Usability Testing for IAJIT OpenConf Journal Management System

Layla Hasan
Department of Management Information Systems, Zarqa University, Jordan
Email: l.hasan2@yahoo.co.uk

Emad Abuelrub
Emirates College of Technology, UAE
Email: abuelrub@yahoo.com

Abstract—The technological advances of the 21st century and the increasing use of the Internet have provided new ways to manage the processes of scientific journals, and led journals to employ electronic journal management systems using the web. Journals seeking to achieve significant benefits through their electronic journal management systems should create effective and usable web systems to ensure successful interaction and communication with their users (i.e. authors, reviewers, and advocators). Despite the importance of making journal management systems usable, there is a lack of research that investigates the usability of such systems. This paper presents the findings from a usability evaluation for IAJIT OpenConf Journal Management System (JMS) of the International Arab Journal of Information Technology (IAJIT) using user testing method. IAJIT OpenConf JMS is a customized version of OpenConf, which used the main screens of OpenConf. OpenConf is a common management system that is used worldwide to manage the processes of various scientific events (i.e. conference, workshops, and symposia). The focus of the evaluation was to identify usability problems of the system from the point of view of three groups of users: authors, reviewers, and advocators. The findings highlight nine areas with usability problems in the OpenConf management system related to its main screens and functionality. General recommendations to OpenConf management system were suggested.

Index Terms—usability evaluation, Journal Management Systems (JMS), OpenConf, IAJIT.

I. INTRODUCTION

The processes of journal management, i.e. submitting and reviewing papers, are complex and time consuming tasks. One of the challenges faced by scientific journals is to reduce the time from paper submission to publishing. The advancement of information technology and the extensive use of Internet provide new ways to manage the processes of scientific journals. This results in what is called electronic journal management systems, which is an electronic system that automates all management processes of a journal including submitting and reviewing papers. Therefore, reducing the time required for processing a paper. Journal management systems can be regarded as a domain-specific Content Management Systems (CMS) which is "the process of managing electronic content through its lifecycle – from creation, review, storage, and dissemination to destruction" [13]. IAJIT OpenConf JMS is an example of journal management systems. This system is a customized version of OpenConf, which is a peer-review management system, with the purpose to facilitate the submission and review processes for events (i.e. conferences, workshops and symposia).

The number of IAJIT users (i.e. authors, reviewers) increased rapidly. In 2003, number of papers submitted was 55 and number of reviewers was 38. However, in 2010, number of papers submitted was 445 and number of reviewers was 326. In 2006, IAJIT start using web technology which enables all users to use it anytime and anywhere, provides a wide range of reports, provides various settings according to users' needs, publishes papers electronically, and saves time and efforts [6]. As the number of IAJIT users increases, a challenge for IAJIT is to meet users' expectation in terms of content and interface design. To be successful, it is important to understand users' need of IAJIT OpenConf JMS interface and to minimize users' efforts while interacting with the system [5]. However, there is a lack of research which evaluates the usability of journal management systems.

This paper summarizes findings from a usability evaluation of IAJIT OpenConf JMS interface. The objective of the evaluation is to identify the usability problems (weakness) of the interface, as well as opportunities for further enhancement. The rest of the paper is organized as follows. Section two presents background information and reviews related work, section three presents the aims and objectives of this research, section four describes the methods used, section five presents the main results, section six presents the main recommendations, and section seven presents some conclusions and future work

II. Background And Related Work

This section presents background information regarding this research and reviews related work. It is divided into three subsections. The first section presents an overview about OpenConf management system. Section two provides an overview about IAJIT and IAJIT OpenConf journal management system, and section three reviews related work.

A. The OpenConf Management System

OpenConf is a peer-review management system that greatly facilitates the submission and review processes for conferences, workshops, grants, and books. The OpenConf is developed using the PHP scripting language and MySQL database.

OpenConf is available in two editions: community and professional. The community edition provides a peer-review system that is free. It is suitable for organizations that have their own server and an employee with PHP & MySQL expertise since this edition is limited in technical support and features. The professional edition includes all the features of the community edition plus technical support, additional capabilities, and the flexibility to deploy OpenConf on an organization's own server with multiple deployment options. Examples of the community edition's features include: submission handling, online reviewing, automated review assignments, and submission acceptance. Examples of the features supported by the professional edition include: committee discussion, reviewer bidding, online proceedings, and technical support. Thousands of scientific events (such as conferences, workshops, and journals) have chosen OpenConf for their events and/or peer-review management system. OpenConf is being used worldwide, and has powered events in 90 countries (Fig. 1).

Figure 1.   Countries using OpenConf [12]

OpenConf provides three accounts for three groups of users with different options for each account. The accounts and their options are:

a. Author's Account

This account is specified for authors. Authors have three options in their account: *submit a paper* using the 'Paper Submission Page'; *re-upload paper* using the 'Re-Upload Paper Page' (this option could be used if an author forgot to upload his/her paper using the 'Paper Submission Page'; and *upload final paper* using the 'Upload Final Paper Page' which is used by an author to submit the final version of his/her paper after being accepted and after addressing reviewers' comments.

b. Reviewer's Account

This account is specified for the Technical Committee and Editorial Board members. Technical Committee members are responsible for reviewing papers. Editorial Board members are also responsible for reviewing papers and making the final decision to a paper (advocate a paper), i.e. whether to accept or reject a paper, based on the reviewer's comments. The Editorial Board members are called advocators in this paper.

Members of the Technical Committee and Editorial Board have similar options provided by the OpenConf system: They can sign up for the first time by entering their specified keycode provided by the Editor-in-Chief, then fill the specified form ('Technical Committee Signup Page' or 'Editorial Board Signup Page'), which includes information about him/her including the username and password to be used for signing-in to the OpenConf in the future. They can update their profile using the 'Update Profile Page', and they can review the reviewing guidelines using the 'Reviewing Guidelines Page'.

Furthermore, after the Technical Committee members sign up to the system, the 'Technical Committee Member Page' appears. It lists papers assigned to the member to be reviewed. The member has the option to open the assigned paper or the 'Review Page' which is designed to insert reviewer's comment (Technical Committee's comments) regarding the paper reviewed. After the Editorial Board members sign up to the system, the 'Editorial Board Member Page' is displayed. It lists papers to review and papers to advocate. The member can open the assigned paper to be reviewed and then fill the 'Review Page' reflecting his/her reviewing comments. 'The Editorial Board Member Page' also displays summary of the reviewing results of the reviewed papers awaited the Editorial Board member to take the final decision (accept or reject) based on the reviewers' comments.

c. Editor-in-Chief's Account

This account is specified for the Editor-in-Chief (Program Chair). It has many options to manage the conference/journal process and control the other accounts. For example, the Editor-in-Chief has the ability to control the settings of the OpenConf system (i.e. to open or close submissions and signup for the two accounts listed above); control the submitted papers (i.e. list/delete papers, set paper format, list papers directory), control the review committee (i.e. list/delete committee members, list committee members by topic); and controlling the advocate committee (i.e. list/delete committee members, list committee members by topic).

B. IAJIT and IAJIT OpenConf Journal Management System

IAJIT is a specialized, refereed, and indexed journal that is published quarterly. IAJIT is the official journal of the Colleges of Computing and Information Society (CCIS), stemming from the Association of Arab Universities. IAJIT invites contributions from researchers, scientists, and practitioners from all over the world. It

provides a forum for original and significant contributions in the field of information technology since its first launch in 2003 [18].

In 2006, CCIS developed and customized the OpenConf system, and used the same main screens to manage its operations and procedures for IAJIT. This system was named IAJIT OpenConf. The aim of using this system was to enhance the quality of IAJIT processes. IAJIT OpenConf automates all management processes of IAJIT including submitting papers, reviewing papers, and following-up reviewers' and authors' inquiries and replies [6]. The users of IAJIT OpenConf include authors, reviewers, advocators, Editorial Board members, Editor-in-Chief, and IAJIT secretariat.

C. Usability of Content Management Systems

Usability is one of the most important characteristics of any user interface; it measures how easy the interface is to use [8]. Brinck *et al.* [3] defined usability as "the degree to which users can perform a set of required tasks". A variety of usability evaluation methods have been developed which could be employed to identify usability problems of a JMS. These methods can be categorized into [4]:

a. *User-based usability evaluation methods*: This category includes usability evaluation methods that involve users in the process of identifying usability problems. The most common method in this category relates to user testing.

b. *Evaluator-based usability evaluation methods*: This category includes usability methods that involve evaluators in the process of identifying usability problems. Heuristic evaluation is the most common method in this category and involves having a number of expert evaluators assess the user interface to judge whether it conforms to a set of usability principles (namely 'heuristics') [11]. Nielsen [9] identified a set of ten usability heuristics to be used in the evaluation of any user interface.

c. *Software-based usability evaluation methods*: This category involves software tools in the process of identifying usability problems. The software tools automatically collect statistics regarding the detailed use of systems such as websites.

Researchers stressed the importance of making CMSs usable. For example, Robertson [14] indicated that a CMS will only be used if it is usable. Despite the importance of good usability in CMS, including electronic JMS, few studies were found in the literature that evaluated the usability of such systems. Those that were found employed usability methods that involved evaluators in the process of identifying usability problems. For example, Bos *et al.* [2] indicated that the original set of heuristics developed by Nielsen [9] were too general and were too vague for evaluating new products such as CMSs because they were designed originally to evaluate screen-based products. Consequently, Bos *et al.* [2] developed twelve heuristics specific to CMS that can better guide evaluators in finding usability problems while performing heuristic evaluation of a CMS. Alternatively, Robertson [14] suggested eleven core principles that can be used to assess the usability of CMS. The principles include: minimize the number of options, be robust and error-proof, and provide task-based interfaces.

However, little research has employed user testing methods in the evaluation of CMS, especially in the evaluation of electronic JMS. The user testing method is considered as the most important and useful approach, since it provides direct information regarding how real users use the interface [11]. Also, the user testing is the most direct way of assessing the ease of use of CMS and can provide concrete results [14].

III. AIMS AND OBJECTIVES

The aim of this research is to investigate the usability of IAJIT OpenConf JMS in order to identify usability problems from the point view of three groups of users: authors, reviewers, and advocators.
The specific objectives for the research are:

a. To use user testing approach to measure how three groups of real users interact with IAJIT OpenConf JMS and the actual actions that were taken by them on the system.

b. Based on objective a, to identify the main usability problems and opportunities for improving performance.

c. Based on objectives b, to suggest recommendations on how to improve the usability and performance of the OpenConf system.

IV. METHODOLOGY

This section explains the rationale behind the selection of participants. It also includes an overview of the user testing materials that were developed for the user testing, and the evaluation procedure. This is followed by a discussion into how the collected data were analyzed.

The Editor-in-Chief of IAJIT was asked to provide information about their current and proposed users (such as demographic information, experience using the computer, the Internet, and web-based journal management systems) and then 15 users were recruited with characteristics that matched those specified by the Editor-In-Chief. The fifteen users were distributed on three groups (authors, reviewers, and advocators), five users per group. Users' characteristics are given in Table 1. User testing was carried out over a 3-week period in June 2010. All users were experienced computer and web users, but none of them had ever used IAJIT OpenConf JMS before. All participants volunteered and no incentives were given for their participation. Nine of the participants had prior experience in using web-based journal management systems.

Appointments were made with the selected participants. The purpose and the objective of the evaluation were explained by the observer using a testing script. After signing the informed consent form, the participant was asked to complete the pre-test questionnaire which was designed to gather users' background information and experience (results are shown in Table 1). Then users

TABLE I.
USERS' CHARACTERISTICS

Gender		Education		Yearly Experience with JMS		
Male	Female	PhD	Master	1-5 times	6-10 times	>10 times
10	5	13	2	6	3	0

proceeded to do the main tasks. Three task scenarios were developed for three groups of users: authors, reviewers, and advocators. This included typical tasks for the system that represented the actual use of each group. The typical tasks for authors include: submitting a paper, changing the email address, viewing the paper, and tracking the paper. The typical tasks for the reviewers include: signing-up to the system, reviewing a paper, apologizing to review a paper, and changing the email address. The typical tasks for the advocate include: advocating a paper and changing the email address.

Data were gathered from each user testing session using screen capture software (Camtasia) [17]. Furthermore, as the user worked on each task, the observer noted the sequence of pages, the time taken to complete each task, and any comments made by the user. After completing the tasks for the system, the user was given the post-test questionnaire to fill out in order to gather users' preference information. The post-test questionnaire was based on the Computer System Usability Questionnaire (CSUQ) [7]. All user testing sessions followed the same procedure.

The data collected during the user testing were analyzed in several ways. The performance data were summarized in different ways. The task timing (in seconds) was computed, and descriptive statistics were used to obtain the mean time (in seconds) and the standard deviation. The tasks' accuracy was also determined. This represents the percentage of users who completed each task successfully within the time benchmark. In order to identify the usability problems from the performance data, two steps were used [4, 15]:

a. *Identifying the problematic tasks*: In order to compile a comprehensive list of usability problems for the system, all the problematic tasks were considered. All the tasks that one or more users could not complete successfully within the time benchmark were considered.

b. *Identifying users' problems and conducting a source of error analysis*: In order to identify users' problems/obstacles/difficulties with the problematic tasks, and to investigate the usability problems behind these, different sources were examined. These included the in-session observation notes, notes taken from reviewing the 15 Camtasia sessions, and users' comments noted during the test.

Data collected from the post-test questionnaires were used to find evidence of usability problems with the system and to describe the positive aspects of the system. Likert scores were calculated for each statement of the post-test questionnaire in order to obtain the overall results concerning the participants' satisfaction with the system. A Likert score of 1-3 was regarded as a negative

response, 5-7 a positive response, and 4 a neutral one. The negative response on the post-test questionnaire statement was interpreted as indicating there was a usability problem from the users' point of view. Qualitative data obtained from users' responses to the open-ended questions on the post-test questionnaires were taken into account in determining the usability problems.

V. FINDINGS

This section presents the findings obtained from the analysis of the different user testing methods. The summary of the performance data is presented in two Tables. Table 2 presents the mean time (in seconds) and the standard deviation for each task for the three groups of users, while Table 3 presents the accuracy of the tasks for the users where the problematic tasks for each group of users are shaded.

The observation notes, the notes generated from reviewing the 15 Camtasia files and users' comments from the user testing, were summarised in terms of tasks. This summary presents a snapshot of each task and highlights the critical incidents that occurred during each task across the system. These incidents represent potential problems with users' interactions with the system and they are divided into three types:

a. *Critical problems/obstacles*: The user made a mistake/error and was unable to recover and complete the task on time. The user might or might not have realized the mistake/error.

b. *Non-critical problems/obstacles*: The user made a mistake/error but was able to recover and complete the task within the time limit.

c. *Other problems*: These were noted when the user had difficulties, or when unusual behaviour was observed, or when a user made a comment while performing the task.

Using the observation summary, a large number of usability problems were identified on the system by each task. Furthermore, the analysis of the quantitative and qualitative data obtained from the post-test questionnaires identified a list of negative issues (usability problems) and positive issues on the tested system.

TABLE 2.
MEAN TIME (IN SECONDS) AND STANDARD DEVIATION.

Task No.	Authors		Reviewers		Advocates	
	Mean Time	Std. Deviation	Mean Time	Std. Deviation	Mean Time	Std. Deviation
Task 1	629.000	254.000	349.000	116.000	349.000	188.000
Task 2	268.000	157.000	462.000	143.000	264.000	108.000
Task 3	180.000	62.000	92.000	44.000	---	---
Task 4	530.000	210.000	118.000	62.000	---	---

TABLE 3.

TASK ACCURACY

Task No.	Accuracy Score		
	Authors	Reviewers	Advocators
Task 1	20% (one participant)	40% (two participants)	20% (one participant)
Task 2	20% (one participant)	20% (one participant)	20% (one participant)
Task 3	0% (no participant)	100% (all participants)	---
Task 4	20% (one participant)	80% (four participants)	---

The following subsections review the usability problems identified on the system. Section 5.1 reviews the detailed usability problems identified by the performance data, observation, and qualitative data. Section 5.2 presents the issues identified by quantitative data.

A. Performance Data, Observation, and Qualitative Data

This subsection reviews nine usability problems identified by the performance data, observation, and qualitative data obtained from the open-ended questions of the post-test questionnaires. These problems are related to the main screens and functionality of the OpenConf system.

I. The Home Page of the OpenConf

One problem was identified on this page by users who played the role of authors. The problem related to the difficulty in knowing what was the required link to click to submit a paper. It related to the fact that the 'Home Page' of the OpenConf displayed two links to be chosen by an author: 'Submit a Paper' and 'Sign in' (Fig. 2). Observation showed that all users clicked at the 'Sign in' link to submit a paper instead of the 'Submit a Paper' link (which was required by the system). Users expected to sign-in to the system before submitting a paper, which was not the case of the system. This problem was one of the observed difficulties authors faced while performing Task 1.

Figure 2. The Home Page of IAJIT OpenConf.

II. Paper Submission Page

Users who played the role of authors identified five problems on this page; three of them were identified by the performance data and observation (specifically while users performed Task 1), while two of them were identified by the qualitative data obtained from the post-test questionnaires:

a) *Inappropriate page design*: This page included five rows which had similar fields: name, organization, country and email (Fig. 3). The aim of this design was to provide the user (author) with an option to enter information about four additional authors, if the submitted paper has more than one joint author. Five corresponding labels were displayed at the left of each row which identifies the number of author (i.e. Author #1, Author #2, Author #3, Author #4 and Author #5). However, these labels were not obvious to users. It was observed that none of the users noticed the labels and they were confused by entering similar information more than once in the fields.
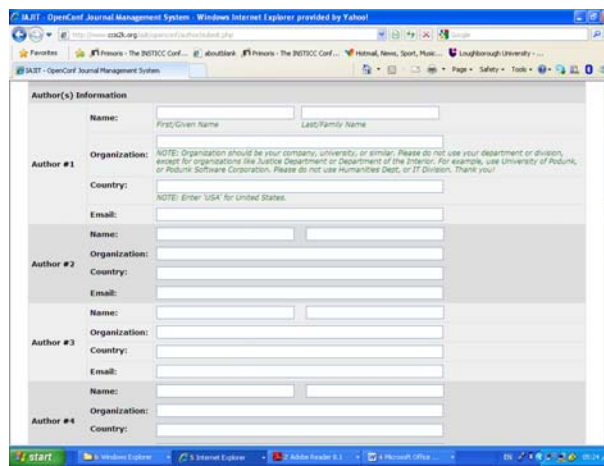

Figure 3. The Paper Submission Page.

b) *The difficulty in distinguishing between required and non required fields*: This page displayed a note at the right of two fields: 'Alternative Email' and 'Telephone', which notified users that it is required to enter information in one of these two fields. However, observation showed that the note was not obvious for users.

c) *The difficulty in knowing what was the specification of information that was required for 'Password' and 'Confirm' fields*: It was not clear to users what was the specification of the 'Password' and 'Confirm' fields (i.e. how many characters to be entered) since no label or note was displayed beside these fields.

d) *This page did not display a confirmation after uploading a paper.*

e) *This page requires users to enter* information *in the 'Country' field*. Users preferred to select their country from a list.

III. The Use of Paper Id and Password to Sign-in

Observation showed that all users who played the role of authors faced difficulties while performing Task 2, which required users to sign-in to IAJIT OpenConf to change their email addresses. One of the critical problems identified by the observation method related to the fact that the system uses both the paper identifier (ID) and a password for signing-in to OpenConf. The paper ID was displayed after a new user submitted his/her paper (after thanking the user for his/her submission) in a small font. The location of the paper ID and the font size might be reasons behind the paper ID being missed by users. This problem prevented four users (out of the five users) from completing Task 2 successfully on time.

IV. Reviewer Committee Signup Page

Users who played the role of reviewers identified five problems on this page; four of them were identified by the performance data and observation (specifically while users performed Task 1), while one problem was identified by the qualitative data obtained from the post-test questionnaires:

a) *The difficulty in knowing what kind of information was required for the 'Organization' field*: This page displayed a note to users which explains what information was required for this field. However, the location of the note, the font, or the color might be reasons behind the note being missed by users.

b) *The difficulty in knowing what was the specification of information required for the 'Username' and 'Password' fields*: Observation showed that users did not recognize the note written at the right of these fields (Fig. 4). Therefore, there were data entry problems.

Figure 4. The Reviewer Committee Signup Page.

c) *The difficulty in distinguishing between required and non-required fields*: This page did not indicate which fields were required and which were not.

d) *The fact that when users missed entering one or more of four fields (first name, last name, telephone, and email) on this page, a non-representative error message was displayed at the top of the page*: The

message was "Check that you have entered your first and last name, telephone, and email correctly and without extra spaces" (Fig. 5). This message did not specify the fields which had data entry problem.

e) *This page requires users to enter information in the 'Country' field*: Users preferred to select their country from a list.

V. The Inability of a Reviewer to Sign-in Automatically to the System

The observation showed that users who played the role of reviewers faced usability problems while performing the reviewing task (Task 2). One of the problems was critical for four users (out of the five users) and prevented them from completing Task 2 successfully on time. The problem related to the fact that the system did not allow reviewers to automatically sign-in to the system after signing-up.

Figure 5. The Reviewer Committee Signup Page- error message.

VI.   Review Page

One problem was identified on this page by the observation and performance data while users performed the reviewing task (Task 2). This problem related to the fact that some statements on this page were unclear for users: Rigor of arguments, written organization, standard of English, references to other work, reviewer familiarity with subject matter, and referencing IAJIT (from the past two years)?.

VII.   Update Profile Page

The observation showed that it was not easy for users who played the role of reviewers and advocators to change the email address in their profiles. This related to two usability problems:

a) *The system required users to enter their current password on this page after making changes to their profiles.*

b) *The difficulty in knowing what information was required to be entered for some fields on this page to change the reviewers' profile*: Whether to insert

information in the 'New Password' or 'Current Password' fields.

VIII.   Committee Member Page

One problem was identified by the observation and performance data on this page by users who played the role of advocators while performing Task 1 (advocate a paper). This problem related to the inappropriate page design. This page included two tables: papers to review (at the top of the page) which displayed information about papers to be reviewed, and papers to advocate which displayed information about papers to be advocated (Fig. 6 and 7). The aim of this design was to provide the advocator with the capability to review and/or to advocate a paper. Observation showed that all users spent time looking for the paper to be advocated inside the wrong table (papers to review) before scrolling down to the bottom of the page where papers to advocate were displayed.

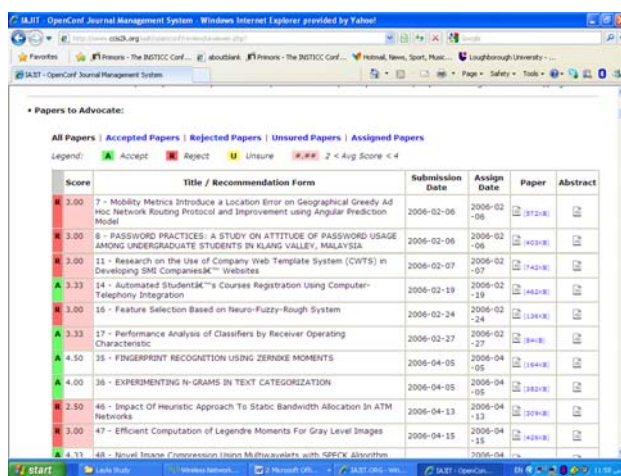Figure 6. The Committee Member Page- the upper part.

Figure 7. The Committee Member Page- the lower part.

.

IX.   Reviews Page

The observation and performance data identified two problems on this page by users who played the role of advocators while performing Task 1.

a) *Inappropriate page design*: The design of this page was divided into two parts. The upper part displayed information about the paper to be advocated. The lower part displayed reviewers' comments. It was observed that all the users were confused as they expected to see the reviewers' comments at the top of this page

b) *One of the recommendations (unsure),* which an advocator can select in order to advocate a paper, was unclear for users.

B. Quantitative Data

This subsection reviews issues identified by the quantitative data obtained from the analysis of the post-test questionnaires. It includes positive and negative issues.

Despite the fact that the observation and performance data showed that users faced difficulties while performing the typical tasks on IAJIT OpenConf JMS, the Likert scores of the post-test questionnaires revealed that the three groups of users were satisfied with the system. For example, the Likert scores showed that:

- Overall, users were satisfied with how easy it was to use this system.
- Users can effectively complete their work using this system.
- Users were able to complete their work quickly using this system.
- It was easy to learn to use this system.
- Users believe they became productive quickly using this system.
- The information provided by the system was easy to understand.

However, Likert scores of the post-test questionnaire identified the following usability problems from the point view of the three groups of users:

- The system did not give error messages that clearly tell the user how to fix problems.
- Whenever the user makes a mistake using the system, he/she did not recover easily and quickly.
- The information (such as online help, on-screen messages, and other documentation) provided with this system was unclear.

The findings of this research stressed the usefulness of the performance data and observation in identifying specific usability problems on a JMS system. This is in agreement with the indications provided by earlier research [1]. The findings of this research also suggest the usefulness of using open-ended questions in the satisfaction questionnaire to identify additional and specific usability problems on a JMS system, problems which could not be identified using the performance data and observation. This is in agreement with the findings of a previous study which also included open-ended

questions in the satisfaction questionnaire, and found that this method provided greater depth of usability problems on the tested site [19].

The findings of this research regarding the quantitative data from the satisfaction questionnaires revealed that: despite the fact that the system had usability problems, and the users reported explicitly the specific problems (through their answers to the open-ended questions in the satisfaction questionnaire), the users did not rate the corresponding statements for the system negatively.

These findings suggest that the quantitative data from the satisfaction questionnaire reflected the users' overall satisfaction with a system without taking into consideration the identification of specific problems. Therefore, this method was not effective or useful in pointing out specific types of usability problem on a JMS system. In fact, these findings are not surprising when compared to the literature. Research has found that users' satisfaction with a site cannot be used to investigate the usability of the site [16]. This is related to the fact that users tend to be polite and give a high rating to a site even if the site is unusable [10].

VI. RECOMMENDATIONS

Based on the results obtained from the analysis of the different usability methods, a set of recommendations were suggested to be considered when using the OpenConf system. These recommendations related to the OpenConf system in general. They are useful for any organization interested in downloading the OpenConf to manage the processes of their scientific events. It is worth mentioning that the recommendations could be implemented easily to the OpenConf system since it is an open source, and therefore it can be customized easily. The recommendations are related to nine areas.

I) *The Home Page of the OpenConf*
Remove the 'Submit a Paper' link from the links to be chosen by authors, and enable an author to register/sign-up to the system before submitting a paper.

II) *Paper Submission Page*
a. Change the design of the 'Paper Submission Page' by removing the rows related to information about additional authors. Add a button/link to provide an author with the option to insert information about additional author(s), if a paper has more than one author.
b. Indicate clearly the required fields at the 'Paper Submission Page' by inserting a special character/mark besides the required fields, such as (*). Also, display a clear message above the required fields, such as "required fields are marked (*)", so that users can have an idea regarding which fields are required and which are not.
c. Improve the obviousness of the notes displayed on the 'Paper Submission Page' by changing their color into red.
d. Display a clear message about the specification of information to be entered in the 'Password'

and 'Confirm' fields. For example, such specification can be displayed inside the fields (as default value) to make it clear and obvious.
e. Provide the capability to display a confirmation message after an author upload his/her paper to the system.
f. Change the 'Country' field on this page into a combo box to enable authors to select their country from a list instead of typing it.

III) *The Use of Paper Id and Password to Sign-in*
Do not use a paper id for signing-in to the system. Use user name as it is easy to forget paper id. Furthermore, it might be confusing for an author if he/she submitted more than one paper in which he/she will have more than one paper id to sign-in to the system.

IV) *Reviewer Committee Signup Page*
a. Improve the obviousness of the note related to the 'Organization' field so that users can enter information in this field correctly. For example, the note could be displayed inside the organization field (as a default value), or before the field using a larger font size and/or a red font color.
b. Improve the obviousness of the specification of information required for the 'Username' and 'Password' fields. For example, the specification of the information could be displayed inside these fields (as default values), or the font size of the information can be increased, and/or the font color of the information can be changed into red.
c. Indicate clearly the required fields at the 'Reviewer Committee Signup Page' by inserting a special character/mark besides the required fields, such as (*). Also, display a clear message above the required fields, such as 'required fields are marked (*)', so that users can have an idea regarding which fields are required and which are not.
d. If users have data entry problems(s), then display a clear error message which specifies the field(s) that had data entry problems(s).
e. Change the 'Country' field in the 'Reviewer Committee Signup Page' into a combo box to enable reviewers to select their country from a list instead of typing it.

V) *The Inability of a Reviewer to Sign-in Automatically to the System*
Allow reviewers to automatically sign-in to the system after signing-up.

VI) *Review Page*
Re-consider the unclear statements displayed on the 'Review Page'. An explanation or an example could be displayed beside the statements to clarify them.

VII) *Update Profile Page*
a. Remove the requirement/condition of entering the current password of reviewers and advocators if they want to change information in their profile.

b. Remove the fields related to new password from the 'Update Profile Page'. Add a link/button to provide reviewers with the option of entering a new password.

VIII)   Committee Member Page

Add two links at the top of the 'Committee Member Page' (Papers to Review and Papers to Advocate) to facilitate the access to the papers to be reviewed and/or advocated.

IX) Reviews Page

a. Display the reviewers' comments at the top of the 'Reviews Page', or display an obvious link to the reviewers' comments at the top of the 'Reviews Page' to facilitate reading the reviewers' comment.

b. Clarify the meaning of the unsure recommendation. For example, add an obvious explanation or an example for this recommendation.

VII. CONCLUSIONS

OpenConf is one of the most common management systems which support the submission and review processes for different types of scientific events including conferences and journals. The OpenConf system has been used extensively for different types of scientific events around the world. IAJIT is an example of journals that used the OpenConf system (the main screens and functions of the OpenConf) to automate its processes. IAJIT made some developments and enhancements to the OpenConf system and named it IAJIT OpenConf.

This research provides an overview of the OpenConf system and its functionality. Then it investigated the usability of IAJIT OpenConf JMS using user testing methods in order to identify usability problem areas from the point view of three groups of users (authors, reviewers, and advocators). The findings highlighted areas with usability problems related to the nine screens and functionality of the OpenConf system in general.

The results are particularly useful for IAJIT to improve the overall usability of its JMS. The results also are useful for organizations already using the OpenConf system, and for organizations interested in using it in the future. It will help them to improve the usability and design of the OpenConf system to meet users' needs.

The results offer a base for future research. The next step will be to implement the suggested recommendations presented in this paper in the future version of IAJIT OpenConf. This will be important to assess their impact on the usability of the interface. The findings of the present evaluation provide a baseline for assessing improvements.

REFERENCES

[1] Benbunan-Fich, R., 2001. Using protocol analysis to evaluate the usability of a commercial website. *Information & Management*, Vol. 39, pp. 151-163.

[2] Bos, R., Gurp, J., Verpoorten, J. & Brinkkemper, S., 2005. Heuristic evaluation of content management systems: CMS specific heuristics. In P. Isaisa and M. B. Nunes (Eds.), *Proceedings of the IADIS International Conference*, Vol. 2, pp. 247-254.

[3] Brinck, T., Gergle, D., and Wood, S. D., 2001. *Usability for the web: designing websites that work*. Morgan Kaufmann Publishers.

[4] Hasan, L., 2009. Usability evaluation framework for e-commerce websites in developing countries. *PhD Thesis*, Institutional Repository, Loughborough University, UK.

[5] Hasan, L. and Abuelrub, E., 2010. Usability test report for IAJIT OpenConf journal management system. *Technical Report*, Colleges of Computing and Information Society, Association of Arab Universities, Jordan.

[6] IAJIT Secretariat, 2007. IAJIT OpenConf report. *Technical Report*, Colleges of Computing and Information Society, Association of Arab Universities, Jordan.

[7] Lewis, J.R., 1993. IBM computer usability satisfaction questionnaires: Psychometric evaluation and instructions for use. *Technical Report 54.786*, Boca Raton, FL: IBM Corporation. <http://drjim.0catch.com/usabqtr.pdf>, [accessed 20.05.07].

[8] Nielsen, J., 2003. Usability 101: Introduction to usability. Useit.com. <http://www.useit.com/alertbox/20030825.html>, [accessed 14.02.06].

[9] Nielsen, J., 1994. Heuristic evaluation. In Nielsen, J. and Mack, R. L. (Eds.), *Usability inspection methods.* John Wiley & Sons, New York, pp. 25-64.

[10] Nielsen, J., 1998. *Failure of corporate websites.* Useit.com. <http://www.useit.com/alertbox/981018.html>, [accessed 14.02.06].

[11] Nielsen, J. and Mack, R. L. (Eds.), 1994. *Usability inspection methods.* John Wiley & Sons, New York.

[12] OpenConf. OpenConf conference management peer-review software and hosting service. <http://www.openconf.com/>, [accessed 15.08.10].

[13] Parapadakis, G., 2000. What's in a name? *AIIM E-DOC Magazine*, <http://www.edocmagazine.com/archives_articles.asp?ID=18350> [accessed 23. 3.05].

[14] Robertson, J., 2007. 11 Usability principles for CMS products. Step Two Designs Pty Ltd, <http://www.steptwo.com.au/papers/kmc_usabilitycms/index.html>, [accessed 15.08.10].

[15] Rubin, J., 1994. *Handbook* of *usability testing*: how to plan, design, and conduct effective tests. John Wiley & Sons.

[16] Spool, J. M., 1999. *Website usability: a designer's guide*. San Francisco, Calif, Morgan Kaufmann.

[17] TechSmith. <http://www.techsmith.com/camtasia/>, [accessed 15.08.10].

[18] The International Arab Journal of Information Technology. <http://www.iajit.org/>, [accessed 15.08.10].

[19] Williams, P., Madle, G., Weinberg, J., Kostkova, P., N. D., and Mani-Saada, J., 2004. Information for the public about disease: usability issues in the development of the National Electronic Library for Communicable Diseases. *ASLIB Proceedings*, 56(2), pp. 99-103.

Layla Hasan holds a BSc degree in computer science from the University of Jordan, Jordan in 1996; an MBA degree in business administration from the University of Jordan, Jordan in 2004; and a PhD degree in computer science from the Loughborough University, UK in 2009. Her research interests include web-based human computer interaction, website usability methods, web analytics, and website quality.

She is currently an assistant professor in the Department of Management Information Systems at Zarqa University, Jordan since 2010. In addition to her work as a member of the Department, she was the Editorial Secretary of the International Arab Journal of Information Technology (IAJIT) and the Director of the General Secretariat of Colleges of Computing and Information Society (2011-2012). She also worked as Director of the General Secretariat of the International Arab Conference on Information Technology (ACIT) and the Editorial Secretary of the International Arab Journal of Information Technology (IAJIT) before obtaining her PhD (2005-2006). Furthermore, she worked as Head of the Information Center at the Association of Arab Universities before joining Zarqa University. She had more than 17 publications in international conferences and journals, and she is a reviewer for many international conferences and journals specialized in computer science and information technology.

Emad Abuelrub is a professor of computer science and dean of the Emirates College of Technology, UAE. He received his Bachelor degrees in computer engineering and computer science from Oklahoma State University, USA, in 1984 and 1985, respectively. He then joined the Alabama A&M University, USA, where he obtained his MSc degree in computer science in 1987. He completed his PhD degree in computer science from Louisiana State University, USA, in 1993.

He is a board member of the Quality and Accreditation Council, Association of Arab Universities, a consultant to many Arab organizations and universities in information technology and quality assurance, and a certified reviewer by QAA and EFQM. He is involved in the organization of many international conferences in computing and information technology. His areas of interest include parallel and distributed systems, interconnection networks, fault-tolerance computing, e-technology, and quality assurance in higher education. He has over 80 publications. He is a member of the IEEE, ACM, and JEA.