An AHP Approach to Assess Hospital Websites

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ABSTRACT

Hospital Website is a site that furnishes patients/users with online information and information related services, such as clinical services, various types of treatments, symptoms of a disease, doctors availability, and a channel of communication with the hospital and peer users. These days, many people are using the internet to choose a proper hospital/medical center website with their required medical needs. Hence the quality of websites of hospitals/medical centers is very important to provide the required information of the patients or users. In this paper, we use one of the most popular multi criteria decision methods (MCDM); analytical hierarchy process (AHP) to choose a hospital/medical center website in Hyderabad.

Keywords: Multi-criteria decision method (MCDM), Analytical hierarchy process (AHP), Quality metrics

1. INTRODUCTION:

These days, time is critical factor in human life. Consequently, the organizations including hospital/medical centers, are attempting to give electronic administrations to the patients/users. Hospitals are extremely populated centers; hence they cause so many problems like viral diseases like cold and flu and also, high price of doctor’s appointments, long lines of reception in hospitals and necessity of physical presence in laboratories, radiology and sonography centers to receive the results have led to an increase in using of hospitals/medical websites. Using the internet and communication technology provides the hospital and medical centers with the following benefits: to provide more qualified services, to provide valuable information for their patients, to decline the expenditures, to have direct interaction with patients, to save their time, to increase efficiency, and finally to enable the hospitals/medical centers to overcome the competitors. Recently, we have seen a proliferation of electronic websites with a tremendous amount of information either with high quality, or with low quality, as well as sites that are out right misleading. Furthermore, there has been a rapid increase in the use of the internet for health information and advice. Nowadays, it is believed that prevention is prior to treatment. The explosion of the web and increase in hospital/medical websites has determined the need of comprehensive frame work to evaluate the aspects related to the quality of hospital/medical websites. The objective is to make a hospital/medical website useful, profitable, efficient, reliable, safe, and accessible. Awareness of quality issues has recently affected all kinds of websites. An organization, hospital or a medical center, with a website which is difficult to use or to interact leads to a poor image on the internet and weakens an organization’s position. Therefore, it is important for any hospital/medical center to have the ability to make an assessment of the quality of their services and information, in order to improve their offerings over time and benchmark against competitors.

There is limited number of research studies in which more than one or two assessment variables associated
with design, organization and implementation of a website are considered. Thus, while there should be a considerable number and variety of factors associated with website success, little researches exist about the combination of these factors and services. In another word, although there are various and remarkable number of success factors in websites, there is not any research comprehensively considers all of these factors and services. In fact, there is not any investigation relevant to hospital/medical websites. The users are considered as an important factor in realization of purposes in an organization. Accordingly, users and their needs should be the priority in designing and implementing websites. To know users means that to understand how they make preferences. Generally, user preferences for a website indirectly measured through an interview or a questionnaire. In our research, to interacted and consulted with users and studding the visitors and patients’ feedback, a questionnaire was voluntarily distributed among a great number of users of four hospital/medical websites; including doctors, website designers and usual people. By visiting hospital/medical websites and their different sections and services, the users consciously or unconsciously gave different values to the factors evaluating websites’ quality. Then, we used the obtained data as a base to make a conceptual frame work.

2. LITERATURE REVIEW

Because of the great expansion of websites in all dimensions of life and dependency on web services in different organizations, websites characteristics are really important. They have been a constant concern of research in different domains and they were widely studied in the e-commerce literature. Although, as it mentioned before, there are limited number of studies in which more than one or two variables associated with design, implementation and organization of web site are considered. Thus, while there should be a considerable number and variety of factors associated with website success, little research exists about the combination of these factors and services. Most of the current studies are either dealing with a limited number of quality factors or directed toward a specific web service. The literature review is organized in three sections as 1) literature review related to all types of websites in general, 2) literature review related to hospital/medical websites,3) literature review related to mathematical models used to evaluate websites.

2.1. Literature review related to all types of websites in general

Chang liu et al. [1] had identified that the four factors, playfulness, system use, service quality, and system design are important in website success. Nicolae George Dragulancescu [2] had done an attempt to propose basic criteria to evaluate websites quality. Ming Hui Huang[3] had pointed that a successful website should be able to use its attributes to satisfy both entertainment and the information needs of users. Marquis, G.P.[4] had studied the use of traditional system design techniques to website design. Soyoung Kim et.al.[5] had introduce a dimensional hierarchy for quality of retailer websites, and they had also introduced websites quality dimensions presented by different persons and sources. Gonzalez, F.J.M et al.,[6]had evaluated commercial websites. They have pointed four categories: accessibility, speed, navigability, and content are the important factors for website success. Jos van Iwaarden et al.,[7] had conducted a survey on students of universities to identify the factors for university websites. Luis Casalo et al.,[8]had discussed the role of perceived usability, satisfaction, reputation and consumer familiarity on the website loyalty formation process. Layla Hassanet al.,[9] had proposed general criteria to evaluate the quality of website regardless of the type of service that it offers. They have identified that content quality, organization quality, design quality, and user -friendly quality is the dimensions for the criteria. To evaluate websites, Kuo et al.,[10] conducted a survey on organizational websites and identified four dimensions: information quality, empathy, ease of use and accessibility. Zeithaml et al., [11] developed a measure scale including eleven dimensions of service quality of transaction websites by using focus group interviews of consumers. They are: personalization, security, responsiveness, assurance/trust, site aesthetics, access, ease of navigation, efficiency, flexibility, reliability, and price knowledge

2.2. Literature review related to hospital/medical websites

Pierre Michaud et al.[12] had studied implementation and evaluation of health website for adolescents in Switzerland which focused mainly on health issues. N.B.Teo et al.,[13] had used an interactive web-based questionnaire to evaluate a breast cancer website. Karsten Wend Land et al [14] had explained the optimal solutions for the website. Elizbeth Silence et
Making (MCDM) is a largely used discipline to solve complex decision problems involving multiple criteria, so instead of traditional methods, the multicriteria decision methods (MCDM) can give the best solution. Multiple Criteria Decision Making (MCDM) is a largely used discipline to solve complex decision problems involving multiple criteria. In this study, we considered the seven-quality metrics/criteria: content quality, design quality, organization quality, user friendly quality, performance quality, service quality and technical points, proposed by Vahid Rafe et al., [44] and assumed that the patient/user’s requirement is to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know the disease symptoms, to get second opinion from the concerned specialists, to know the information about various clinical services and process and to know
preventive methods for normal health problems but not for serious, emergency cases. This paper presents the ranking for the websites of top four hospitals in Hyderabad: APOH, CARH, YASH, KIMH, and the hospital names are not revealed because of their corporate security. The first three letters represent the hospital name. In this study, we use analytical hierarchy process (AHP) which can be used for qualitative and quantitative data. The AHP measures the relative importance of alternatives. The importance of one priority over the other can be judged by numerical value using a scale of 1-9 where 1 denotes equal importance and 9 denotes the absolutely highest importance. The result of these comparisons using the AHP scale is a square $n \times n$ matrix. A pair wise comparison is based on evaluating two elements (alternatives or criteria) at a time. A pair wise comparison is the process of comparing the relative importance, preference, or likelihood of two elements with respect an element in the level above. When all the pair wise comparisons are done, we calculate the priorities and a measure of consistency of our judgement. Generally, the consistency ratio should be less than 0.10 (10%). The number of comparisons would be $\binom{n(n-1)}{2}$, where $n$ is the number of criteria in the model. Detailed description of the theoretical aspects of AHP can be found in Saaty.[32] Table-1 shows the quality metrics and corresponding indicators. Table-2 and 3 shows the AHP results.

### Table-1

<table>
<thead>
<tr>
<th>Quality metrics</th>
<th>Elements and Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content quality</td>
<td>Comprehensive content, relevance usefulness, timely, Multilanguage.</td>
</tr>
<tr>
<td>Design quality</td>
<td>Appropriateness, attractiveness, colors, text,</td>
</tr>
<tr>
<td>Organization quality</td>
<td>Logical structure, sitemap, scope, links, navigation, organization.</td>
</tr>
<tr>
<td>User friendly quality</td>
<td>Ease of use, interactive features, privacy, customization, satisfaction.</td>
</tr>
<tr>
<td>Performance quality</td>
<td>Speed, accessibility, security, responsiveness, usability</td>
</tr>
<tr>
<td>Service quality</td>
<td>E-appointment, E-medical data base, E-laboratory, E-frequently asked questions, E-payment, Helping functions, Hospital events</td>
</tr>
<tr>
<td>Technical points</td>
<td>Programming language, page structure, size of website, extendibility, solving technical problems,</td>
</tr>
</tbody>
</table>

### Table-2

<table>
<thead>
<tr>
<th>Quality metrics</th>
<th>weightage</th>
<th>$\lambda_{\text{max}} = 10.9799$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content quality</td>
<td>0.174712</td>
<td>$C.I = 0.663316$</td>
</tr>
<tr>
<td>Organization quality</td>
<td>0.167421</td>
<td>$CR = 0.5025$</td>
</tr>
<tr>
<td>Design quality</td>
<td>0.0980093</td>
<td></td>
</tr>
<tr>
<td>Service quality</td>
<td>0.164308</td>
<td></td>
</tr>
<tr>
<td>User friendly quality</td>
<td>0.129514</td>
<td></td>
</tr>
<tr>
<td>Performance quality</td>
<td>0.155287</td>
<td></td>
</tr>
<tr>
<td>Technical points</td>
<td>0.110749</td>
<td></td>
</tr>
</tbody>
</table>

$\lambda_{\text{max}}$ = largest eigen value, $C.I$ = consistency index $= \left(\frac{\lambda_{\text{max}} - n}{n-1}\right)$, $C.R$ = consistency Ratio $= C.I / \text{saaty index}$, here $n=7$, saaty’s index $=1.32$ (corresponding to $n=7$). The AHP solution shows that first rank for AHOP, second rank for KIMH, third rank for CARH, and fourth rank for YASH.
Table-3

<table>
<thead>
<tr>
<th>Website</th>
<th>AHP weighting</th>
<th>ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOH</td>
<td>0.2804</td>
<td>1</td>
</tr>
<tr>
<td>YASH</td>
<td>0.2087</td>
<td>4</td>
</tr>
<tr>
<td>CARH</td>
<td>0.2477</td>
<td>3</td>
</tr>
<tr>
<td>KIMH</td>
<td>0.2595</td>
<td>2</td>
</tr>
</tbody>
</table>

4. CONCLUSION

In this study, we have applied Analytical hierarchy process (AHP) to give ranking for the four websites of hospitals corresponding to the seven-quality metrics. AHP is a good method which gives ranking for the alternative by using pair wise comparisons. We can use new criteria to evaluate websites and other methods of multi criteria methods (qualitative and quantitative). This technique can be used to evaluate other websites also.

REFERENCES:

7) Jos van Iwaarden et al. Perceptions about the quality of websites: a survey amongst students at Northeastern University and Erasmus university, Inf. Manage. 41:947-959, 2004
13) N.B. Teo et al., Use of an interactive web based questionnaire to evaluate a breast cancer website. Breast 14:153-156, 2005
15) Elizabeth Silence et al., Health websites that people can trust - the case of hypertension. Interacting with computer, 19:32-42, 2007


36) Turri J. J. Program eases decision making. Health progress, 69:8,40-44,1988

37) Tak, F.W., Prelude to the benchmarking of general radiography. Hong Kong Radiographers Journal, 6:1,3-9,2002


