This is the entry point for Makerere University: an institution that, like all Uganda institutions, had been driven to near collapse during the two decades; an institution that, with the other multiplicity of demands on the national budget, could not expect sufficient government funding. Like other Ugandans, the Vice Chancellors who managed it, the faculty who gave instruction, and the administrators, had to break the mould in order for the university to survive.

The traditional approach of donor conferences was tried. It brought some responses, but nowhere near enough to address the huge challenges of rehabilitation and rejuvenation. Makerere demolished the ivory tower mentality and changed the admission paradigm, to the continuing consternation of many of those admitted under the old paradigm, and many in the population who have a convoluted pride in the old exclusive image of the ivory tower.

A new admission paradigm

Makerere used to admit the cream that would be trained to man the civil service and the private sector, with guaranteed employment. The objective was to identify and refine the best, under conditions far beyond the incomes of the majority of society. Makerere dropped this approach, deciding to be-

come instead a place that educates as many of the Ugandans that want a university education as possible. It has become inclusive rather than exclusive.

Makerere used to admit only those students that could be paid for by the government, with thousands of Ugandans seeking worse quality university education outside the country at very high cost. Makerere decided that it could maximize the use of resources (space, time and faculty) and admit private students in order to finance recovery and development needs.

Makerere used to offer courses that it deemed useful: take it or leave it. Makerere now offers courses that the market considers useful and is willing to pay for, with institutionalised processes in many cases for determining what the consumers of the graduates consider relevant.

Accommodation of students and staff used to be the priority. Provision of pedagogic facilities is now the priority, and new academic buildings are replacing former staff residences.

Makerere changed and bootstrapped itself, albeit with some negative consequences discussed below. It became a shining example of institutional transformation. The Ugandans who run it were from the same stock of Ugandans that had learnt to survive by their wits. They applied their wits to the survival of their institution.

The chaos of change

Makerere University succeeded beyond its dreams, and student numbers rose from less than 5,000 to more than 20,000 in less than 10 years. The consequences: systems, ranging from the processing of admissions, delivery of instruction and examining, management of academic records, management of human resource and financial records, availing books, and routine administration, started grinding to a halt. Public confidence started eroding, and there have been many indignant, and sometimes justified, complaints. It was a nightmare to register at university, get an academic transcript, convince the university that one has paid fees, find literature and to obtain any information of any description became a Herculean task.

Total chaos started reigning, and had to be addressed before institutional collapse occurred. Yes, the academic history and sheer stubbornness maintained the momentum, but solutions had to be found, and fast.

ICT is taken on board

Makerere University was, in the late 1980s and early 1990s, one of the first (if not the first) entities in Uganda to be an e-mail service provider under the address mukla through ESANET. Makerere, because of lack of awareness, did not appreciate the tremendous opportunity here and neglected it. The result was that mukla was left to the wits of a few individuals, who eventu-

ally gave up. Again in the early eighties, some pioneers, notably Professor Mugambi, pushed for placing computerisation high on the agenda of Makerere University, with some success in getting commitment from the government of Uganda to provide funds under an African Development Bank loan for some computer equipment and a basic limited network. Real progress was however very limited until the year 2000.

This history is given to show that a few people in Makerere have always been aware of the benefits, and indeed pushed for, computerisation. These were however isolated efforts that never gained prominence. The pioneers, led by Professor Mugambi, must however be saluted: they started off, in very adverse circumstances, what has eventually become a major university undertaking.

In reality, it was not until the chaos of change was experienced that the introduction of ICT became a do or die issue. The old manual systems were failing. The reputation of this premier institution was suffering. Makerere had to be responsive to change to survive. The academic and administrative management of a student population of more than 20,000 as well as academic and administrative staff of more than 3,000 was otherwise in a shambles. The environment was not conducive to instruction within the new learning paradigms. The integration of ICT in all the functions of the institution was consequently identified as a priority strategic objective if Makerere was to achieve its mission and fulfill its vision.

Herein lies a critical lesson: The integration of ICT into the functions of an enterprise will be easier when there is a clearly identified strategic need. ICT must respond to the vision and strategic priorities of the enterprise.

It became the dream of the current Vice Chancellor, Professor Ssebuwufu, to bequeath the University a legacy: a modern ICT-enabled university where all major systems are fully automated and efficient; and where the new instruction paradigm, facilitated through e-learning, is the norm.

The challenges

The normal focus of challenges in implementing ICT services and systems is often perceived as financial resources to buy computers and software, and to set up and operate international and internal connectivity on a sustainable basis. The challenges, in our experience at Makerere University, go far beyond this. We found the following critical issues that, if not properly handled, become barriers to success.

One, is the lack of real awareness about the benefits of ICT, and the implications if the university does not integrate ICT in its functions.

Two, is mindset, fear, and consequent unwillingness to face the changes from the highest decision makers to the lowest operational levels. In such a

situation, enterprise resources therefore cannot be committed to joining the information and knowledge society.

Three, is the process: how does one go about it? Integrating ICT in private and public enterprises is a new area in Uganda. We must develop local expertise to plan and manage the change.

Four, is the lack of a clear perception of how ICT resources can be sustainably managed, the operational risks, and likely escalating costs of poor information resource management. Information resource management (IRM) is another area where local expertise needs to be developed if we are to contain costs while ensuring reliability and efficiency.

Addressing the challenges

Creation of awareness and ownership

ICT must always be introduced in the context of an enterprise's strategic objectives. It is just one of the many various strategic approaches that contribute to the achievement of the enterprise goals. The starting point is therefore a clear understanding of the enterprise vision, mission, and strategic objectives.

Step two is the identification, by the users – not ICT professionals – of the constraints and problems that an enterprise has in achieving its strategic objectives, and this should encompass all constraints and problems. The users really understand their processes and problems better than ICT professionals, and only need to be guided in verbalising them.

Having identified constraints and problems, ICT is then introduced as an approach that solves some of them, making the enterprise more efficient and productive. This third step has two stages:

- Putting ICT in context. It is important that users appreciate what ICT is, including its strengths, limitations, and risks.
- Looking at organisations that have integrated ICT in functions similar to those of the enterprises: learning from best practices.

The fourth step is a basic definition of functionality by the users. This must be a high level definition that should avoid direct reference to technology.

Finally, the users must develop timelines, and put in place users' project teams that will move the process forward. ICT professionals must be available at all stages to give information and, where really necessary, guidance. ICT professionals **MUST NOT** take over the process.

The approach in Makerere has been to run users' workshop where users are also resource people. The sessions have been structured such that all participants give their input. It is our experience that having gone through this process, the majority of users obtain a better appreciation of ICT and its

benefits, costs, limitations and risks. More importantly, the users feel that they own and control the process, as indeed they must if success is to be achieved within the shortest possible time.

Addressing the mindset

Addressing the mindset is probably the greatest challenge. Implementation of ICT is not simply the introduction of new technology, but a complete re-thinking of how the enterprise's functions are achieved. Success only comes when people are able and willing to change their working habits and thinking processes. Planning for the introduction of ICT in Makerere has provided an opportunity for a complete re-evaluation of all the processes. The rallying cry: 'Achieving more with less'.

Users must be willing to change, to re-train, to acquire new skills compatible with the new environment. The biggest worry of users invariably comes up as security of employment. The message must be driven home that the issue is not loss of jobs, but liberating human potential for higher-level functions. Yes, job losses are sometimes inevitable, and, if so, this must be faced squarely. The opportunities of higher production rather than reduced human resources should be thrown onto the scales.

At Makerere, considerable emphasis has been put on the issue of addressing mindset, again in workshop style sessions where people can raise their worries and formulate answers to them. There is complete acceptance that methods of work must change. All plans are now given a student-centric focus, in recognition of the principal clients of the university.

The process

Like any other journey, the process of integrating ICT in any enterprise must be well planned if the journey is to be achieved in the shortest possible time and at the lowest cost. In addition, a well-planned process is the springboard for developing funding proposals (internal, government, or development partners).

Formulating the ICT Policy and Master Plan

An ICT Policy and Master Plan, comprising content and functionality aspects, process aspects, and the resource aspects of ICT, is formulated to aid an enterprise in achieving its strategic objectives using ICT as a vehicle. It is formulated based on the existing environment and projections. Since these projections change with time, there must be an inbuilt dynamism in the ICT Policy and Master Plan. Continuous gap analysis will help in identifying the necessary adjustments, and sometimes, radical changes to the ICT Policy and Master Plan. The only constant should be the Vision of the Enterprise. ICT Policy is the foundation for tactical (or project level) ICT management,

while ICT policy determines ICT developments and management over the strategic time horizon (say five years). In formulating an ICT Policy and Master Plan, we need to:

- **Quantify the starting point**
The starting point is where we are, and this must be fully quantified. We must fully define the enterprise in terms of its vision, mission, objectives, functions, resources (physical, financial, human resource, ICT resources and expertise, etc).
- **Know the destination**
The destination is not an ICT issue because it is fully defined by the enterprise vision, mission and strategic objectives. If these are not well articulated, this is the logical starting point. ICT must be introduced as an aide to getting to the destination, otherwise it will have no defining boundaries, and technology would have been introduced for the sake of technology.
- **Identify the vehicle**
The supposition here is that ICT has been identified as the most cost-effective vehicle, at this time, to get the enterprise to its destination. This would have been decided within the higher context of the enterprise strategic plan.
- **Define the route**
The route and management of the journey are the issues that are captured in detail by the ICT Policy and Master Plan. These need to be defined by users, guided, where necessary, by ICT professionals. Development of the ICT Policy and Master Plan must be through:
 - Enterprise wide consultations
 - Involvement of policy makers and management
 - Learning from best practices (and failures).

At Makerere University, the Policy and Master Plan formulation process has involved members of the highest policy body, the University Council, academic and administrative management, and students. Because of this participation, the priority of ICT is accepted at all levels, and Makerere is currently committing close to shs 1 billion (\$600,000) per year, in addition to development partner funds, to ICT implementation and management. The amount has been growing from year to year.

Implementation

(i) Mobilising funding

The first challenge in implementation is mobilisation of funding. It has been the experience of Makerere University that top-level commitment, institutional ownership, well-formulated project proposals, and enthusiasm of the main actors, are key factors in internal and external funds mobilisation. This is reinforced by open methods of work, including regular reporting that captures both output and financial accountability. In Makerere, for example, all information pertaining to the ICT project is in the public domain, including the web. All ICT procurements are competitively advertised on the web (See <http://makerere.ac.ug/tender>). It is a fact that to-date, Makerere has not really experienced any major financial-based constraint in the implementation of ICT services and systems.

(ii) The well-articulated policy and master plan

Proper policies and a plan have had a major impact on the process of working with development partners: funding responds to the priorities as identified by Makerere university, rather than being driven by the development partners. In addition, development partners have been very willing to have the resources they provide fit into the master plan matrix. The plan therefore moves as an integrated whole, rather than as isolated sub-projects.

(ii) Implementing services and systems

Any enterprise-wide integration of the ICT project is a major project, and it is prudent to break it down into distinctive sub-projects, each managed by a project team under the overall control of an implementation committee. At the sub-project level, we deal with tactical ICT management, concerning the planning and control of resources within the framework of the ICT Policy objectives. In the Makerere experience, the easier sub-projects are those that relate to the establishment of the necessary infrastructure and the soft resources to manage it. These are followed by projects for the delivery of web-based services (e-mail, internet and intranet access). Infrastructure as well as web-based services projects are best handled by ICT professionals within the agreed policy framework.

The harder projects are the information systems projects. There is normally a great temptation, once the ICT Policy and the Master Plan has been completed, for ICT professionals to take these over for quick implementation. This is a mistake. Long-term sustainability, and dynamic adjustment as circumstances change, require that implementation should be managed by the users, with guidance from ICT professionals where necessary. The

implementation phase is in itself a learning process. It gives the users a chance to examine in depth what they do and to define new systems. It strengthens continuing ownership of the process.

In Makerere, project committees were set up for the major information systems. These are:

- The Library Information System
- The Academic Records Information System
- The Financial Information System
- The Human Resource Information System

It has been impressive to observe how fast the project committees consisting of users rather than ICT professionals get to grips with their statements of requirements for the systems analysts. They have acquired in-depth understanding of their processes, and defined their desired system functionality.

Table 1 summarises the estimated cost of implementing ICT services and systems, including current status, while Table 2 gives the funding mobilised to date. The timeline envisages conclusion of the project phase by the end of 2003.

Table 1: Makerere ICT Master Plan Costs

Sub-Project	Status	Cost (US \$)
1 Skills Training for End Users	Started 2001 and ongoing	600,000
2 Library Information System	Tender award Dec 2002	300,000
3 Academic Records Info. Sys	Request for Proposals published	500,000
4 Finance Information System	Request for Proposals published	300,000
5 Human Resource Info. Sys.	Request for Proposals published	200,000
6 Implementation of E-learning	110 trainers trained; Policy prepared	500,000
7 Data Network	Main campus done; others started	1,500,000
8 Email and Internet Access	Implemented	350,000
9 Office Automation (Computers and Building Local area networks)	Ongoing under internal and development partner supported projects in various units	6,600,000
10 Development of ICT Support Unit	Implemented; Training continues	650,000
Total		11,500,000

Table 2: Funds mobilised

	Source	Amount (\$)
1	USAID/Leland Initiative (Including Equipment in Kind)	800,000
2	NORAD (NOK 9.5million)	1,100,000
3	Sida/SAREC (SEK 35.3 million) (Including access to online information resources)	3,300,000
4	Government of Uganda (ADB loan)	1,000,000
5	Makerere University (Internal funds to-date)	500,000
6	NUFFIC (E-learning pilot training) (dfi 497,525)	120,000
7	Various partners working through different faculties (computers and LANs)	500,000
	Total to date	7,320,000

Organisational impact

Even prior to the implementation of the main information systems, the organisational impact has been noted in the following areas:

(i) Research/ Instruction and learning

Makerere now has access to online journals and other information resources. It is a noted major user of the INASP facilitated publications. There is also an increased level of e-mail-based interaction between staff and students, and the generation of online courses (currently using Blackboard) has started. Another important aspect that is handled by the Library is the creation of local content by placing Makerere's rich social and scientific (medical, agriculture, engineering, etc) research content on line.

(ii) Administration and internal communication

The culture of email based communication and transactions is spreading very fast. Internal administrative communication is now very efficient compared to what it used to be.

(iii) Attitude

One of the most remarkable changes is in the attitude of people. Two years ago, Makerere had a 128kbps incoming internet link and hardly any networked computers. Currently, all units, without exception, are now setting aside internal funds to put in place ICT resources. Two years ago, the question was, 'Is it really necessary to allocate funds to ICT resources?' The current complaint is 'ICT procurements are too slow, and yet we are using our own funds. Internet access is too slow'.

Continuing challenges

The major hurdle of initiating implementation has been overcome. Development partners are responding to the needs of Makerere, but many challenges remain:

(i) The cost of internet access via satellite

This remains a major challenge. The cost of satellite-provided Internet access is very high. African universities, working with various development partners, are looking at ways of co-operating in consortia to reduce the cost of access. This initiative was discussed at a workshop of universities and libraries from Ghana, Mozambique, Nigeria, South Africa and Uganda in Addis Ababa. This forum, supported by The Partnership (Ford, Carnegie, Rockefeller and McArthur) of Foundations, was convened to address 'Effective Use of ICTs to Create a new Environment for Learning, Teaching and Research'. A specific task force has been set up to address the issue of the cost of Internet access.

(ii) ICT human resource retention

ICT expertise is scarce and expensive, and African universities must compete with the commercial ICT industry. This creates a permanent challenge. The Makerere approach is to accept this situation and target bright students in their senior undergraduate years to work in ICT support after graduation for a few years (when they are at their most creative) before they move on. The level of responsibility given to them is also a challenge that motivates them.

(iii) The cost of software

The cost of the common standard packages is prohibitively high for Makerere. The policy is to go as far as possible in using open source software, and join cooperative groups on the continent that are taking this direction. The University of the Western Cape in South Africa, for example, is developing an open-source e-learning platform. Another international consortium of universities is working on an Academic Records Information System.

(iv) Sustainability

The Makerere ICT policy has built sustainability into the policy statements. Heads of academic and administrative units meet to agree on levels of expenditure and the contribution of the different units. When sufficient access for students is in place, consideration will be given to a flat charge not exceeding \$30 per year at current costs. An important approach in implementation is never to implement more than can be maintained or sustained using internal resources.

(v) Providing adequate access for users

This is the largest outstanding component of the Master Plan. It requires gradual tackling to ensure sufficient resources to maintain the computers. The target is one computer per five students.

Conclusion

These are still early days in the integration of ICT in all the university functions in Makerere University. There is however a clear direction, and all indications are that the objectives will be achieved. This prediction is not based simply on optimism, but rather on the dynamism and realism that has been built in the process to ensure proactive strategic redirection where necessary. Makerere was forced by necessity to take ICT on board: it is therefore a do or die situation. Makerere shall succeed. We invite colleagues to share our experiences, and our motto: 'We Build for the Future'.