Available online at www.elixirpublishers.com (Elixir International Journal)

Leadership Management

Elixir Leadership Mgmt. 71 (2014) 24482-24487

ISSN: 2229-712X

Effective Management and Application of ICT towards the Accessibility to Learning Development in Higher Education

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ARTICLE INFO

Article history:

Received: 8 January 2014;

Received in revised form:

20 May 2014;

Accepted: 30 May 2014;

Keywords

Information and Communication Technology (ICT),
Effective management and Application of ICT,
E- learning,
Higher Education.

ABSTRACT

An effective management and application of ICT is very important in education nowadays. ICT and e-learning platform plays an important part in the successful implementation of distance, collaborative and e learning for the higher education learners. This approach in the teaching and learning process with the application of ICT culture would create intelligence, academic excellence and quality work life of working adult learners. A good higher education system is required for overall prosperity of a nation. A tremendous growth in the higher education sector had made the administration of higher education institutions complex. Many researches reveal that the integration of ICT helps to reduce the complexity and enhance the overall administration of higher education. This study has been undertaken to identify the various functional areas to which ICT is deployed for information administration in higher education institutions and to find the current extent of usage of ICT in all these functional areas pertaining to information administration. The various factors that contribute to these functional areas were identified. A theoretical model was derived and validated.

Introduction

Information and Communication Technology (ICT) playsa vital role in supporting powerful, efficient management andadministration in education sector. It is specified thattechnology can be used right from student administration tovarious resource administration in an education institution(Christiana Maki 2008). Computers can be used extensively for educational administration. The following are some of the areas where computers can be used for effective educational administration (Ben-Zion Barta et. al. 1995):

- General Administration
- Pay Roll and Financial Accounting
- Administration of Student Data
- Inventory Management
- Personnel Records Maintenance
- Library System

Universities and colleges routinely use ICT for many administrative and support tasks, such as payroll and marketing, and specialist activities such as scientific research. Until recently, this was less true of its use in their core activity of teaching and learning (Collis, 2002; Oliver, 2005).

Computers began to appear in school and university classrooms in the more advanced countries around the early 1980s. Broadband connections to schools and universities became commonplace in wealthier countries in the second half of the 1990s. In developing countries, experience is more limited. This is not necessarily a bad thing, as it should allow those countries to learn from the investments of richer countries. Initially, educators saw the use of ICTs in the classroom mainly as a way to teach computer literacy. Most now see a broader role: that of delivering many kinds of learning at lower cost and with higher quality than traditional methods of teaching allow. In addition, schools and universities increasingly use ICTs, as do other large organizations, to reduce the costs and improve the efficiency of administration.

A comprehensive approach is required in planning, developing, operating and maintaining the government's ICT security processes. The ICT security measures need to be incorporated early, in the requirement specification and design of the ICT system, before the implementation stage to ensure a cost-effective and comprehensive system. The main steps include:

(a) Assessing the current security strengths and vulnerabilities
(b) Developing ICT security policies, standards and processes
(c) Designing and developing customized security architecture
(d) Evaluating and selecting the best security system for the organization.

Literature review

Researchers have been done on distance, collaborative and e learning but rarely anyresearches done on the management and application of ICT perspective which enableaccessibility to distance education for development. This is the utmost important aspectin the process of accessing to knowledge and education because e learning environmentcan be used widely either for educational or training purposes (Shirley, 200;Alstete,2001). Besides, many studies revealed the need for ICT integration into administrative activities of higher education institutions. The various ways of introducing technology in education institution administration are the following (Caroline Salerno 2009):

- Sending e-mail notices and agendas to staff, rather than printing and distributing them
- Submission of lesson plans through e-mail
- Foster technology growth by asking parents to write e-mail addresses on medical forms.
- Insist that all teachers create a class Web page

Tele:
E-mail addresses: payid2405@gmail.com

- Attend technology conferences to see what other schools are doing, what other teachers are doing to integrate technology, and what principals are doing to encourage the use of technology in their schools and classrooms.
- Admissions through web-enabled services.
- All day-to-day activities of the institution (General Administration)
- Staff administration

However, the problem which still exists is the effective management and application of the contents and its effectiveness in accessibility by the users. Other questions that may seem difficult to answer are working adult learners learning process with weekend face-to-face instructions in the campus or learning centers with the aid of internet at home through the e-learning platform provider. Therefore as Koatas M.,Psarras, J. and Stefanos P.(2002) stated, academic community is addressing more and more on the rise of on-line community that will be instrumental in the realization of advanced learning society. Even to some extent, certain quarters would prefer to combine both the electronic enabled learning system and traditional one. Young (2001) suggested that e- learning works best within a blended training solution which incorporates traditional methods and technology-led learning. One method is to utilize it as a method of providing a consistent level of skills within a team of delegates prior to them participating in an instructor-led session so they can get the most out of the training and the instructors' time and knowledge.

Eisinger (2000) also mentioned that by combining traditional learning characteristics with the unique environment available on-line, elements that emergewould differentiate excellent e learning, namely the sharing of knowledge. The suitability of courses offered will have some impact towards the students' learning process, as Young (2001) suggested that within the web-enabled environment, learners can access courses, individual topics and performance support resources any time, from the office, at home or while traveling. Standard web browsers offer a consistent andseamless user interface across a wide variety of workstation platforms and networks. One might also ask for the fulfillment and requirements of the curriculum as well as thecontent relevancy because most of the courses followed, as Morris (1996) quoted, distance and collaborative interactive project.

The production of teaching materials could be enjoyed nationwide by academic staff participation, irrespective of their location. Newideas and materials would become immediately available for discussions and trials after dispatch by e-mail to a central server. Fry (2001) noted a series of benchmarks for ensuring distance, collaborative and e-learning quality. Evaluating program effectiveness includes a documented technology plan, with password protection, encryptions, back-up system and reliable delivery, established standards for course development, design and delivery, good facilitation of interactive and feedback and the application of specific standard for evaluation.

Koubek, and Jandl, (2000) listed out 4choices of media for the specific support depends on the needs of the individual learners. The evaluation is based on the fact that there is no best medium for a specific area or learning institution. Effectiveness in the management of distance, collaborative and e-learning platform needs to have certain quality. As Ian Roffe (2002) proposed, elements of quality control and assurance system in distance learning should produce learning materials and monitoring correspondence learning activities. However, Lewis (1989) suggested that e-learning is still too new for most learners to identify on-line learning as a preference. Thus the she ernewness of e-learning for many individuals and groups brings pressure on evaluation to yield information about its effectiveness and efficiency as a learning solution.

Theoretical Model

Rajeev Singh (2008) has specified that ICT has played a major role in reducing operational inefficiency and improving decision-making in many areas of governance. An integrated Higher Education Service System is one such concept that can empower the governing bodies to administer the progress of the education plan in the whole country and serve various stakeholders in a much better manner. According to (Christiana Maki 2008), administrative subsystems include Personnel administration, student administration, resources administration, financial administration and general administration. Ulf Fredriksson and Elżbieta Gajek (2009) mentioned that communication and general administration are the two main areas in which ICT is used in the management of education institutions. It is evident from the above that administrative activities in a higher education institution consists of student administration, staff and resources administration, communication and general administration.

According to Hossein Zainally (2008), "Information and Communication technology provides several facilities and possibilities for educational administrators to do their tasks". There is a mention that communication and information systems have changed the very nature of higher education, allowing information to be transferred, stored, retrieved, and processed by almost all who work, study or interact with a given institution. The author has also quoted from other research work that there is an increase in managerial effectiveness and efficiency through usage of Information and Communication technologies. The various research studies conducted to evaluate the extent of usage of Information and Communication technologies in multiple aspects of higher education revealed that heads of faculties utilized technology in planning, and to a large extent in the supervision and evaluation of academic affairs, student affairs, financial affairs and administrative affairs. It was concluded that information and communication technologies have an impact on increase of the scientific level of faculty members, students, and staff.

Ashish Kumar and Arun Kumar (2005) highlighted the importance of Information Technology (IT) as a modern daytechno-management tool that would benefit institutions of higher education in India. GumalaSuri (2005) reported that Spanish and Indian universities have been changing fast due to the development of new Information and Communication Technologies (ICT). The author has mentioned that user satisfaction is a widely used measure of ICT success. The author has concluded by providing a conceptual model for implementing a good technical system. It is mentioned that ICT is used in administration to support the business strategies and processes of higher education institutions, and a "dynamic new shift occurred in higher education" due to the application of ICT in University administration.

This facilitated creation of large and complex institutions that could function with increased efficiency and user-friendliness. It is also mentioned that usage of ICT in higher education administration involves "harnessing technology for better planning, setting standards, effecting change and monitoring results of the core functions of universities. One of the key conclusions arrived at is that the integration of ICTs in higher education is inevitable (UNESCO, 2009). Olive Mugenda (2006) said ICT fosters the dissemination of information and knowledge by separating content from its physical location. This flow of information is largely impervious to geographic

boundaries allowing remote communities to become integrated into global networks and making information, knowledge and culture accessible, in theory, to anyone. It is also mentioned that ICT enhances day-to-day management of institutions and the various functional areas in which it could be used are specified below:

- Timetabling
- Student admission and Tracking
- Financial Management
- Medical services
- Procurement and Store management
- Data distribution and management

ICT facilitated contact and information exchange and also promoted access to higher education. ICTs included systems for student admission and records, examination results and transcripts, finance database, human resources database, and management information. Various literature reviews reveal that Information administration is one part of overall administration of education institutions which mainly covers general and day-to-day operational activities. Hence, it could be concluded that Information administration cycle includes four major components namely, Student administration, Staff administration, and General administration. A theoretical model for Information administration has been formulated, and is depicted below:

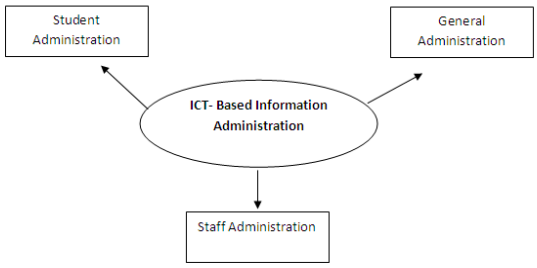

Figure 1: Theoretical model for Information administration

Information administration in this context refers to activities relating to the management of higher education institutions which is often mentioned in other studies as managerial activities in higher education institutions. Regarding on theoretical framework above, ICT- Based Information is been using tremendously in three aspects in higher education which are the student management, staff management and general administration. The administrative systems include Personnel administration, student administration, resources administration, financial administration and general administration (Christiana Maki, 2008).

Student administration is an important and integral part of information administration. This involves various activities commencing from the admission process to learning activities till processing of results and performance analysis. The integration of ICT into this process enhances the overall admission activities of higher education institutions by making it more accessible to many (Thomas Kwaku Obeng 2004). Based on the literature review, the important items identified under this category relates to the automation of admission process through e-media. This includes admission enquiry by students, applying for admissions through electronic media, registration / enrolment using computers, course allotment, and availability of information like timetable / class schedule in electronic form and attendance monitoring / maintenance through e-media.

Staff administration includes recruitment and work allotment of faculty and staff in the institution, their attendance and leave management, and performance appraisal. This also includes relevant communication to and from the institutions and among peers. Staff administration are done through Information and communication technology (ICT) helps in processing of voluminous records in a quick, meticulous, and impeccable manner thereby making data retrieval easier (Thomas KwakuObeng 2004).ICT helps in providing a good communication system in higher education system (Magni 2009). ICT helps in providing timely information to all concerned. Communication could be for internal and external information acquisition and dissemination. It includes communication between the important stakeholders of the system such as sending e-circulars to students, faculty and staff. The dissemination of information about the institution using e-kiosks is also a very important item to be considered. A very important part of Information administration is general administration of higher education institutions which includes the various day-to-day activities of the entire system. ICT into general administration has brought increased efficiency and optimal resource utilization (Hasan et al. 2007). The various items classified under this category include usage of electronic media for scheduling of halls and other resources, fee payment, and handling internal and external examination activities in coordination with the faculty members, all day to-day activities, intra and inter communication.

ICT in Higher education

There are important differences between the use of ICTs in schools and in higher education and especially in universities. One of them is the context in which schools and universities typically use ICTs. While school teaching that makes use ofICTs generally occurs with a class that is physically present, this is not normally the case when ICTs are used to deliver higher education courses. Part of the challenge in introducing ICTs into schools is finding ways to combine the teacher's presence with that of the technology.

A more significant difference is that, school education is generally free, students increasingly pay atleast part of the cost of university education. This is especially true for students in the United States. There, average total tuition at top private universities increased in real terms from about $16,300 in 1992-93 to aboutUS$19,700 in 1999-2000; and at top public universities, from about US$4,000 to US$4,800. So, one of the driving forces behind the spread of distance learning in both schools and universities are the desire tocut costs. But the pressure tends to be stronger in higher education, because it comes from the students as well as from the educational policy-makers. But the pressure tends to be stronger in universities, because it comes from the students as well as from the educational policy-makers.

In terms of their use of ICTs as a teaching tool, universities fall into three broad categories. Many conventional universities in rich countries use computers in the ways that schools do—as a teaching tool or to improve the efficiency of communicating with students and of administration. The technology of distance education has become increasingly sophisticated. While many higher educations in developing countries rely on relatively simple technologies, such as satellite television, others use a wide variety of techniques for distance instruction. For example, some use techniques such as online discussion, allowing a degree of student interaction that is impossible in print-based distance learning. In the United States, live video instruction is now the most popular and fastest growing mode for delivering distance education. Other popular technologies include WebCT or Blackboard, two web-based management systems for both course management (course content made available in web) and

administration (for instance, student IDs, building access, and campus commerce).

However, for developing countries in particular, costs of distribution can still be a formidable obstacle. If distance learning is to achieve its potential in developing countries, inexpensive and efficient communications are essential. Technologies such as low-cost WiFi and VSAT will gradually bring down the cost of connections for rural areas. In addition to browsing material at their own pace, students can listen to lectures through voiceover- IP applications which require less bandwidth than video conferencing. New mobile phones which allow the transmission of images and video will enable interactive communications, but they will certainly be used first in wealthier countries, just as personal digital assistants (PDA) are already being deployed in university teaching.

Malaysian Public Sector ICT Strategic Plan

The Government of Malaysia has launched the Public Sector ICT Strategic Plan in 2003 to ensure that the various ICT initiatives undertaken by the Government agencies will be in line with the Public Sector ICT vision. In addition it is also aimed at providing efficient and quality service to its customers i.e. the citizens and businesses. In achieving this vision, the ICT Strategic Plan will be the blueprint that defines the vision, strategic direction and framework for the usage of ICT in the Public Sector; the objectives and strategic thrust areas of ICT development for the Public Sector; as well as the implementation strategies and action plans to be taken to realize the objectives of the plan. ICT Strategic Plan Objectives are:

• Efficient and Effective Online Service
• Streamlining internal process and change work habits
• Connect agencies through secured communication network

The Public Sector has a key role to play in supporting the Government's aspirations. In particular, the Public Sector has a pivotal role:

• To enable a conducive and vibrant economic environment;
• To facilitate growth and competitiveness of the industry and the Private Sector
• To support the country's manpower needs
• To enhance the quality of life of Malaysian citizens

In order to achieve the stated objectives, ICT is recognized as a key enabler for the PublicSector to carry out its role efficiently andeffectively. The Government thus needs to define ways to leverage on ICT to transformthe Public Sector's internal operations and provision of Government services to the public. This transformation involves providing the services and information via electronic means on an 'anywhere and anytime' basis. It also requires the creation of a conducive environment, effective back office processes and seamless front-end integration across the Public Sector to encourage citizens and businesses to adopt the new practices. Figure 2 summarizes some of the reasons for strong ICT agenda in Malaysia:

Key Organizational Structures

The following are some of the important organizations involved in spearheading the ICT programmes in Malaysia:

E-government Steering Committee(EGSC)

This is the highest level of the E- government implementation structure. The Steering Committee is chaired by the Chief Secretary to the Government. Members of EGSC include representatives from various government agencies such as the Economic Planning Unit (EPU), Implementation Coordination Unit (ICU), National Institute of Public Administration Malaysia (INTAN),Treasury, Ministry of Energy ,Communications and Multimedia, Malaysian Administrative Modernization and Management Planning Unit (MAMPU), Office of Auditor General, Public Service Division and Multimedia Development Corporation (MDC). MAMPU acts as the secretariat to the EGSC.

Figure 2: Pushing factors for ICT development in Malaysia

Bil	Reasons	Descriptions
1	Political Will	• Political commitment • Visionary leadership • Government policies and strategies • Strategic programs • Explicit funding commitment • Legal and regulatory
2	National ICT Policy Strategies	• Enhancing Position as a Global ICT and Multimedia Hub • Towards Ubiquitous Communications Network • Bridging Digital Divide • Rollout Designated Cyber-cities and MSC Flagship Applications • Fostering New Sources of Growth • Increasing Development of the ICT Workforce •Accelerating e-Learning Acculturation; and • Enhancing Information Security
3	ICT Strategic Programs	• National strategic ICT roadmap • Development of local content & industry • Shared services outsourcing • New sources of growth • DAGS roll-out • e-Learning implementation • ICT for All • MSC multimedia applications
4	MSC Malaysia – ICT Successes	•Computerisation of Government Agencies • Bridging the Digital Divide •Communications Infrastructure Service Provision Program • Telecentres • ICT Training/Services • ICT Funding • MSC Multimedia Applications • ICT Research and Development
5	Infrastructure	• Accessibility • Availability • Affordability
6	Human Capital	• Programs to Bridge the Digital Divide – Digital Dividends • Affordable Devices • Skills development • Knowledge workers • Certification
7	Content	• Development of local content • Content Focus Areas - Mobile / 3G - E-Learning - E-Commerce - Broadband Content - Creative Multimedia – Animation, Games • Translation engines • Digitization of content
8	R&D and Technology	• New technology • Standards and Certification • Funding mechanisms
9	Environment of Trust and Confidence	•Sustainability – globalization / competitive environment • Human capital/capacity building – the need to align with new requirement/needs of the industry / new economy • Harnessing MSP in meeting global and national goals • Adequate indigenous content for meeting needs of local

The key roles of the EGSC are to provide the policy direction and approve the E-government programme and activities. In addition, the committee also monitors the implementation progress of each pilot project under the responsibility of the lead agencies.

The Multimedia Development Corporation (MDeC)

Established in 1996, the MDeC leads the development and implementation of the MSC. A government -backed organization, it acts as champion and international promoter of the MSC. Its stated mission is "to shape a world leading environment, attract and nurture leading-edge and world class companies, facilitate knowledge transfer and wealth creation, and build a value-based, highly effective institution". MDeC acts as a "one-stop shop" facilitating applications from companies to re-locate to the MSC Malaysia. It shapes MSC-specific laws, policies and practices by advising the government and standardizes MSC's information infrastructure and urban development. In facilitating the establishment of company operations within the MSC, the MDeC serves as champion, facilitator and partner. As a performance oriented, client focused agency, it endeavorsto cut through bureaucratic red tape to provide timely information and good advice, expedite permit and license approvals and introduce companies to potential local partners and financiers. One division of the MDeC is the MSC Venture Corporation, created to provide venture capital to innovative and emerging ICT enterprises and multimedia companies at the start-up, growth and pre-IPO stages.

Malaysian Administrative Modernization and Management Planning (MAMPU)

MAMPU was set up in 1977 as a central agency within the Prime Minister's Department. It was entrusted with the task of introducing administrative reforms in the public sector to upgrade the quality, efficiency and effectiveness of the Malaysian public service in accordance with national goals. MAMPU advises the Government in the area of organizational management and acts as consultant to various agencies for organizational development. It also provides technical and management expertise as the central agency for ICT development and office automation in the public sector. MAMPU has been intimately involved in the implementation of two key programmes, namely the ISO 9000 (also known as ISO 9001:2000) quality standard and the Electronic Government flagship of the MSC project.

Recommendation

There are other academic burdens which have to be reduced and deal with or it will affect the portal administrators' effective management of LMS. The implementation of e-learning application needs to be scrutinized. Special task force or a supervisory panel at ministerial level must be set up to supervise the implementation stages. Therefore, the setting up of independent distance, collaborative and e-learning center in each public university governed directly by the university with full-time staff and incorporated as an independent faculty with standardize LMS in the accessing and dissemination of knowledge under the patronage of the Ministry of Higher Learning.

Government synchronizes and connected to enable a more efficient and cost effective learning system to transform the country's population into learned human capital. The success also requires a team of skillful, dynamic, experienced, confident and committed e- learning portal administrators and course managers. All in all, the effective management and application of ICT in distance, collaborative and e-learning in the eastern region should follow a constructed model based on religious perspective. In gearing up for the wholesome human capital for the country, every quarter must sacrifice for the good course. For this matter, the public and private sector employees have to contribute by giving allowances in terms of time off for their staff to concentrate in their learning process as adult learners. The adult learners are not only assets to the department but also to the nation.

The government must play its part by installing and commissioning the broadband facility and extending the bandwidths throughout the country. Constant supply of electricity throughout the country is a must to ensure the success of the project. Malaysia has been very successful in this perspective because both the telecommunication and energy divisions are under the charge of one ministry. The proposition of a Malaysian comprehensive distance, collaborative and e-learning model must be carried out with immediate effect.

The main concerns in this model are that the e-learning portals administrators and course managers have to equip themselves not only with the knowledge in writing learning contents but also management science with religious touch, which is vital. However its success depends much on the managerial skills towards the guided distance, collaborative and e-learning should be referred to. In conclusion, the utmost important element in the success of management and application of ICT in distance, collaborative and e learning in the Malaysian tertiary education in the preparation of high quality human capital and the realization of the country's vision to be a develop country by year 2020 is the accessibility to learning for development of lifelong learning for every individual Malaysian.

Conclusion

The Malaysian adult learners' distance, collaborative and e-learning program is still a model of integrated and guided approach whereby face-to-face lectures and tutorials, chalk and talk in the conventional classroom continue to exist alongside the integration with modern techno-learning platforms. The formulation of the e-learning application curriculum and and ragogies will stay for many years to come. Gradually, by inculcating the new techno -education culture, we are able to realize the country's vision. Besides, by enhancing the usage of ICT on these functional areas and especially for general administration will enable enhancement of overall information administration in higher education institutions in the realm of global competitive environment. Success will require support from many stakeholders, including all agencies in the educational system and sufficient funds to establish and maintain the application and management of ICT in the institutions. In addition, policies, norms, and guidelines will have to be established to promote the use of ICT in learning development.

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