Original Article

# Quality assessment of Isfahan Medical Faculty web site electronic services and prioritizing solutions using analytic hierarchy process approach

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## ABSTRACT

**Context:** Implementing information technology in the best possible way can bring many advantages such as applying electronic services and facilitating tasks. Therefore, assessment of service providing systems is a way to improve the quality and elevate these systems including e-commerce, e-government, e-banking, and e-learning. **Aims:** This study was aimed to evaluate the electronic services in the website of Isfahan University of Medical Sciences in order to propose solutions to improve them. Furthermore, we aim to rank the solutions based on the factors that enhance the quality of electronic services by using analytic hierarchy process (AHP) method. **Materials and Methods:** Non-parametric test was used to assess the quality of electronic services. The assessment of propositions was based on Aqual model and they were prioritized using AHP approach. The AHP approach was used because it directly applies experts' deductions in the model, and lead to more objective results in the analysis and prioritizing the risks. After evaluating the quality of the electronic services, a multi-criteria decision making frame-work was used to prioritize the proposed solutions. **Statistical Analysis Used:** Non-parametric tests and AHP approach using Expert Choice software. **Results:** The results showed that students were satisfied in most of the indicators. Only a few indicators received low satisfaction from students including, design attractiveness, the amount of explanation and details of information, honesty and responsiveness of authorities, and the role of e-services in the user's relationship with university. After interviewing with Information and Communications Technology (ICT) experts at the university, measurement criteria, and solutions to improve the quality were collected. The best solutions were selected by EC software. According to the results, the solution "controlling and improving the process in handling users complaints" is of the utmost importance and authorities have to have it on the website and place great importance on updating this process. **Conclusions:** Although, 4 out of the 22 indicators used in the test hypothesis were not confirmed, the results show that these assumptions are accepted at 95% confidence level. To improve the quality of electronic services, special attention should be paid to "services interaction." As the results showed having "controlling and improving the process in handling users complaints" on the website is the first and most important one and the process of "changing brand/factory name/address in the text of the factory license/renewal or modification of manufacturing license/changing the formula" is the least important one.

**Key words:** Analytic hierarchy process approach, Isfahan Medical Faculty, service interaction, service quality, usability, websites

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## INTRODUCTION

One of the university options for improving service quality and its transformation is benefiting from ICT. Electronic service delivery channels and mainstream media are the university websites, which offer all the services including registration, course selection, conference registration, counseling, and speech feedback. Here, the evaluation is not about the physical environment but about a virtual world. Therefore, with this large change in giving services, the evaluation will change and new indicators are required to measure and evaluate this type of services.

Ranking countries in terms of electronic state, Iran ranks 108 with 0.4067 point. With this rank, it stands lower than countries such as Fiji, Armenia, Kyrgyzstan, Montenegro, and Guatemala.[1] Percentage of governmental electronic services in Iran during the years 2004-2005 increased two fold (from 15% to 28%), but since then there was no serious progress.[1]

## LITERATURE

The first step to understand the quality of services is having a clear understanding of the concepts of quality and service.

### The concept of quality and service

Quality means the extent to which customers' needs associated with organizational culture are met.[2] Quality is a set of activities, processes, actions, and interactions that are offered to customers to resolve their problems.[3] A product is of good quality when it is matched with what the customer wants and needs.[4] Service has a broad meaning. Service is a business activity, which seeks the needed change in the service receiver in special places or times, and thus, creating a value and providing some advantages. Service is the result that the customers demand. Service is an activity or benefit that one party gives the other party, which is essentially intangible and does not have ownership in something. Customer satisfaction and improved quality of service received are two important indicators in assessing the performance of the organization.[5] Now-a-days, companies have to care about their products and service quality, if they want to exist. This way, they can keep their own customers and attract some other ones and guarantee their revenues.[6]

Electronic service quality is defined as[7] development and efficiency in purchasing, selling, and delivering products and services. Further definition is provided by Sntos[8] "Assess and judge the overall quality of electronic services offered to customers in virtual markets." Since electronic services focus on the quality of services delivered through websites and portals,[9] therefore, we can also define the quality of governmental e-services as "overall assessment of quality and service by users in virtual environment as one of the key factors in determining the success or failure of the governments."[10] Governmental e-services concentrate on websites and portals and user satisfaction.[9]

### Electronic services

One of the governments' options for improving service quality and its transformation is taking advantage of ICT and e-government. Electronic service delivery channel is a website that offers all services. The concept of electronic services was defined because it was challenging and covers many aspects. The easiest way to define e-services is to say: "Change a service to an electronic form for a customer."[11-13] Buckley studies[14] include, the definitions proposed in e-service area and these definitions are clearly based on the private sector experience and e-government term should be used instead, in the public sector.

In addition, Verdegem and Veerleye found that e-government includes different definitions that they may all reflect the government's strategic priorities.[11]

### The concept of e-government

Since the services in the present study are better clarified by using the concept of e-government, it is necessary e-government as "the use of ICT and its applications by providing information to government and public services for the people."[15] Organization for Economic Co-operation and Development (OECD)[16] provides a definition for e-government: "The use of ICT, especially, the Internet, as a tool to access the government better by the people." World Bank[17] also has its own definition: "E-government is using information technology by governmental agencies (such as Wide Area Network, the Internet, and mobile computing) that transfer the information to citizens, businesses and other governmental branches. Governmental commissions[18] define e-government as" the use of ICT to manage people who are combined with organizational change and new skills to improve public services and promote the democratic process and empower people's policy support.

E-government can be defined as application of information and communication technologies to give information services effectively to citizens and customers.[19,20] So the idea of electronic government rose to increase the effectiveness and efficiency in delivering public services to customers. It has to be noticed that the nature of customers' needs is different based on the relationship they have with the government. These forms, which have been raised in e-government issues are government relations with citizens, government with businessmen, government with employees, government with government and government and foreigners.[21,22]

### User-oriented e-government

Bertot, *et al.*[23] found that a user-oriented e-government provides services and resources in the way to meet the needs of users and provides a real service. The United States is promoting citizen-oriented design.[15] In this regard, two basic plans have been designed: "Using electronic service for the whole government" and "using electronic service for some parts of the government." Citizens believe that

using electronic service for whole parts of government helps them to access the information and services without the need to have the knowledge of government structure. However, using the electronic service in some parts of the government from the perspective of a customer is the integration of public online services through an entry point regardless of whether these services are provided by various units or other power sources.[15] Being user-oriented definitely means providing public welfare. Public welfare is benefits (in cash or not) that e-business services give to citizens. OECD found that one of the goals of user-oriented approach is the quality of services for users from both the perspective of user satisfaction and service transparency. It also found out that there should be a balance between this approach and cost-effectiveness in the public sector. This balance has been noted in other studies.[11,22]

Büyüközkan and Çifçi studied on e-service quality web site in health-care industry. Their study included a combined fuzzy analytic hierarchy process (AHP) and fuzzyTechnique for Order of Preference by Similarity to Ideal Solution (TOPSIS) methods to measure electronic service quality performance. The main criteria for evaluating web based health-care service quality, which is achieved through this study include: Tangibles, responsiveness, reliability, information quality, assurance, and empathy.[24]

Regarding e-service quality, Papadomichelaki, and Mentzas developed a quality model named e-government service quality (e-GovQual). e-GovQual is a four dimensional, 21-item scale. Four dimensions are used: Reliability, efficiency, citizen support, and trust.[25]

Hasan and Abuelrub, reviewed the most recent evaluation criteria used in different e-business services. Consequently, they provide the dimensions of the criteria, which can be used by web designers and developers to create quality websites to improve the electronic service. These dimensions of the criteria are content quality, design quality, organization quality, and user-friendly quality.[26]

### Quality assessment

The purpose of e-government evaluation is achieving greater efficiency in government operations and improving public services. In the following, quality assessment category is presented in four layers:

- The performance process layer, which is mainly related to quality models to give traditional services
- Site technical operation layer, which is related to the technical performance and security of the site
- Site quality layer, which is related to factors that address usability
- Customer-satisfaction layer, which considers the general quality level between what was presented and what was expected.[9]

This classification is shown in the chart below. It is noteworthy that in this study, satisfaction is measured with the quality of web users (layer 4).

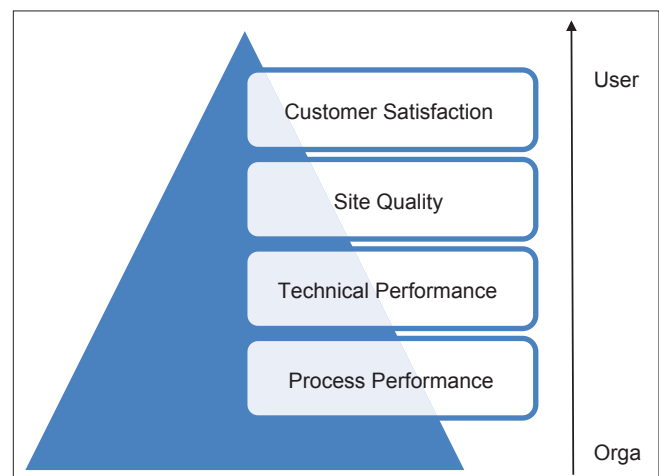Form 1: View a four-layer Quality Assessment.

### Aqual model

Aqual model is based on the user perceptions of the quality which is measured by its importance. Five factors of usability, design, information, trust, and empathy are effective in Aqual, which are integrated in three factors of usability, quality of information and service interaction.[27] Usability includes, usability and design, the quality of information includes information and service interaction includes trust and empathy. Aqual, created by Barnes and Vidgen, is a method for evaluating the quality of website, and has been tested in many fields such as instant bookstores, auction sites, and e-government partnership. Aqual model was chosen in this study to evaluate the quality of web services.

## RESEARCH METHODOLOGY

The primary source of research was a questionnaire. Research hypothesis related to quality assessment of university website e-services were tested using non-parametric tests and the strategies proposed by experts, were prioritized using AHP approach.

First the related researches were studied, then the criteria for measuring electronic services were identified, and finally the solutions proposed to improve performance measurement criteria were prioritized by the AHP model. The research population was 200 students of Isfahan University of Medical Sciences. Calculated Alpha value to evaluate reliability was 92.6 for the first questionnaire that focuses on service quality measurement. The second questionnaire determined the importance of ICT indicators for electronic services and was answered by ICT authorities and experts. Its reliability was calculated as 90.01.



**Form 1: View a four-layer Quality Assessment**

## THE FIVE CRITERIA FOR EVALUATING WEBSITE ELECTRONIC SERVICES

Results of interviews with experts and officials in ICT department for determining measurement criteria are presented in Table 1.

## IDENTIFYING STRATEGIES TO IMPROVE THE PERFORMANCE OF WEBSITE ELECTRONIC SERVICES

Extracted guidelines are listed in the table below. This list is prepared using reviews of all current processes in the university. Those processes, which could be changed in to electronic form were 22 items. During interviews with experts and users, most important ones are listed in Table 2.

## RESULTS

After determining the measurement criteria and guidelines by studying processes, which are in progress in seven departments of the university using EC software, AHP model was derived, which is represented in Diagram 1.

Diagram 1. Prioritization guidelines.

According to the results presented in Table 3, the solution "the controlling and improving the process in handling users' complaints" is of the utmost importance and authorities have to have it on the website and place great importance on updating this process.

## CONCLUSION

In the present study, one of the multi-criteria decision making techniques was evaluated. It is evident that using opinions of more experts in a group decision making setting can lead to more effective solutions, and better priority results. In fact, using this technique helps us choose the optimum solution with the right priority, and thus, make the most effective decisions. This way, we will benefit more in long-term by realizing the most important aspects of the project. Although, 4 out of the 22 indicators used in the test hypothesis were not confirmed, the results show that these assumptions are accepted at 95% confidence level. To improve the quality of electronic services, special attention should be paid to

### Table 1: Describe the measurement criteria

| The measurement criteria | Abbreviated name | Row |
|---|---|---|
| To provide facilities for user's feedback | S1 | 1 |
| Acceptable price of web services | S2 | 2 |
| Easy access via the internet | S3 | 3 |
| Giving all details about the services of each department | S4 | 4 |
| Confidentiality of information transmitted from applicants to the university website | S5 | 5 |
| Continuous improvement in service users | S6 | 6 |
| Easy access to all information about web services | S7 | 7 |
| No hacker access to user's information | S8 | 8 |
| Credibility of information on the site | S9 | 9 |

### Table 2: Guidelines described

| Title of service | Abbreviated name | Row |
|---|---|---|
| Licensing clinical care at home (home visits) | P1 | 1 |
| Doctors working in medical institutions | P2 | 2 |
| Issuing licenses for general and specialty clinics | P3 | 3 |
| Issuing licenses for physiotherapy centers | P4 | 4 |
| Issuing licenses for counseling and midwifery centers | P5 | 5 |
| Controlling and improving the process of responding to complaints and inquiries | B6 | 6 |
| Issuing licenses for laboratories | D7 | 7 |
| Issuing licenses for pharmacies | G8 | 8 |
| Changing brand/factory name/address in the text of the factory license/renewal or modification of manufacturing license/changing the formula | G9 | 9 |

### Table 3: Prioritization guidelines

| Description of each guidelines | Abbreviated name | Rating |
|---|---|---|
| Controlling and improving the process of responding to complaints and inquiries | B6 | 1 |
| Issuing licenses for general and specialty clinics | P3 | 2 |
| Issuing licenses for physiotherapy centers | P4 | 3 |
| Issuing licenses for pharmacies | G8 | 4 |
| Doctors working in medical institutions | P2 | 5 |
| Issuing licenses for counseling and midwifery centers | P5 | 6 |
| Issuing licenses for laboratories | D7 | 7 |
| Licensing clinical care at home (home visits) | P1 | 8 |
| Changing brand/factory name/address in the text of the factory license/renewal or modification of manufacturing license/changing the formula | G9 | 9 |
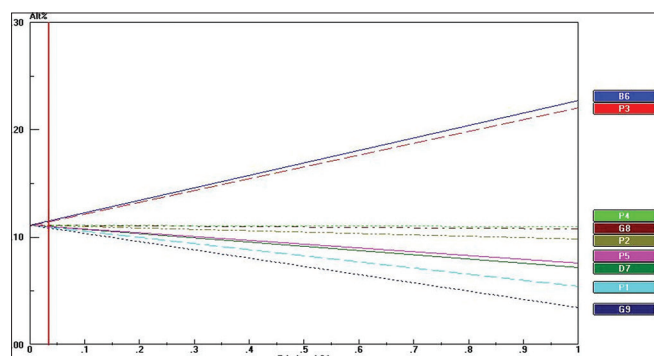


**Diagram 1: Prioritization guidelines**

"services interaction." As the results showed controlling and improving the process in handling users' complaints on the website is the first and most important one and the process of changing the brand name/manufacturer's name/factory address in license/renewal or modifying license/changing the formula are the least important ones.

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