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Impact of Web Portals on E-Learning

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ABSTRACT

This study examined the impact of web portal on e-learning among undergraduate students; it considers the benefits of using the portal and the problems encounter when using the portal. A pure qualitative method using descriptive survey approach was embarked upon. Focused group discussion method was used for data collection. The questions asked were trial tested and analyzed to determine its validity and reliability. Responses obtained were analyzed and presented thematically.

The results revealed that the generality of the respondents confirm that web portal positively impact e-learning in the following ways: being used as supplementary to pass across information to the learners in addition to learning through the electronic format; enhancing information sharing, information needs and processing of each user; provide the strategy to overcome the problem of distance; and improving respondents computer and information literacy skills. The study also revealed the challenges faced by the students when using web-portal. These are Loss/Forgotten Password, Slow Network/ Server Access Problem, Incessant power failure and Swift and unannounced removal of important information.

The study concluded pointing out the implications and the recommendations based on the findings for the improvement of the use of web portal for e-learning at the university.

Keywords: *Web portal, Internet, Intranet, Information system, Users' satisfaction, Undergraduate students,   University   of   Ilorin, Nigeria.*

1. INTRODUCTION

A portal is an application that primarily integrates the organization's information and provides users with a single interface. A student portal is a web-based interface to access personalized information, resources, applications, and education/academic options with which students can reach a range of internal and external sources through a network connection in a password-protected setting. The use of portals by university students has been growing steadily and – despite many restrictions such information technology (IT) budgets – investments in portal solutions are still growing. As noted by researchers, portal projects are usually complex, time and cost-consuming, and entail a high failure risk. Notwithstanding, the university of Ilorin Nigeria has embarked on the initiative of creating a web portal for all her students for the past five years and lots of resources have been invested on the project and students have been enjoying the benefits.

The assessment of portal impact and benefits is, however, often problematic, since common cost-benefit analysis methods do not take intangible impacts and intervening environmental variables into account. Similarly, measuring the success of information systems (IS) and understanding the return on investments on IT is the focus of a large and growing body of research (Dehning and Richardson, 2002).

Enormous benefits and advantages are associated with the implementation of a university portal particularly to e-learning. Karim and Masrek (2005) noted that portal implementations are helpful in helping enterprises achieve organizational effectiveness. According to Eisler (2003) other than providing a personalized and customizable user interface for accessing both internal and external information, a campus portal also provides the opportunity to create gateways to information and points of access for constituent groups. Bajec (2005) noted that today, almost all universities are either developing or purchasing portal solutions for their needs. Despite the growing interest in universities adopting portal technologies; studies addressing the issue of its impact on e-learning are still very limited. Moreover, examining e-portal impact on e-learning from the students' perspective has been ignored. Extant literature has revealed several studies investigating employees'/staffs' portal. However, evaluation and investigation of students' portal have been neglected. Since the University of Ilorin has invested huge resources on the provision of portals for all her students, it is important to find out whether or not these students especially the undergraduate ones who constitute the majority have the perception that the portal has impact on e-learning.

The bulk of the studies that were found in the literature were mainly concerned with reporting the experiences of developing a university portal or setting plans and strategies for its development (see Jafari, 2003, Eisler, 2003; Thomas, 2003; Campbell and Aucoin, 2001; Frazee et al., 2003; Bishop, 2003). To bridge the already identified gaps above, this study examine the impact of web portals on e-learning and consider the benefits of using the portal and the problems users encounter when using the portal in order to identify levers for improvement.

2. LITERATURE REVIEW

2.1 Background on University of Ilorin

The University of Ilorin was established by a decree of the Federal Military Government of Nigeria in August, 1975 with mandate to implement one of the educational directives of the country's national development plans which aimed at providing more opportunities for Nigerians aspiring to acquire university education and to generate high level of man-power. In line with this goal, the University of Ilorin Library was established in May 1976 to support teaching and learning of the parent institution. In order to meet information needs of the University community, the library acquired numerous print and electronic materials that cut across all disciplines of studies in the University. The University library, through the support of the National University Commission (NUC), subscribed to a number of electronic information resources (Databases) that are expected to also enhance teaching, learning and research activities of the University community. These electronic resources can be accessed either from the Electronic library centre or from any computer connected to the internet with the aid of User name and password already provided to members of the University community.

2.2 The Concept of Web/E-Portal

The concept of an Internet Portal is a relatively recent phenomenon. It is seen as collection of information and services of an enterprise or as a community accessible to members through a single secure and customizable Web site. An Enterprise Portal is a user-centric enterprise-wide web-based system that incorporates a sophisticated integration of all types of information content and services. As a core organizational information system, it is often an internally developed and designed to suit the particular needs of organizational stakeholders (employees, clients, customers). A campus portal is an instance of an Enterprise Portal in a tertiary educational institution.

Portal applicable to tertiary learning institution are usually referred to as 'campus portal'. Campus portals were pioneered by UCLA in 1999, to be followed by similar systems at the University of Washington and the University of Buffalo (Moskowitz, 2001).

Roberts-Witt (1999) claimed that there are three types or portals. These are: Data Portals which is concerned with managing such structured data as corporate databases with a single point of access. Information Portals, this is similar to the Data Portals. This type of portal is concerned with managing such unstructured data as e-mail, text, and other documents by using indexing and cataloguing systems with search and retrieval functionality. Collaborative Portals is the type that focus on group interactive functionality as well as the integration of the enterprise by bridging intranet, extranet, private source data, and public information. The users are also allowed to access all collaborative functions such as classified topics, conferencing, team discussion, news channel, calendaring, and the abilities to personalize the interface. Fuangvut and Hasan (2005) assert that campus portals have many specialized features.

However, they are distinguished by their main user-base: the students. Although students are a critical component of the social life of the institution they are not employees. Nor can they necessarily be considered the organization's customers as they are frequently not the ones paying the bills. Like most professional organizations, an educational institution has two types of employees, in their case academics and administrative staff. Consequently, the set of stakeholders involved in a campus portal is quite diverse and their needs complex. Base on this, Fuangwut and Hasan (2005:5) summarized the characteristics of campus portal as including: "personalization, customization, easy to use, categorization, single point authentication and access, powerful unified search engine, unified presentation of information, communication and collaboration tools and security".

2.3 E-portal at the University of Ilorin

The University of Ilorin e-portal contract agreement was signed with the company named Simplex Automation System Ltd, Lagos, Nigeria on February, 2008. The e-portal was developed for the University of Ilorin students and staff Records Management. It is intended to document the processes, to manage students' admission, registration, academic records, courses administration, online results and transcript processing, online payments (payment via the portal using online electronic means), assignment of courses to lecturers. Among other functions are;

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- View personal details
- On-line registration
- Change of course/ programmed online as applicable
- Hostel accommodation
- Review courses
- Check current charges
- Download other registration forms
- Manage password

The University of Ilorin student's portal was put into use at the beginning of the new session 2008/2009 (11th of November, 2008).

2.4   E-learning and Web Portal

The term learning means "to gain knowledge or understanding of or skill by study, instruction or experience". Unfortunately e-learning does not possess such a precise and clear definition. The understanding of the e-learning concept varies from "training via the Internet" according to (Computer User High-Tech Dictionary, http://www.computeruser.com), to a more extended definition as "an approach to facilitate and enhance learning by means of personal computers, CDROMs and the Internet" as explained in (Wikipedia, the free encyclopedia, http://en.wikipedia.org). E-learning is the delivery of education (all activities relevant to instructing, teaching, and learning) through various electronic media (Koohang & Harman, 2005). The electronic medium could be the Internet, intranets, extranets, satellite TV, video/audio tape, and/or CD ROM. An e-learning web portal is able to provide students with network access to information covering all learning resources and services available to them. Typical e-learning portal features contain one or more of the following components (Volodymyr & Wilfried, 2004): organization, information, documentation, assessment and communication to mention just a few.

An e-learning platform is specialized software, sometimes referred to as the virtual learning environment or the Course Management System (CMS). This software should be capable of providing facilities for both the development and the delivery of e-learning services. The CMS is usually a distributed online system connected to the Internet through the e-learning web portal. Several communications media are used for e-learning including the Internet, Intranets, extranets, video/audio tape, and/or CD ROM. From history, some educational institutions have started the process of creation of enterprise open source applications such as course management systems and electronic bulletin (e-bulletin) board. These are some of the initiatives taken by higher institutions to move away from proprietary software towards open source.

Kim, Chaudhury and Rao (2002) claimed that there are three types of web portals:

- Data Portals: concerned with managing such structured data as corporate databases with a single point of access.
- Information Portals: In contrast to the Data Portals, this type of portal is concerned with managing such unstructured data as e-mail, text, and other documents by using indexing and cataloguing systems with search and retrieval functionality.
- Collaborative Portals: This type is focused on group interactive functionality as well as the integration of the enterprise by bridging intranet, extranet, private source data, and public information. The users are also allowed to access all collaborative functions such as classified topics, conferencing, team discussion, news channel, calendaring, and the abilities to personalize the interface.

2.5   Impact of Web Portal

The web portal is implemented in order to provide e-learning and web integration facilities. This has proven to be very convenient in flexible administration and integration purposes. Web portal comprises of appropriate learning and communication tools that can enable translators to upgrade their knowledge and skills in the use of current localization technologies, from anywhere, anytime, at their own pace. Participant in an e-learning course can be a teacher to the rest of participants. With their help, and assisted by a course facilitator, each participant should be able to construct his or her own knowledge and technical skills using the learning resources available in the course Web portal. This pedagogical methodology is known as Social Constructivism.

According to Guzmán (2005), a Web portal is a means by which translators can get training in localization tools. Normally, the portal (e.g. Blackboard) provides a number of assignments with instructions on how (and why) to perform different tasks with different localization tools. The course facilitator is available to help (rather than teach) participants in real time by using a chat room at scheduled times. The use of a discussion board lets course participants to organize an online community

where they can post questions on these tools and discuss problems and possible solutions with their course peers

There are other important effects resulting from the use of an e-portal system. This may include improvements in learning performance, effectiveness, domain or knowledge, and decision making (Cusmain, 2005). In this study web portal impact on e-learning refers to the impact on individual users in terms of enhancing information sharing, information needs and processing of each user. Web-portal system contains all the tools and resources required for e-learning university: study navigator to guide the learning process, software and resources for the learning management system (LMS), core curricula, training content; means for innovative training; tools for assessment and certification.

Web portal is an information system, going by Rao (2006) description of an information system that was implemented in a real-world setting along with an information systems success survey incorporating the three suggested factors of information system success. This paper presents the results of measuring and monitoring a university student services system (Web portal). The study includes three parts: a student perception survey, statistics of system usage by students, and the impact/benefits of the system on e-learning, and the challenges. It was found that the new system not only decreases overall operational costs, but also increases the service levels to students and increases overall student satisfaction. In addition to the cost savings, increased service levels and student satisfaction, the implication of the study is that through student survey results, the university management and students are also realizing reliability, quality, and security when using the system.

Web portals contain a variety of contents that can be classified into three groups: pedagogical and research, informational and communication, and administrative (Popovic, Lindic, Stemberger, and Jaklic (2009). Through the web portal, teachers are able to publish news, prepare term plans, and use document system to publish course materials. Teachers, students, and external collaborators (e.g. guests from business sphere) can collaborate with each other in on-line discussions. Students are able to access on-line study materials and sources and take web-based exams. Popovic et al. (2009) also pointed out that with the help of web portal, surveys carried out at the end of each course, the gathered data is promptly analyzed and results delivered to faculty and staff to provide feedback for educational process improvement. Informational and communication elements include different information connected with the study (e.g. news from courses, important assignment

dates, changes in teachers' office hours, exam examples and practice etc.) and information regarding corporate relations, international relations, and career services. It is also noted that web portal elements cover administrative processes, including students signing up for final exams, reviewing their current and past grades, filling out administrative forms and ordering various certificates (e.g. certificates of enrolment, certificates of passed exams, GPA etc.), reviewing available jobs from partners, or looking for available internships. Learners and teachers of e-learning can manage their email accounts, record their working time, and review received assignments.

3. PREVIOUS RELATED STUDIES

Fuangvut, and Hasan, (2005) reported the findings of research into the characteristics, types and methods of the development of campus portals. In the process of collecting and analyzing the data collected for the research, it became apparent that the divergent views of different stakeholders could be related to the characteristics that are popularly associated with values of generations X and Y, and 'the baby boomers'. The paper identifies these characteristics and applies them to the findings of the case. The conclusion from this analysis indicates that attention to intergenerational issues may have considerable impact on the success of many information systems projects.

Dias (2001) reviewed literature on corporate portals, whose main purpose is to provide easy access to enterprise digital information. Corporate portals use metadata and extensible Mark-up Language to integrate unstructured data to structured data from enterprise operational databases, supplying access to corporate information through a personalized interface, available over the internal hypertext network on the Intranet. A corporate portal functions as a single gateway to all information and knowledge resources in an enterprise. At the beginning, the author describes the improvements in information management, going through different stages from physical control of information containers to corporate portals. This paper presents definitions, concepts, main components of corporate portal architecture, and different kinds of corporate portals found in specialized literature. The author also points out the potential benefits of this technology to enterprise business.

Goose, S. et al (2000), researched on Vox Portal, a scalable VoxML client and a WWW Server-hosted dynamic HTML«VoxML converter. They reported that, Interactive voice browsers offers an alternative paradigm that enables both sighted and visually impaired users to access the World Wide Web. In addition to the desktop

PC, voice browsers afford ubiquitous mobile access to the World Wide Web using a wide range of consumer devices. This technology can facilitate a safe, 'hands-free' browsing environment. The interest in ubiquitous computing has escalated in recent times. Ubiquitous, or pervasive, computing is the attempt to break away from the traditional desktop interaction paradigm by distributing computational power and resources into devices in the environment surrounding the user.

From the above synopsis of related studies, it is clear that limited studies have examined impact of web portal on e-learning. There seem to be no single study conducted particularly in the context of the University of Ilorin Nigeria and Africa as a whole on this subject matter. Therefore, this study will constitute one of the pioneer studies on determining the impact of e-portal on e-learning from an African context.

4.   OBJECTIVES OF THE STUDY

The major objective of this study was to examine the impact of web portal on e-learning from the perception of the users at the University of Ilorin, Nigeria in the light of the resources that have been invested on it. The sub-objectives of the study were to:

a. Determine the students' perception of the impact of web portal on e-learning.
b. Identify the challenges faced by the students when using web portal.
c. Suggest solutions as means to levers the improvement of web portal.

4.1   Research Question

In the light of the above stated objectives, the following research questions were developed.

a. What is the perception of the undergraduate on the impact of web portal?
b. What challenges are faced by the undergraduate students when using web portal?
c. What possible solutions can be proffered to levers improvement of web portal?

4.2   Methodology

A pure qualitative method was adopted in the conduct of the study using survey design approach. Owing to the general limitations of quantitative methods in capturing the fabric of phenomenon and the necessity to understand informants' perceptions about the focus of the study, only qualitative method was employed.

Moreover, qualitative techniques are suitable for their taking on-board people's experiences and the meaning they individually or collectively attach to issues. This approach, with its characteristics of profundity and thoroughness, is more particularistic about contextual issues (Devine, 2002: 199) such as impact of web portal on e-learning. This is done by placing informants' perception in the context of their individual experiences.

4.3   Population and Sample

The target population for this study comprised the undergraduate students at the University of Ilorin, Nigeria. Currently, the total population of undergraduate students in this university is 16, 800. Since the study adopts a pure qualitative approach therefore a relevant sample must be used. Based on this, a purposive sampling method was embarked upon to select sample for the study. At the moment, there are twelve faculties at the University of Ilorin, Nigeria. Eight faculties based at the main campus of the university were sampled. This is to avoid the difficulty of travelling to the remaining three faculties located some distance away from the main campus. Using purposive sampling technique, 30 students were sampled from each of the eight faculties; this gave a total of 240 students representing the sample for the study.

5.   PROCEDURE FOR DATA COLLECTION

Since the study employed a pure qualitative approach, interview was used to collect data. The sample from each of the faculty constituted a focus group. This gives a total of eight focus groups that was constituted for the study. Each focus group was interviewed on the subject matter of the study. The interview items contained predetermined questions on the subject matter of the study. Respondents who have a busy schedule were administered the interview schedule/ guidelines which contained all interview items. Through this, respondents in this category were given opportunity to express their responses in writing; this was later transcribed and interpreted. The interview scale was validated before administration to ensure its adequacy for the collection of data on the study. It should be noted that limited data can only be gathered through interview compare to other methods of data collection. This justify the 240 sample used in this study.

5.1   Data Analysis and Results

Data collected was analysis thematically based on the objectives of the study. The results of the analysis are presented as follows.

5.2   Impact of Web Portal on E-Learning

The first objective on this study is to determine the impact of web portal on e-learning. To achieve this objective, respondents were asked to indicate the ways through which web portal has contributed to e-learning at the university. Common response include the fact that web portal has in no small measure impacted e-learning at the university. This is because the platform is being used as supplementary to pass across information to the learners in addition to learning through the electronic format. Not this alone, students are able to access information resources anywhere anytime, save student's time and enables courses to be covered in time, improves access to instructional material as they have opportunity to download more information resources from websites. Moreover, the respondents emphasized the impact of web portal on individual users in terms of enhancing information sharing, information needs and processing of each user. Web-portal system contains all the tools and resources required for e-learning: study navigator to guide the learning process, software and resources for the learning management system (LMS), core curricula, training content; means for innovative training; tools for assessment and certification. One focus group member also pointed out that "web portal also provides a strategy to overcome some of the problems created by distance". Without mincing words most of the findings on impact of web portal reported in this study confirm the earlier report by (Guzmain, 2005, Rao, 2006, Popovic et al., 2009).

In addition to the above, the finding also reveals that web portal impacted e-learning by providing just-in time access to timely information. Not this alone, it improved interactivity between the school, the teacher and the students. Students have the opportunity of interacting with their teacher on the information they read on the portal and deliberate on it with their teacher in class. Furthermore, the use of web portal for e-learning was considered an opportunity for the respondents to improve their computer and information literacy skills. One respondent noted that "it is important that you access the portal in order to get latest information and other vital information concerning your academic record".

5.3   Challenges of Using Web Portal

The second objective on this study is to identify the challenges faced by the students when using web portal. To achieve this objective the respondents were asked to indicate the challenges they faced when using web portal for e-learning at the university. The respondents when responding to this, emphasized that; "the most important and common challenge faced when using web portal for e-learning is the incessant power

failure. One focus group member have this to say "power is the most terrible challenge we are facing; in the process of doing something important and tangible, the power is cut off and that is the end, Sometimes, when the power is restored, you may not be able to recollect the stage you are and where to continue".

Moreover, slow network is another challenge of web portal identified by the respondent. Base on this, one respondent has this to say. "Sometimes it can take you hours to download or retrieve important information or course content/note from the web portal especially the PDF file". In relation to this, it was also pointed out by some focus group that "using web portal for e-learning is time consuming since you have to wait endlessly before you retrieve the actual information you want".   The general opinion of the respondents in this study further revealed that there is complexity of learning based on cognitive and knowledge oriented process thereby making the e-learning method using Web portal more difficult. Similarly, portal based e-learning requires greater efforts and huge resources especially financial which is not readily available. Respondents also commented on the expensive nature of access to the web portal. It is true that here at the University of Ilorin; there is limited access to computer and the Internet if a student does not own a personal PC or laptop. They have to access the portal through a cyber cafe. This is money and time consuming as slow network is always experienced. Additionally, it was also emphasized by the respondents that they do lost their password and that the school authority do remove information from the portal unannounced.

5.4   Solutions to Improve Web Portal for E-Learning

To achieve the objective of proffering solution to the use of web portal for e-learning, respondents were asked to suggest solutions as means to levers the improvement of web portal. Findings include the fact that the need to find solution to the issue of incessant power outage is very germane. Power failure happens to be one of the common problems faced by most developing countries especially in Africa.   When there is absence of power there is little that can be achieve as far as using web portal for e-learning is concerned. In the light of this, it was suggested that there should always be an alternative to power outage. One focus group member reacted this way "thank God for the ICT revolution which now provide several opportunities to combat the power outage thing. Now there is solar energy and other alternatives; only that all are still cost intensive. Perhaps, the university cannot afford to make provision for standby generating set; it is expedient to think about how quality

solar energy can be put in place to sustain the e-learning activities in the school".

On the issue of waiting endlessly for downloading to complete, it was suggested that the university should consider going for higher bandwidth as this will assist in settling the issue of slow network connection and similarly ease access to the portal both on and off campus. To solve the problem of inadequate access, the results reveal that university should Endeavour to make resources available and consider investing on buying computers with internet connections and make it free for the students. However, this does not stop them from charging users some token for making the facility available; but this should be reasonable amount and should be charged along with the school fees.

6. RECOMMENDATIONS

The study has revealed the impact of web portal on e-learning including: supplementary to pass across information to the learners in addition to learning through the electronic format; enhancing information sharing, information needs and processing of each user; provide the strategy to overcome the problem of distance; and improving respondents computer and information literacy skills . On the challenges, the study has identified a number of challenges faced by the students when using web-portal. These are Loss/Forgotten Password, Slow Network/ Server Access Problem, Incessant power failure and Swift and unannounced removal of important information and announcement. In the light of these, the university authority is called upon to see to it that slow network and server problem is ratified to enable portal users enjoy its services. Not this alone, the students themselves should take care of their pass word which some usually forget. They are advice to write the password on their cell phone or diary to protect it from being lost. Other recommendations are that:

- Adequate ICT training should be provided for the students by the university authority, this will enhance more effective and efficient use of the web portal.
- University authority should make adequate provision for power generating plant that will serve the generality of the students to forestall incessant power outage.
- University authority should employ more ICT staff for adequate monitoring and portal administration to ensure quality services delivery.

- Deadline for removal of posted information on the portal should be displayed along with the information .This will create awareness for the portal users.

7. CONCLUSION

This research has emphasized most positive impact of the use of web portal on e-learning. The challenges which students faced when using web portal for e-learning have also been identified. With the paper we make a contribution to the understanding of the impact of web portal on e-learning; the area where literature has revealed scanty of research findings. The study was limited to undergraduate students. In the long run, a longitudinal study could be made in which the impact of different participants' characteristics and its impact on users' satisfaction with the web-portal can be examined.

REFERENCES

[1]   Bajec, M. (2005), Educational Portals: A way to get integrated, user-centric university information systems, Web Portals: The new gateway to Internet information services, Tatnall, A. (ed.), Idea Group Publishing, Hershey, PA, USA..

[2]   Bishop, A.Y. (2003). Building a campus portal – a strategy that succeeded, in Jafari, A., Sheehan, M. (Eds), Designing Portals: Opportunities and Challenges, Information Science Publishing, Hershey, PA, pp.186-201.

[3]   Campbell, K., Aucoin, R. (2001). Values-based design of learning portals as new academic spaces, in Jafari, A., Sheehan, M. (Eds),Designing Portals: Opportunities and Challenges, Information Science Publishing, Hershey, PA, pp.162-85.

[4]   Dehning, B., & Richardson, V. J. (2002). Returns on Investments in Information Technology: A Research Synthesis. Journal of Information Systems 16 (1), 7-30.

[5]   Devine, F. (2002). Qualitative Methods in David Marsh and Gerry Stoker (Eds.). The Theory and Methods in Political Science, 2nd Edition. New York: Palgrave Macmillan.

[6]   Dias, C. (2001).Corporate portals: a literature review of a new conception Information

Management. International Journal of Information Management 21, 269–287.

[7] Eisler, D.L. (2003). Campus portals strategies; in Jafari, A., Sheehan, M. (Eds), Designing Portals: Opportunities and Challenges, Information Science Publishing, Hershey, PA, pp.68-88.

[8] Frazee, J. P., Frazee, R. V. & Sharpe, D. (2003). Begin with the End (User) in Mind: Planning for the San Diego State University Campus Portal. In Jafari, A. and Sheehan, M. (Eds.), Designing Portals: Opportunities and Challenges, Information Science Publishing, pp. 127-161. Hershey, PA: IRM Press.

[9] Fuangvut, T. & Hasan, H. (2005). Accommodating Inter-generational Stakeholders in a Campus Portal. Retrieved 11 May, 2011, fromhttp://www.iseing.org/emcis/EMCIS2005/pdfs/22.pdf

[10] Goose, S., Newman, M., Schmidt, C., & Hue, L. (2000). Enhancing web accessibility via the Vox Portal and web-hosted dynamic HTML«VxML converter, Computer Networks, 33:583-592.

[11] Guzmán, R. (2005). E-learning for localization tool training. Translation Today 1(2), 14-16.

[12] Jafari, A. (2003). The ABCs of Designing Campus Portals. In Jafari, A. and Sheehan, M.(Eds.), Designing Portals: Opportunities and Challenges, Information Science Publishing, pp. 7-27. Hershey, PA: IRM Press.

[13] Karim, N.S.A., Masrek, M.N. (2005). Utilizing portal for achieving organizational effectiveness. Proceedings of the International Conference of Knowledge Management, ICKM2005. Putra World Trade Centre, Kuala Lumpur, 27-28 October,

[14] Kim, Y. J., Chaudhury, A. & Rao, R. (2002). A Knowledge Management Perspective to Evaluation of Enterprise Information Portals. Knowledge and Process Management, 9 (2), 57-71.

[15] Moskowitz, R. (2001). Campus portals: come to higher education, Matrix: The Magazine for Leaders in Higher Education 2 (3), 54(3).

[16] Popovic, A.; Lindic, J.; Stemberger, M.I. &Jaklic, J. (2009). Web Triad: the Impact of Web Portals on Quality of Institutions of Higher Education - Case Study of Faculty of Economics, University of Ljubljana, Slovenia. Issues in Informing Science and Information Technology pp. 313-324.

[17] Rao, S. (2006). Distance education and the role of IT in India. The Electronic Library 24 (3), 225-236.

[18] Roberts-Witt, S. L. (1999). Making Sense of Portal Pandemonium, Knowledge Management Magazine, 42-46.

[19] Thomas, J. (2003). Indiana University's enterprise portal as a service delivery framework, in Jafari, A., Sheehan, M. (Eds), Designing Portals: Opportunities and Challenges, Information Science Publishing, Hershey, PA, pp.102-26.

[20] Volodymyr B. & Wilfried H. (2004). E-Learning: Challenges and Perspectives. Kyiv Taras Shevchenko University, HSU HH.