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Medical Universities Educational and Research Online Services: Benchmarking Universities' Website Towards E-Government

Mehrdad Farzandipour, Zahra Meidani

Department of Health Information Management/ Technology, Kashan University of Medical Sciences. Kashan, Iran

Corresponding author: Zahra Meidani PhD. College of Allied Health Professions. Kashan University of Medical Sciences, Kashan, Iran. E-mail: zmeidani@yahoo.com

ABSTRACT

Background: Websites as one of the initial steps towards an e-government adoption do facilitate delivery of online and customer-oriented services. In this study we intended to investigate the role of the websites of medical universities in providing educational and research services following the E-government maturity model in the Iranian universities. **Methods:** This descriptive and cross- sectional study was conducted through content analysis and benchmarking the websites in 2012. The research population included the entire medical university website (37). Delivery of educational and research services through these university websites including information, interaction, transaction, and Integration were investigated using a checklist. The data were then analyzed by means of descriptive statistics and using SPSS software. **Results:** Level of educational and research services by websites of the medical universities type I and II was evaluated medium as 1.99 and 1.89, respectively. All the universities gained a mean score of 1 out of 3 in terms of integration of educational and research services. **Conclusions:** Results of the study indicated that Iranian universities have passed information and interaction stages, but they have not made much progress in transaction and integration stages. Failure to adapt to e-government in Iranian medical universities in which limiting factors such as users' e-literacy, access to the internet and ICT infrastructure are not so crucial as in other organizations, suggest that e-government realization goes beyond technical challenges.

Key words: Medical University, e-government Websites, Educational Services, Research Services, e-service

1. INTRODUCTION

E-government is concerned as one of the approaches to access to organizations information and services by means of information technology (1-5). Websites as one of the main components of any e-government do facilitate delivery of online and customer-oriented services (6-8). These relations can be divided into such four functionality fields as Government to Citizens relations (G-2-C), Government to Business services (G-2-B), Government to Government relations (G-2-G), and (G-2-E) Government to Employees relations (9-10). Development and implementation of e-government involve stages called as e-government maturity models. There exist various models for e-government maturity including United Nations', Chandler and Emanuel's, Gartner's, Layne and Lee's, World Bank's, etc as the main models for E-government maturity. According to Chandler and Emanuel's four stages model, electronic government is divided into four stages: information, interaction, transaction, and integration (11-12). In this model, emphasis is mostly put on e-government

functionality fields and customer-oriented relations. Based on this model in the information stage, website design is like a directory in which citizens can access government information over the website. In the interaction stage, simple interaction between citizens and governments are enhanced; various website features and functionality are available including searching, uploading documents and forms and e-mails. At this stage for finalizing the process, the citizens must refer to working offices; however, government processes are facilitated using electronic services (11-12). Transaction refers to services that enable transactions of values between citizens and government. Citizens can pay tax, submit forms, getting or renewing licenses, passports or visas. At the final integration stage integration of services across government and agencies occurs. Citizens can access information on-line from one government portal and service centre (11-12).

Among state organizations, higher education institutes are faced with more challenges in providing services which is due to the presence of competing mar-

kets and developing customer-oriented approach (13). Studies indicate that way of management and giving educational services can affect satisfaction of students and faculty members of universities (14). Some features of e-government services and maturity make them more appropriate for universities and high education institutions than other institutes. Studies show that rate of e-government services utilization is associated with users' job relevance on information technology services (15). Universities accustomed with some aspects IT adoption in terms of e-learning and have less difficulties with e-government adoption' obstacles e.g. digital divide, e-literacy, etc. Universities and students have a rather positive attitude towards information technology (16-17). Numerous existing universities' work flows and processes including registration, learning practices instruction and educational evaluation adapted with information technology and web based tools (18-22). Universities websites serves as a value added tool in the hand of students and researchers (23-24). However, e-government adoptions extensively varied through the countries and to monitor e-government progress over a given period of time numerous methods and framework exist. United Nations Division for Public Economics and Public Administration (UNDPEPA) serves among the first organization to benchmark countries of e-government services. Benchmarking described as an assessment tool to measure an individual country accomplish to achieve e-government by over period of time and to compare its advance with other nations. Policy makers and government employ e-government benchmarking to monitor e-government service development and the efficiency and effectiveness of governmental online services (25).

This study intends to benchmark the websites of medical universities (more potential than other institutions in giving electronic services) in providing educational and research services following the E-government maturity model in the Iranian universities.

2. METHODS

Over the years, numerous benchmarking methods and framework has been emerged (26). Heeks proposed eight methods including official statistics, internal self – assessment, web metrics crawlers, pop up surveys, focus groups, internal administrative records, mass user survey, and third party web assessment to benchmark e-government practices. Categorisation is one of wide spread used approach in third party web assessment methods which gauge simple presence/ absence of pre-established criteria and categorized these criteria into stage model rating (27). The same approach was employed to compare all the websites of The Iranian medical universities in 2012 using checklist. The scoring in this checklist was based on Likert Scale (good, medium, and weak).

Preliminary checklist were developed based on educational and research activities of university and classified according to Chandler and Emanuel's four stages model. Initial checklist was assessed by 20 experts including IT, librarianship, and health information management through the focus group sessions. Baseline results indicated that all potential criteria were included in the initial checklist. The expert panel approved that the checklist is clear and comprehensible (face validity). The same experts reviewed the checklist and agreed on the criteria and categorizations, only minor change was made (Content validity). The checklist including the two main domains of educational and research services in each the four stages of information, interaction, transaction, and integration were covered. In the educational and research part, items such as introducing top educational and research managers, curriculum vitae for the educational and research staff, news and events, duration for choosing courses, presence of various educational and research forms, list of services available, list of educational committees and councils, educational and research rules and regulations, schedule for final exam, list of research committees and councils, Research council decisions, information for conferences and seminars, university educational priorities, and introducing research journals were all taken into consideration. Interactivity of the educational and research services has benefits of following administrative correspondence, record of students' marks by professors, possibility of online removing or adding courses, online student rating system, possibility for questions and answers, feedback from users, online objections to marks, possibility to complain about and criticize the university, complete and send research proposals online, download books and articles from digital libraries, following the research correspondence, ability to answer and question, online registration for congresses and conferences, and receiving cost of research project online. In this study, the transaction stage included items such as issuing graduation certification, student card, electronic education, issuing student transcripts, issuing seminars and conferences participation certification, online payment for costs of research projects, possibility for money deposits, and online judgments and approval of publishing books and articles. Integrative research and educational services covers items such as capability of following students' military services status online, online student transfer and guest, online payment for subscription to scientific association abroad for faculty members, and online possibility to participate and present articles in the scientific conferences abroad.

Test- retest was used for reliability assessment of the instrument; the researcher selected randomly a few university websites and evaluated e-government services based on the administered checklist. E-government services in those websites were again evaluated later using the same checklist (It is to mention that the websites selected were reviewed with intervals) and correlation coefficient of the two stages was

measured. We aimed to investigate the role of data collector, type of computer, and time of data collecting to evaluate the websites. It was delineated that change of data collector, type of computer, and time of data collecting can affect display of website content and evaluation. Consequently, evaluation was conducted through computers with similar hardware features and the same internet band width. Data collecting was done by a trained individual during the same time duration and at the same time in the day time.

Addresses for the websites of the universities were extracted from the Iranian Ministry of Health official website. According to the latest information obtained from that ministry, there exist 40 medical universities in Iran of which 37 ones had an active website. The universities were classified as type I, type II, and type III according to the Iran Ministry's of Health criteria. Consequently, status of the websites of the medical universities was evaluated through four stages of e-government maturity models including information, interaction, transaction, and integration.

Evaluation of the websites was performed via content analysis for the implementation of e-government in which presence or absence of predetermined indices were investigated (28). Based on these indices and educational and research activities of the universities, e-government services were classified according to Chandler and Emanuel's four stages model. Since we intended to compare the role of the websites of medical universities in the implementation of e-government, so, we used benchmarking approach to make this comparison (26). In fact, one of the weaknesses of the content analysis method is its inability in comparing other performance criteria of websites (29). In this study, in addition to the presence or absence of criteria other details were also compared. For instance, chief managers along with presence of their content information in the websites were compared as well. In this regard, criteria like completeness of final examination schedules and so forth were also included. Websites of the universities type I, II, and III were separately scored in terms of criteria with benchmarking approach so that scores 3, 2, and 1 were given to cases of good, medium, and weak, respectively. The education domain was consisted of 15, 11, 7, and 3 items in the information, interaction, transaction, and integration stages, correspondingly. The research dimension was consisted of 15, 11, 7, and 2 items in the information, interaction, transaction, and integration stages, respectively. The most and least scores of research services were 45 and 15, respectively for the information stage. These scores were 33, and 11 for the interaction stage, while they were 21 and 7, for the transaction stage. In the integration stage, they were 6 and 2, respectively. The scores were then gathered by university type and the main domain. Data analyzed through SPSS-18 and using descriptive statistics including Mean, standard deviation, frequency in the main domains, separately.

Means of 1-1.6, 1.7-2.3, and 2.4-3 were considered as weak, medium, and good.

3. RESULTS

Websites of the medical universities type I gained an average score (1.99) in terms of giving educational and research services. Medical universities types II and III received a medium score of 1.89 and 1.75, respectively in this respect (Figures 1 and 2).

In the information stage, medical universities type I and II gained the highest scores for giving information about curriculum vitae of faculty members (mean 2.6±0.4 and 2.5± 0.6, respectively). Mean information score in the medical universities type I and III goes to introduction of the executive programmes for the deputy of education (mean 1±0 and 1.1± 0.5, respectively), while in the universities type II introduction of senior managers in the educational area (mean 1.1±0.2) had the least score.

Evaluating the universities at the transaction stage revealed that universities type I, II, and III gained the minimum score for the presence of online forms for educational services (mean 1.5±0.5, 1.2±0.4, and 1±0, respectively). All the universities received the maximum score for recording students' marks by professors in the sites, online objection to marks, and online possibility for removing or adding courses (mean 3±0, 2.8±0.4, and 3±0, respectively). Mean Educational Services Score for Universities' web site is presented in figure 1.

At the interaction stage, online review of books for publication, uploading research projects, and online completion for research projects and sending them received the minimum score of 1±0. Online submission of manuscripts for journals and downloading books from digital libraries gained the maximum score of 3±0. At the transaction stage for the research services of the medical universities, the highest score
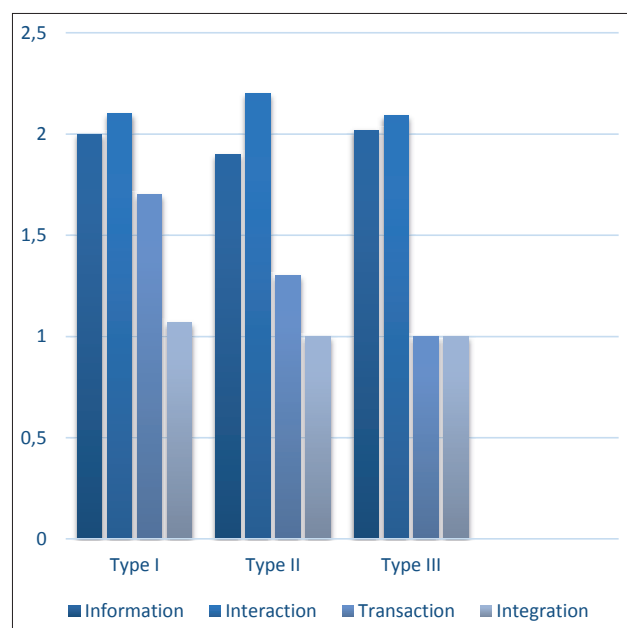

Figure 1: *Mean Educational Services Score for Universities' web site*

was recorded for online reviewing and publication of articles in journals with a mean of 2.2±0.9. All the universities gained a mean score of 1±0 in the integration stage for delivering educational and research services including capability of following students' military services and issuing online permission for leaving the country for the students. Mean of Research Services Score for Universities' website type I, Type II and Type III is compared (Figure 2).
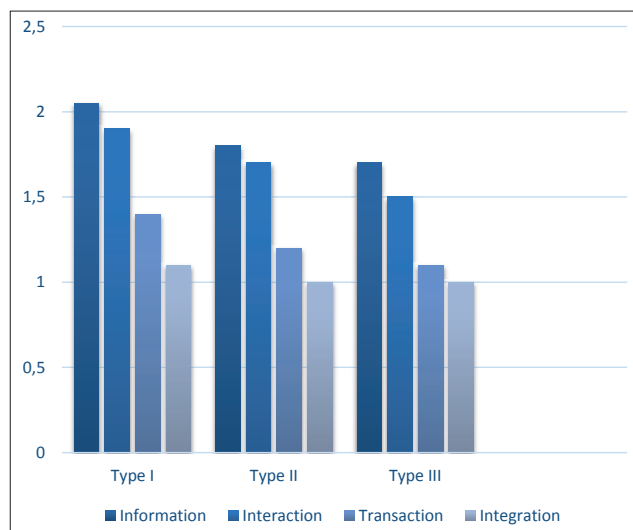

Figure 2. *Mean Research Services Score for Universities' web site*

4. DISCUSSION

This study was conducted to compare the implementation of e-government services through the four stages of information, interaction, transaction, and integrity at the medical universities of Iran. The findings demonstrated that medical universities have passed the information and interaction stages successfully, but had no progress in the transaction and integrity stages yet. It seems that implementation of e-government does not follow a linear pattern and the transaction and interaction stages can be achieved prior to the information stage. Most of the medical universities use the SAMA educational software system, that is processes such as choosing, removing, and adding courses (interaction), evaluating professors by the students, (interaction), recording marks by the professors on sites (interaction), online objection to marks (interaction); issuing transcripts (transaction) etc are done online. Although the universities may be faced with various weaknesses at the information stage, with the execution of SAMA software system, they have passed the interaction and transaction stages more safely. This is due to this fact that the services can be quite independent from the previous stage, but services of higher levels are necessarily always more complicated from the previous levels.

Based on our findings, most of the universities gained a mean score at the information stage. Accessibility to online information accounts for one of the critical success factor for e-services at university. Tanrikulu revealed that accessibility factors including opportunity to see academic calendar information,

content of course, exam grade and school report serve as one of the critical success factor to evaluation and satisfaction with e-learning system (30).

Rahnavard in his study "evaluation of e-government in Iran" stated that Iran has passed the information stage (31). This consistency can be attributed to the importance of information services in the ministries and other state organizations. Khaleghi in "Evaluation of the Iranian websites status base on evaluation general standards" demonstrated that majority of the websites are poor in providing items such as scientific and cultural matters. They are also functioning very weak in providing information through data bases and electronic resources (32). These findings are quite different from those in our study. This difference might ascribe to the differences in websites, interval between the two studies, and evolution of the websites in the previous seven years. At the interaction stage, the medical universities type I and II gained a mean score. According to studies done, only 30 and 26% of the interaction stage characteristics have been fulfilled for the ministries and state institutions in Iran, respectively (31). On the other hand, implementation of "public sector e-government" indicated that most of the state websites in America have completely fulfilled the interactive services [33]. West in this study revealed that most sites (84 percent in 2001 and 68 percent in 2000) had basic kind of interactivity e.g. e-mail. Although only 15 percent of sites in 2001 had areas to post comments, such as message boards and Less than 1 percent offered real-time chat rooms. He found that not only government officials' websites have e-mail addresses available, but also they were highly responsive. This existing gap can be associated with lateness of e-government adoptions in Iran.

The findings demonstrate that all the universities type I, II, and III had a poor performance at the transaction stage and only some universities of type I had progressed at this stage. Studies performed in other institutions in Iran revealed that just 3 and 2% of the characteristics of the transaction stage have been acquired by the ministries and state institutions (31). In other words, e-government in Iran is still in its infancy and all the institutions including ministries and universities suffer from barriers of online services. Our findings confirm that the integrity stage (final stage of e-government) has not been implemented in none of the universities. Rahnavard estimates preparation of the ministries and state institutions as 10 and 11%, respectively to implement the integrity stage (31). Also Keihani pour concludes that the Iranian websites are functioning poorly for integrate the e-government and critical considerations should be made in this respect (33). E-government adoptions in different countries will be faced with various challenges due to information technology infrastructures, users' e-literacy, law and public policy, interoperability of the information systems, record management, digital divide and other socioeconomic factors (34).

However, findings of this study and other related ones persist that developing countries lagged behind to take advantages of fully implemented e-government (35). Dokhtesmati in a study "Status of websites in the middle eastern countries in achieving e-government" comes to this conclusion that the developing countries performs rather better at the first stage of e-government than the other stages (11). Koga stated that Japan has passed the first stage of e-government and is coming to the second stage (36). Kaaya in his study on the websites of the east Africa reported that the investigated websites are in the first and second stages of development and e-government services (7). This may be attributed to the complication of the transaction and integrity stages in the e-government. Layne & Lee believe that implementation of the first two stages of e-government is encountered with the least changes and obstacles. Information stage is mostly focusing on presenting, maintaining, and up-dating the data in the websites. The interaction stage is mostly involved in answering users' queries, designing databases, covering users' needs and requests, and privacy and security of the information. However, in final stages of e-government including transaction and integrity, interoperability of the organizations in different levels to different processes and regulations is necessary. At these stages, besides need for state of the art information technology, adaptability of the electronic data formats, interoperability of the systems, integrity of the heterogeneous databases, contrast between functional requirements and regulations of different organizations, and role of leadership and the managerial challenges should be addressed (37). Conduction of the study throughout the country increases generalization and validity of its findings. This study was for the first time carried out in the medical universities in the country which lacked some of the executive barriers to the implementation of e-government. Conduction of this study on a certain group of the community is considered as one of its limitations; customers in the medical universities own characteristics that limit generalization of the findings of this study to website users of other institutions and ministries.

The researchers recommend that further studies should be done on the barriers for e-government adoptions in the country, studying users' and citizens' attitudes towards the importance of e-government, and managerial challenges in the way of this implementation. To achieve e-government and engage the medical universities in the interaction and integrity phases, determining the needs and expectations of students, professors, and other users of the e-government services in the universities and other high education institutions is advised. Moreover, it is recommended that aims and strategies be determined for exchange of information among various units of any university, interaction of one university with the other and other organizations such as administration for projects and manpower distribution,

military services organization, and ministry of health and medical education. Rules and regulations, management of documents, and determining functional requirements are necessary for these organizations to interact. It is also advised that appropriate information technology devices be applied for cross-functionality of various parts of a university and any university with other universities and organizations. It is better that an evaluation mechanism be established for measuring rate of progress, customers' needs and implementation of e-government in the medical universities.

5. CONCLUSION

Low adoptions of e-government in the medical universities of Iran which are not experiencing many limitations and barriers (such as users' electronic literacy, access to internet, and information technology tools) as other organizations are faced with confirms that implementation of e-government is something beyond technical challenges. E-government is a socio-technical phenomenon like other information technology tools in which various organizational, managerial, social, and economic factors might play a critical role. Thus, medical universities should be prepared for the managerial and social challenges of the e-government along with the technical challenges to come to the transaction and integrity stages.

CONFLICT OF INTEREST: NONE DECLARED.

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