A Proposed Framework for the Development of Web-Based Systems for the Service of Muslim Pilgrims

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ABSTRACT: Saudi Arabia's government, like many other governments, is jumping on the technology bandwagon in an effort to take advantage of the ever-evolving web technologies in its new trend to employ the internet for the service of people. The e-Government Program, Yesser, translates the Saudi Government's keen interest in implementing the e-government concept.[1] Among its directions are to provide web services that help Muslim pilgrims arriving in millions yearly to Saudi Arabia to perform Hajj and/or Omrah.
Often, designers of web sites fall into the pitfall of building cutting edge multimedia web sites that cost too much money, time and effort, only to find users turning away from the web site, discouraged by its slow download times, by its navigation complexity, or by the fact that it does not contain the information they really need.
This paper proposes a six-step user-centered design approach that can be used to guide designers in developing a Hajj and Omrah web site that is both 'useful' to pilgrims, in that it helps them accomplish their goals, and 'usable', in that it enables them to easily and successfully find the information they want.

KEYWORDS: Human-Computer Interaction, User-Centered Design, Web Development, Web Design, System, Hajj, Usability Testing.

Introduction

Internet technology has dramatically changed the ways organizations, educational entities, research institutes and medical institutions conduct their businesses. Furthermore, the internet is transforming the ways governments provide services to people, through e-government services. The development of e-government systems and services is given high priority in governments all over the world, as it is described, for example, in the eEurope action plan [2] for the European Union (EU) [3] or in the American e-Government Act for the United States of America. [4]

E-Government may be defined as the effective, integrated utilization of all information and communication technologies to ease and speed up transactions in government organizations (G2G), between government organizations and customers (G2C), and between government organizations and business organizations (G2B). [5]

The worldwide number of Internet users surpassed 1 billion in 2005– -up from only 45M in 1995 and 420M in 2000. The 2 billion Internet users milestone is expected to be reached in 2011 [6]. In 2002, the worldwide internet population exceeded 580 million users [7], and in October 2006, the worldwide internet population reached 1,086,250,903, which represented 16.7% of the total world population [8]. In view of the widespread use and extended outreach of the internet to millions of Muslims around the world, Muslims turn to the Internet for many of their religious needs. Currently, the Internet is also being used by the Saudi government in its efforts to provide many of its services to people, including Hajj and Omrah related services.

Several web sites, both official, such as the Saudi Ministry of Hajj web site (www.hajinformation.com), the Saudi consular office's web site (www.saudiembassy.net) and the Hajj Assistance Committee of North America's web site (www.Hajj.org), and non-official, such as www.islamweb.net and www.al-islam.com, currently provide Muslims around the world with information about Hajj and Omrah. However, many of these web sites are provided by personal efforts of individuals, thus, lack credibility. Others are credible, yet incomplete, either because they do not provide visa-related information or because they are short of providing all what the user needs such as the educational material that helps pilgrims understand the logistics of their rituals. Providing a 'one-stop shop' for a prospective pilgrim is a valuable idea. A pilgrim visiting such a web site can find all the information pertaining to his once-in-a-lifetime trip and be able to understand both the religious and formal logistics involved in the rituals, apply for a visa, choose an appropriate travel and accommodations package, learn the steps of the Hajj or Omrah, print out useful guides and maps, complete the necessary transactions, and perhaps even order his Hajj and Omrah apparel. Providing all this in one credible web site will conveniently save time, effort and money for many pilgrims. The site may also help pilgrims in preparing them emotionally for the sacred once-in-a-lifetime sought after trip. Providing pilgrims with a virtual Hajj or Omrah experience will enable them not only to understand the logistics involved in their trip, but also to get a feel for the holy experience, including a better sense of time and the duration of each of the rituals and duties involved in pilgrimage.

Providing the pilgrims with a 'usable' and 'useful' web site is crucial. A 'useful' web site is one in which customers are able to successfully perform the tasks they wanted to when they decided to visit the site. A 'usable' web site is one in which customers find its user interface design friendly and easy to use [9]. Often designers build expensive web sites that users spend few seconds at before they turn away and never come back, either because the site is not 'useful' to the users or not 'usable' by the users. The Hajj and Omrah web site should be intended for the users who are the pilgrims-to-be and not the designers. Designers must have this as the goal set forth before they jump into their colorful designs. Unless the pilgrim needs, such as their need to apply for a visa or to find information about accommodations in the holy cities, are central to the design, there are no guarantees that any web site will ever be 'useful' to a pilgrim. And unless the web site is designed and evaluated iteratively there are no guarantees that any web site will ever be 'usable' by a pilgrim.

Saud Arabian E-Government Initiative

In order to drive Saudi Arabia's e-government initiative forward, the Saudi Government launched the Yesser program. The program is the first National e-Government Strategy and Action Plan which is to be implemented within the five years: 2005-2010. The program was launched with the vision that "By the year 2010, everyone in the Kingdom will be able to enjoy – from anywhere and at anytime – world class government services offered in a seamless, user-friendly and secure way by utilizing a variety of electronic means". [5]

The e-Government Program - Yesser - was launched with the following objectives:

- Raising the public sector's productivity and efficiency.
- Providing better and more easy-to-use services for individual and business customers.
- Increasing return on investment (ROI).
- Providing the required information in a timely and highly accurate fashion.

The Implementation is planned to happen using a coordinated decentralized approach by individual ministries and other government agencies. The implementation will, however, be based on a unified e-government vision, national priorities and shared standards and methodologies identified by the Yesser program with the participation of the government agencies. Figure 1 shows the guiding principles and the role of the Yesser program.

FIG. 1. Guiding Principles and the Role of the Yesser Program [5]

User-Centered Design

User-centered design (UCD) is a development process in which users' feedback is collected during the earliest stages of design and development. UCD involves understanding the users' tasks, environments and needs. According to the Usability Professionals Association (UPA), research has shown that UCD generally results in software applications that enable users to perform their tasks successfully [10]. Usually, a prototype is built based on the results from user task analysis. Later on, usability tests are performed to validate that the design meets the performance benchmarks. This is an iterative process until the desired user objectives are met [11-12]. Such design strategies focus more on user's performance and satisfaction and less on designer needs. Rubin [13] reports that UCD has "three major principles: (1) an early focus on users and tasks, (2) empirical measurement on product usage, and (3) iterative design whereby a product is designed, modified and tested repeatedly" [14]. Fuccella [15] defines the four steps in

a UCD methodology as: "audience definition, object identification, object organization and validation". Whatever terminology researchers use in describing UCD, the underlying goal is one: designing for the user.

Although several methodologies for software development & engineering exist, user-centered design approaches, developed by the Human-Computer Interaction community, have gained huge popularity in recent years, particularly for web system development purposes. The reason behind UCD deemed appropriate for web systems has been mainly due to the the fact that more than half of the code and the development costs are related to the user interface (UI) component, and so, the whole design must be driven by UI considerations. Such approaches, however, are still underused by software engineers for several reasons. Reports show that among these reasons are that UCD structure and techniques are still relatively unknown, underused, difficult to master, and essentially inaccessible to common developers and small and medium-sized software development teams [16].

Recent reports on e-government development highlight the importance of user involvement in e-government projects [17-18]. In an interview survey of 16 Norwegian e-Government project leaders, it was found that user involvement is regarded as important by e-Government project leaders, but actual user involvement is often conducted according to the participation practice of industrial democracy rather than the processes and methods advocated within the traditions of HCI. 14 out of the 16 interviewed project leaders reported that users should be involved as early as possible during the requirements phase. Several also stated that the requirements phase was the most important phase for user involvement. However, there was a general agreement that users should be involved also in later phases. [2] Furthermore, usability problems have been found by analysts as the biggest causes of dissatisfaction by e-government users [19], a problem this paper attempts to solve through the usage of its proposed framework.

Benchmarks

Benchmarks are quantitative descriptions of user performance and/or preference goals. These usability goals may measure items such as users' overall success rates or time needed in information retrieval or items such as user satisfaction and preferences [20-22]. Setting benchmarks for web sites is important in that it helps designers measure the true success of their web sites.

It is inappropriate to set a single benchmark for all web sites because of variation among designer evaluation techniques and differences in sites' goals [23]. In other words, if, say, one web site's benchmark is 72% of the times users select the correct choice, the benchmark for another may be 95%.

Keeping inline with the 80% user-satisfaction benchmark predefined by the Yesser program, this paper suggests high benchmarks (i.e. 90-100% success) for critical or major tasks that users want to perform when visiting the Hajj and Omrah web site, such as finding and downloading the appropriate visa application form, and lower benchmarks (i.e. 80-90% success) for less critical tasks such as finding local restaurants. However, keeping up with the high standards that the Ministry of Hajj is striving for, lower benchmarks should be avoided.

Six Steps to Build the HOUSE

The following paper proposes a six-step methodology that can be used by designers and developers of the pilgrims' Hajj and Omrah web site, or what this paper will refer to as the pilgrims' HOUSE (Hajj and Omrah Useful/Usable SitE). Guided by this six step roadmap, designers are likely to produce a 'useful' and 'usable' Hajj web site. The six steps are based on user-centered design methodologies with satisfying the needs of a prospective pilgrim as the central goal. The paper also demonstrates how the six steps can be used. Assuring that the site is 'usable' and 'useful' keeps it in-line with the Yesser vision of providing user-friendly services.

The six steps to build a Hajj and Omrah useful and usable web site proposed in this paper, as shown in Figure 2, are:

Step 1. Identify the users and analyze the tasks they wish to perform
Step 2. Build a prototype based on the collected information
Step 3. Perform usability testing of prototype
Step 4. Evaluate design (by comparing to benchmarks)
If user interface design objectives are met go to Step 6.
Step 5. Improve design based on user feedback then go back to Step 3.
Step 6. Produce final design.

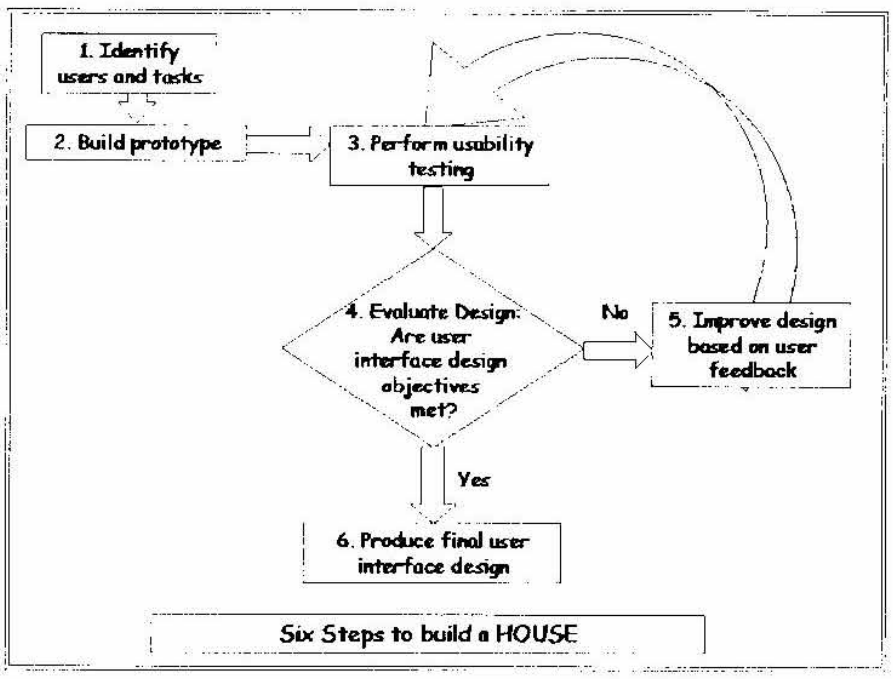

FIG. 2. Flowchart of the Six-Step Proposed Methodology to Building the HOUSE

Step 1. Identify the Users and Analyze the Tasks they Wish to Perform

In order to build the HOUSE, both the users and the tasks they wish to accomplish when in the HOUSE need to be identified.

Who are the users? Although it is more likely that most visitors of the HOUSE are Muslims planning a trip to perform either Hajj or Omrah, it is possible that a small percentage of visitors are non-Muslims searching for information about Islam or the holy places, as research projects that in the US alone as many as 50 million people may rely solely upon the Internet for their faith-based experiences before the end of the decade [24]. Users in either category will be visiting the HOUSE from different countries.

Furthermore, the visitors can be young or old, from different cultures and backgrounds, male and female, some with special needs, and speak different languages. The only common denominator of the visitors is that they have at least some web experience. However, an Australian research on e-government users, found that, generally, users of government services over the internet are more likely to be male (57%), live in metropolitan areas, be under 50 years old, university educated and work as professionals. [19]

The diversity of visitors raises several design challenges. Ideally, the HOUSE must be provided in multiple languages, depending on the highest percentages of Muslims speaking such languages. Examples include: English, Arabic, French, Urdu, Indonesian, Malay, and Turkish. The HOUSE must also be sensitive to different cultures, as adapting to local cultures and native languages are quality indicators of web sites [25]. Furthermore, the HOUSE must comply with the accessibility guidelines provided by the W3C organization [9] to accommodate for users with special needs.

Understanding how users browse the internet is also important in design. Knowing that, for example, 94% of all internet users use Microsoft Internet Explorer (MSIE) to browse the internet, and that 97% use some windows based operating system [26] is an indicator of the importance of ensuring that the HOUSE is accessible by MSIE and that any multimedia provided is compliant with the MS Media players. Furthermore, knowing that 86% of users have JavaScript enabled [26] means that if JavaScript is used in the design, around 14% of the users may not be able to access the HOUSE. By the end of the year 2005, the number of Internet users in the Arab world reached 25 million, or 8% of the Arab world population. Currently, Egypt, Sudan & Saudi Arabia have the largest Internet communities among the Arab countries with over 10 million users and the United Arab Emirates has the largest Internet penetration rate with 54 % of the population having access to the Internet [27].

What are their tasks? In order to identify the tasks, data collection methods such as interviews, questionnaires and focus groups can be used [28]. Areas to go for such answers include the Saudi consular offices around the world where to-be-pilgrims go to apply for visas, to Islamic centers around the world that can easily be reached online, to local Hajj service providers, to both local and international travel agencies, to the Saudi Arabian Airlines and to the Ministry of Hajj.

As it may be impossible to solicit information from each of the above, choosing a sample is doable. It is possible that such entities will be willing to provide feedback if they receive an official request from the Ministry of Hajj for feedback in order to improve the Hajj and Omrah procedures for all Muslims. The official request can either be sent by e-mail or by air mail and contain a questionnaire that can be filled and mailed back in an enclosed prepaid envelope or it can be submitted online through an electronic form. The questionnaire can contain both open ended questions such as "What are the questions you believe the web site we are building should answer?" and close ended yes/no questions. Evaluating current web sites that provide Hajj-related information is another useful form to gather feedback.

As a starting point, this paper proposes that users visiting the HOUSE will want to perform one or more tasks of the following types: (1) visa-related tasks, such as instructions to apply for a visa or to download forms. (2) Hajj and Omrah ritual related tasks, such as learning the steps to perform an Omrah, (3) travel and accommodations related tasks, such as choosing an appropriate travel package, and (4) others such as online shopping for apparel.

The above tasks were chosen based on the results of conducting a focus group to solicit information about what the contents should provide and on the evaluation of the content of 20 existing different Hajj and Omrah web sites.

1. A focus group with 7 Muslim adults (4 Saudis, 3 non-Saudis) was conducted. The discussion lasted about 45 minutes. The adults were asked to provide feedback on what they feel a complete 'one-stop' Hajj and Omrah web site should provide.
2. Evaluation of the content of 20 web sites. The web sites were reached through yahoo (www.yahoo.com) and google (www.google.com) search engines by the following scenario:
    a. The word Hajj was entered as a search keyword using the search engine.
    b. The first 20 URLs returned by the searches, provided they were not online stores, were explored.
    c. The type of information provided by the web-sites corresponding to the 20 URLs was analyzed.

Step 2. Build a Prototype Based on the Collected Information

Usability tests with low-fidelity paper mockups or prototypes are low cost highly effective methods that can be used by designers to identify major user interface and design issues. Furthermore, using paper prototypes in usability testing encourages users to provide significant feedback since the designs are still rough, and increases designers' willingness to make major changes to the design since they have invested minimal time and effort [14,29]. Moreover, paper prototypes are portable, enabling design teams to take them to content experts and to locations where they will conduct their usability testing. Paper prototypes are also very versatile allowing designers to physically manipulate the content of the site during usability testing [14,30]. Therefore, a paper prototype of the HOUSE will be built.

Prototype content organization: The most common method to organize information on the web is to group like web items into logical categories that later become the primary organizing structure of the site [15]. Three popular organization schemes that can be used to logically group items on a web site are: by topic content, by task, and by types of users. When a site is organized by topic content, users first choose a topic then decide what to do with it. This organization works best when a site's purpose is to entertain or to educate. Sites organized by tasks are the most beneficial when visitors need to accomplish tasks through the web site, such as buy and sell. And finally, sites organized by types of users work best when the users are divided clearly into groups with different goals, such as school web sites where the users can be: faculty, student, staff, alumni, or family [23]. As the users of the HOUSE are likely to come to the site in order to perform tasks of the four types described above, such as download forms, apply for visas, and make reservations, this paper proposes that the web site be organized by task. Figure 3 provides an overview of the content organization by task. The tasks included were based mainly on the results of the focus group and the evaluation of the content of the 20 web sites, described above.

The homepage: Schneiderman [31] suggests four strategies for designing the homepage: An executive overview that summarizes the contents and contains links to all major concepts, a top-down approach in which the links are to major categories only, a menu in which the homepage is a detailed table of contents to all items in the web site and a search strategy in which string search is available as a first step.

1. visa-related tasks
   - apply for a visa
     - download forms
     - submit electronically
   - get instructions and regulations on applying
     - for a Hajj visa
     - for an Umrah visa
     - :
   - obtain locations of closest consular offices
   - :
2. Hajj and Omrah ritual related tasks
   - learn the steps to perform Hajj
   - learn the steps to perform Umrah
   - take a virtual tour of the holy places
     - Makkah
     - Madinah
   - :
3. travel and accommodations related tasks
   - choosing an appropriate travel package
   - Make flight reservations
   - :
4. others
   - shop for apparel
   - shop for books
   - :

FIG. 3. Content Organization by Task

The proposed design for the HOUSE homepage uses the second strategy, in which the homepage is designed in a top down approach and will contain links to major categories related to the four main user tasks, namely: visa-related tasks, Hajj and Omrah ritual-related tasks, travel- and accommodations- related tasks, and other tasks. When a user clicks on a link related to any of the four main tasks, the click leads to a page with links to all related subtasks. For example, clicking the link to the visa related tasks leads the user to a new web page with related sub-choices such as a link to visa requirements, location of closest consulate, and application forms which in turn, if clicked, will also lead to another page with links to related sub-choices, for example either to download forms or submit electronically. In general, each link leads to a refined breakdown of the available choices until the specific needed task is reached by the user.

The link names should begin with the most important descriptive keywords. The homepage should also include a one sentence mission statement and include a site's search engine [32]. Figure 4 provides an exemplary HOUSE home page.

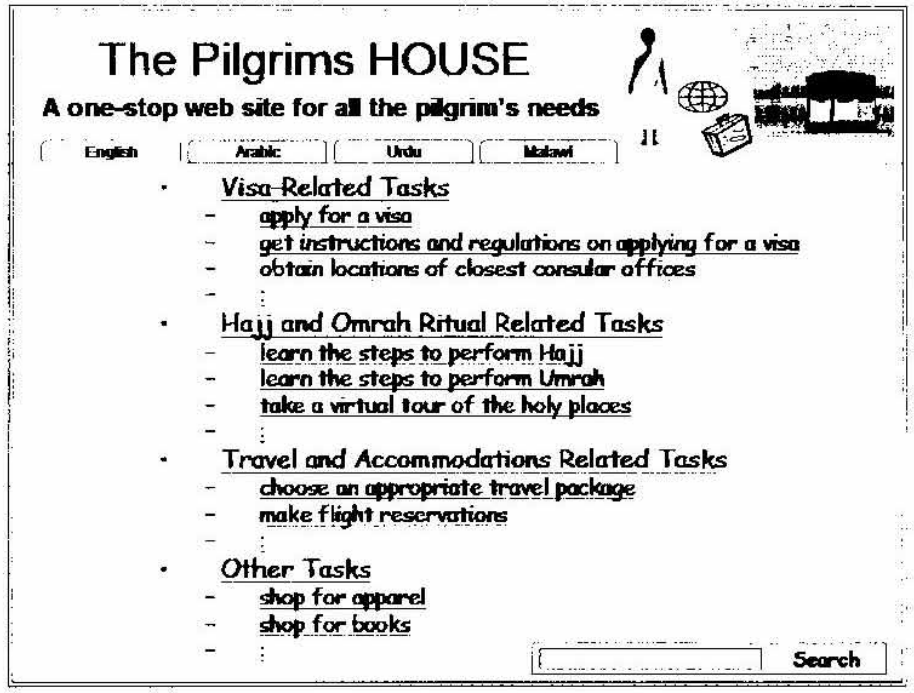

FIG. 4. Exemplary Home Page of the HOUSE

HOUSE Prototype, Version 1.0, paper: Once all the feedback is collected, a preliminary design of the overall organization of the site, as in figure 5, should be constructed. Each of the top level categories will contain an index to the subcategories that can be reached if a top level item was chosen by a user. Each of the subcategories should be represented by a separate page that both describes the contents of the proposed page and an index with links to any other sub-pages that a user will be able to reach from that page.

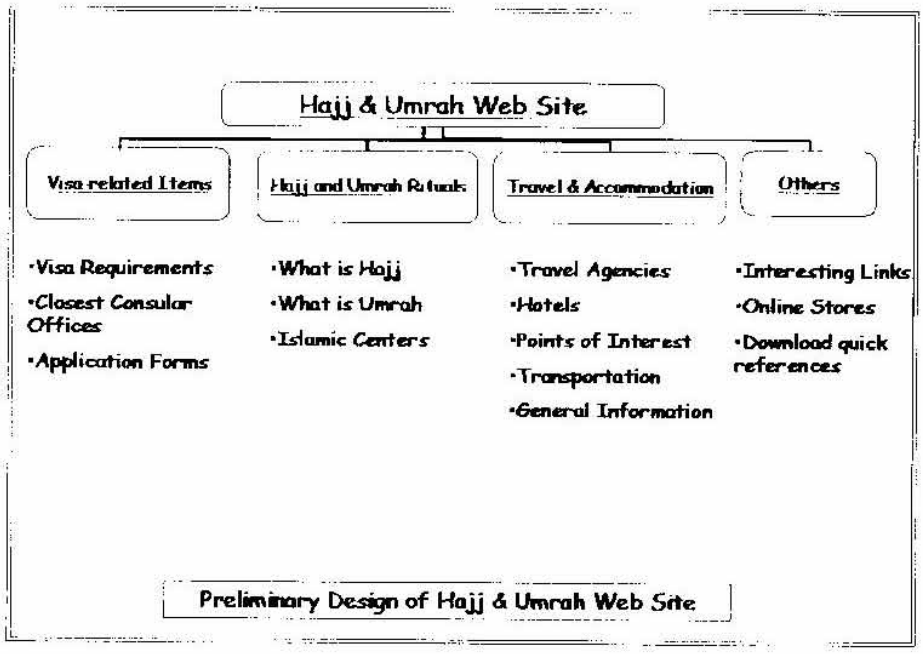

FIG. 5. Content Organization of the HOUSE Prototype - Version 1.0

Step 3. Perform Usability Testing

Several methods for usability testing of e-government sites exist [34]. Many of which have been attempts to asses e-government internationally, in the form of rankings of countries carried out or commissioned by international organizations, such as UNPAN [35], European Commission [36], private sector consultancies (particularly by Accenture [37] Taylor Nelson Sofres [38] and Graafland-Essers and Ettedgui [39]), and academic commentators [40-43].

It is common practice when designing and testing systems with users to separate content from design in prototyping, to allow users and designers to be more focused on content [33]. This paper suggests that the initial evaluation of the prototype focus both on the content and the organization of the content in the web site and less on the design elements such as color and font, as the organization of a web site is likely to be the decisive factor of the success of the entire site [23]. Once the content and organization are well chosen, design elements could be chosen. All labeling and nomenclature used in the initial prototype should also be tested during this early stage.

In 1999, Nielsen, the guru of web site design, suggested a web site usability testing protocol. In his protocol, Nielsen suggested that during usability testing with paper prototypes, each user would be asked to pretend that his finger is the mouse and that he would point to anything on the page that he would like to click on if this was a real web site. Nielsen suggested that before showing the user what page will be displayed if that link was clicked, the user should be asked

what he would expect to happen. This information will be recorded for comparison purposes of the user expectancy with the actual prototype design [29]. In usability testing, the test administrator or the designer would ideally ask users to perform a few tasks using the proposed design.

This paper suggests using Nielsen's protocol in testing the prototype. Users, who are content experts, can individually be asked questions such as:

1. Find information about:
   - The types of Hajj
   - Where to get more information about Saudi Arabia regulations
   - Best prices for hotel rooms
   - The weather in Saudi Arabia
   - The Hajj calendar
   - Where to order books about Omrah
   - Local restaurants in the area
2. Which of these items would you click on? Why?
3. What information would you like to see that is not available here?

When answering the first question, the user should be told to continue searching for all the requested information in a continuous effort as if he is actually navigating through the web site and not to start all over again from the homepage when locating the following piece of information.

Useful data to be collected during this phase of evaluation may include the number of unsuccessful selections made, number of times the user gave up, the navigation paths the user used to get to the next required piece of information, user comments, and observed frustration, if any.

Multiple tests with small numbers of users usually are more useful than elaborate testing with multiple users [44]. Testing the prototype with 5-6 individuals at this stage should be sufficient to uncover any major flaws with the content itself, its organization and the nomenclature.

Step 4. Evaluate Design

(If user interface design objectives are met go to Step 6)

During this step, designers must compare the data collected during the usability tests in Step 3 above, to the preset benchmarks of the site. If the benchmarks are met, the designer will move to step 6. Otherwise, that means the prototype failed to meet its objectives and so Step 5 will need to be carried out next.

Step 5. Improve Design Based on User Feedback then Go Back to Step 3

Improved design: HOUSE Prototype, Version 2.0, paper: Based on the results of usability testing of Version 1.0 of the prototype, Version 2.0 can now be developed. This version must address all usability issues uncovered during the evaluation of Version 1.0. Major reorganization of content may be needed. Revision of naming based on the results should also be completed at this stage. A second prototype can easily be produced by shuffling the papers around until all design issues and usability problems raised thus far are resolved. Additional pages of content, based on feedback, may be created and added to the new organization.

At this stage, designers can introduce visual design and navigation tools. A background page that contains the general consistent visual design items that will appear on all pages, such as the name of the site and a logo, can be introduced. This page may be designed in a variation of styles to allow users to discuss their preferences and to compare features. For example, the designers may vary the location of navigation bars for testing purposes. Designers should also provide sample page designs for each of the main categories identified in testing of Version 1. These pages should include a main navigation bar across the top of each page that enables users to jump from one major category to another, a header bar that helps orient the users, and a margin on either the left side or the right side of the page that contains links to all subcategories within that category. It is recommended for menus in English written software and web sites to be left-justified, in order to enable users who are used to reading from left to right to be able to scan them easily. However, as cultural issues play major roles in design differences [25,45], choosing the side in which the margin should be located can also be tested with users. And it will only be logical for menus in the Arabic pages to be right-justified, in order to enable users who are used to reading from right to left to be able to scan them easily.

Each web page should be designed carefully, in which the focus of attention should be clear, headings should guide the reader, links should be useful and not overwhelm the reader, and visual layout should be compact vertically to minimize scrolling [31]. Many guidelines exist that can help designers make wiser choices. Nielsen's Alertbox [32] is a place where many web designers turn for timely advice. Nielsen has been a partner in a group of designers who built the infamous amazon.com site and the yahoo site, two of the world's most used sites today.

Step 3. Perform Usability Testing – Second Iteration

Version 2.0 can now be tested with users using a similar protocol as the one used in evaluating Version 1.0. Needless to say, different users must be recruited for the testing of this version. The goals of this evaluation should include the same goals defined in Version 1.0, i.e. evaluating content, organization and nomenclature. However, the evaluation of Version 2.0 should also include the evaluation of navigation strategies and visual layout.

Step 4. Evaluate Design – Second Iteration

(If user interface design objectives are met go to Step 6)

During this step, designers must compare the data collected during the usability tests in Step 3 above, to the preset benchmarks of the site.

An assumption that the prototype failed to meet the objectives is made.

Step 5. Improve Design Based on User Feedback then Go Back to Step 3 – Second Iteration

Improved design: HOUSE Prototype, Version 3.0, online: Once Version 2.0 usability testing is completed, developers can now proceed to building the actual HOUSE, knowing that, hopefully, no major organizational, content-related, or navigational flaws will appear. Developers should accommodate for all problems surfacing during the evaluation of Prototype Version 2.0. Actual content, including multimedia, should be created to replace mockups. This prototype is likely to contain less usability errors than the ones uncovered during the evaluation of the first two versions. However, it is very likely that some small design issues may occur during usability testing of this version.

Other issues: As designers will add real content to pages at this stage, several issues such as graphic file sizes and types, accessibility issues, discussed earlier, and resolution problems must be considered during this stage.

Download time and the use of graphics: Normally, users will not wait more than 15 seconds for a page to download [44]. Keeping that in mind and knowing that 55% of internet users still use 56K modems or slower connections to access the Internet [46], designers should avoid, at least for the time being, using slow multimedia movies and large graphic files unless they truly add to users' understanding, as when demonstrating items such as how to perform the Omrah. Options to skip slow loading pages and alternative non-flash versions are also necessary.

Liability and disclaimer: If the site offers links to other web sites, before leaving the site, a disclaimer note should be displayed explaining that the page the user is linking to is not sponsored nor guaranteed by the Ministry of Hajj. This is common practice that is used by many governmental agencies around the globe.

Step 3. Perform Usability Testing – Third Iteration

As Version 3.0 of the prototype is a pre-test to the final version of the HOUSE that will be deployed on the www in service of the pilgrims, usability testing may be more extensive and formal. The site may be launched online directly and usability tested in its real-time environment, to uncover problems related to issues such as download time and accessibility, or can be first tested on in-house servers before being brought out to millions of people on the web. Benchmarks should be closely tested during this stage. Furthermore, several methods for evaluation can be used such as the use of checklists, questionnaires, log analysis and focus groups.

Step 4. Evaluate Design - Third Iteration

(If user interface design objectives are met go to Step 6)

During this step, designers must compare the data collected during the usability tests in Step 3 above, to the pre-set benchmarks of the sites.

If the benchmarks are met, designers can proceed to the next step, i.e. Step 6: Producing the final design. If not, further branching back to Step 2, will be needed.

An assumption that the prototype met the objectives is made.

Step 6. Produce Final Design

The Final HOUSE: Once this step is reached, feedback received from the last usability test should be used to improve the last tested prototype, and the HOUSE is considered completely built and ready for its visitors.

Conclusion

This paper proposed a six-step user-centered approach to building a Hajj and Omrah Useful and Usable web SitE (HOUSE) that is both 'useful' to pilgrims, in that it helps them accomplish their goals, and 'usable', in that it enables them to easily and successfully find the information they want.

The HOUSE cannot be successfully built unless it is thoroughly tested for usability and usefulness to users and improved based on feedback from testing. The approach is iterative, in that designers reiterate through the steps of designing prototypes, conducting usability tests, and evaluating if the prototypes meet the preset benchmarks several times before producing the final version.

Using the six-step approach to building the HOUSE depends initially on low-fidelity paper prototypes that enable designing with minimal losses of effort, time and money.

The author of this paper prays that this effort, however minute, help in paving the way to better services for pilgrims.

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