The Website of the University of Jordan: Usability Evaluation

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Abstract*: Using the heuristic evaluation method, this research comprehensively investigated the usability of the website of the University of Jordan, the largest and oldest university in Jordan. The evaluators considered in their investigation the most frequently visited pages on the university's website from the viewpoint of 237 students. The evaluators were also asked to visit all pages on the website related to all faculties and their corresponding departments. The results showed that the total number of usability problems found on the University of Jordan's website was 2,926; these related to 28 specific usability problem areas. The results describe the specific usability problems identified on the University of Jordan's website in terms of their type and location.*

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1. Introduction

The tremendous developments in information technology and communications witnessed by the 21st century have resulted in an increasing use of the Internet in all areas of life as the primary source of information [5]. Academic institutions (e.g. universities and colleges), which were among the early developers of websites to present themselves on the Internet, have been affected by the revolution in information technology and communications. Such institutions have changed the aims of their websites in an attempt to respond to technological advances and the increasing number of Internet users. In the early 1990s, university websites started as informational websites aiming simply to be a presence on the web [3, 20]. Nowadays, academic websites have become a vital part of academic institutions and one of their most visible faces [20]. Therefore, the aim of these websites for the academic institutions changed. Research indicates that educational websites now aim to:

- Recruit major stakeholders for the institutions (e.g. prospective students, prospective faculty, alumni, parents) [2, 3, 21];
- Provide a cost-effective and timely method of communication with stakeholders [13];
- Provide a way to present their image on the Internet (e.g. academic offerings, programs, services, student resources, etc.) [2, 3, 13].

In order to achieve the above-mentioned aims, and to respond to the new generation of students who have grown up with technology, educational websites need to consider usability when designing and improving their websites. Usability is one of the most important characteristics of any user interface; it not only evaluates the quality of a website, it also provides managers with insights into potential problem areas [1, 18]. Usability has been defined as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use" [9].

Earlier research has proved that addressing the usability of educational websites can help students to enjoy the learning experience, increase their confidence, and encourage them to use the website [12]. Unfortunately, a university website design is often based on the perceptions of web designers and/or managers in a university instead of students' needs. Furthermore, many website designers have little knowledge of user interface design and usability engineering, subsequently wasting users' time and causing unnecessary traffic on the Internet [3].

There is a lack of research that comprehensively investigates and evaluates the usability of educational websites using the heuristic evaluation method. Noiwan and Norcio [19] explained one reason behind this, which related to the fact that educational websites are large and contain several sub-sites. They concentrated in their study only on the home page of the tested university website, and three or four steps away from it. Also, earlier research which employed the heuristic evaluation method did not consider the pages most frequently visited by students on universities' websites [3, 11, 19, 21, 24]. Furthermore, these studies used quantitative data based on questionnaires in order to identify usability problems on the tested educational websites from the evaluators' point of view. Therefore, these studies did not provide details regarding specific types of usability problems

that could be found on educational websites. Finally, there is a lack of research which evaluates the usability of educational websites using the heuristic evaluation method in the context of Arabic websites.

The aim of this research is to evaluate comprehensively the usability of the website of the largest and oldest university in Jordan, The University of Jordan, in order to identify common usability problem areas within it. The specific objectives for the research are:

1. To investigate types of frequently visited pages on a university website from the viewpoint of students;
2. To use the heuristic evaluation method to assess to what extent the University of Jordan's website has conformed to usability principles, taking into consideration the results obtained from objective 1;
3. To identify the number of common usability problem areas in the case study website in terms of their type and location.

This paper is presented as follows. Section Two presents an overview regarding the context of this research: The University of Jordan while Section Three reviews related work. Section Four describes the method used for the purpose of this research to investigate the frequently visited pages on a university website; the results of the investigation are also presented in this section. Section Five describes the heuristic evaluation method used in this research and Section Six outlines the main results and discusses them in the light of the literature. Finally, Section Seven reviews and presents some conclusions.

2. About the University of Jordan

The University of Jordan (UJ) is a public university located in Amman, the capital of Jordan. Jordan is one of the Arab countries which has been noticeably affected by the revolution in information and communications technology, despite the challenges it faces as a developing country (e.g. lack of payment systems, lack of trust, the high cost of personal computers, the high cost of connecting to the Internet, cultural resistance). The latest statistics show that the number of Internet users in Jordan has grown from 127,300 in 2000 to 2,481,940 in 2012 [8]. Jordan has 10 public and 19 private universities [14].

The UJ was established in 1962; it is the oldest and largest institution of higher education in Jordan. The university has the highest admission averages in the country and is considered the premier university in Jordan. The university currently employs about 1,400 faculty staff and has more than 38,000 students enrolled in undergraduate and graduate programs [23].

At the undergraduate level, students are able to select from 63 different programs offered by 18 faculties: Arts, Business Administration, Science, Shari'a (Islamic Studies), Medicine, Nursing,

Agriculture, Educational Sciences, Engineering and Technology, Law, Physical Education, Pharmacy, Dentistry, Humanities and Social Sciences, Rehabilitation Sciences, Information Technology, Foreign Languages, and Arts and Design.

For those interested in graduate education, the university offers 30 doctoral programs, 81 Master's programs, 16 programs in Higher Specialization in Medicine, one program in Higher Specialization in Dentistry, Professional Diploma Programs, and interdisciplinary Master's programs across a wide spectrum of academic disciplines.

From an international perspective, the University offers 63 international programs at undergraduate level and 130 international programs at graduate level in all fields of specialization.

3. Literature Review

Various usability evaluation methods have been developed to evaluate the usability of websites. These methods can be categorized into three areas in terms of how the usability problems are identified: for example, by evaluators, users, or tools. Evaluator-based methods are aimed at finding usability problems that users might encounter while interacting with an interface from the evaluators' point of view. Heuristic evaluation is one of the most frequently used evaluator-based usability evaluation methods. It involves a number of evaluators assessing the user interface and then judging whether it conforms to a set of usability principles, namely heuristics [16].

The studies which employed the heuristic evaluation method to evaluate the usability of educational websites used either the ten usability heuristics suggested by Nielsen [17, 11, 21], or specific heuristics that were designed for educational websites [3, 19, 24]. The most common usability problems that were identified by these studies in the tested educational websites related to:

- Old content [3, 19, 24];
- Lack of navigational support [11, 19, 21, 24];
- Inconsistency problems [11, 19, 21];
- Ineffective internal search [11, 19];
- Language problems (e.g. misspelling of words) [19];
- Inappropriate page design [3, 21];
- Incomplete information [24]; and
- Inappropriate design of menus [11].

Other studies which employed users in the evaluation and identification of usability problems on educational websites were found in the literature. Kasil and Aucikurt [10], for example, employed 54 students to investigate 132 websites of tourism departments at universities in Turkey. Similarly, Christoun *et al.* [4] investigated students' overall satisfaction with an academic website, with regard to its technology,

usability, aesthetic, and content, using an online questionnaire. These studies shed light on the usability problems that were found in the tested academic websites from students viewpoints. These included:

- Old content [10];
- Missing information (e.g. academic calendar, FAQ, programs) [10];
- Not supporting more than one language [10];
- Ineffective search function [4]; and
- Difficulty in finding information [4].

Few studies, however, were found in the literature that focused on Arabic websites. The study conducted by Mustafa and Al-Zoua'bi [15] is one example. They employed a questionnaire given to 252 students to evaluate the usability of nine Jordanian university websites. The results showed that the overall usability level of the websites was acceptable. However, there were some weaknesses in some aspects of the sites; these were related to design, interface, and performance. However, the study did not provide details regarding specific types of usability problems that users identified on the university sites. Similarly, Hasan [6] asked 237 students to provide ratings for nine Jordanian university websites using usability criteria. The students were also asked to report qualitatively what they liked and disliked regarding the design of the websites. The results showed that the most common weaknesses on the websites included: the design of the sites, the fact that most of the sites were inconsistent in terms of colors and fonts, the Arabic and English language interfaces, the design of the pages, and the lack of support for the Arabic language.

Interestingly, other studies were found in the literature that identified the relative importance of design issues in the design of usable educational websites from a student viewpoint [2, 7, 22]. Specifically, these studies identified the most and least important/liked features on a university website from the perspective of students. The results of these studies showed that the most important features were related to: the availability of online admission applications, internal search tools, simple layout, useful information, good use of graphics and color, simple and comprehensive menu, well organized information, ease of navigation, and user-friendliness.

However, the least important features, as found by Astani [2] and Sandvig and Bajwa [22], were related to the site's inclusion of: a purpose statement, the school's history of excellence, major local businesses and interests, a link to the region's weather, outdated links, incomplete and outdated information, confusing menus, inability to find information, cluttered and disorganized information, slow download time, and small fonts.

Regarding Arabic websites, only one study was found; this was conducted by Hasan [7]. She investigated the relative importance of design criteria in the evaluation of the usability of educational websites from the viewpoint of 237 students. The results identified those design features which students most preferred for a usable educational website. These included: navigation support, logical structure of a site, quick downloading of web pages, aesthetic design, and up-to-date information.

The literature outlined above sheds light on various types of usability problem that were identified on educational websites from the point of view of evaluators and users using heuristic evaluation and questionnaire methods, respectively. Furthermore, the literature summarized the most and least important/liked design aspects for usable educational websites from the viewpoint of students.

4. Frequently Visited Pages on a University Website

In order to achieve the first objective of this research, which related to investigating types of frequently visited pages on a university website, a specific questionnaire was designed. This was divided into two parts: the first aimed to collect demographic information from the participating students while the second part aimed to collect information, using an open question, about the frequently visited pages on a university website from the viewpoint of the students.

The questionnaire was given to undergraduate students from various faculties at one of the universities in Jordan. The total number of students who provided usable responses was 237; 149 males and 88 females. The student participants were, in general, experienced computer and web users; 91% had more than three years of computer experience and 75% had used the Internet for more than three years. The 237 students listed a total of 540 frequently visited pages. The pages they specified are shown in Figure 1. For example, the available courses page was the most frequently visited page listed by the students (21.11%). Five pages, however, were listed only once or twice; these are presented in Figure 1 under 'Others'. These pages include: Photo album, annual book, university newspaper, university conferences, and library.
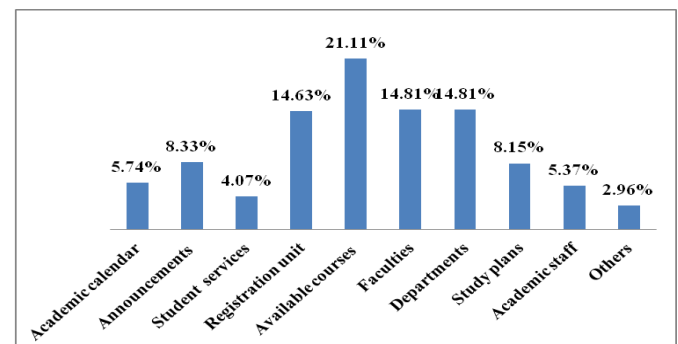

Figure 1. Pages frequently visited by students on a university website.

5. Methodology

The University of Jordan website was selected as a case study for this research since this university is the largest and oldest in Jordan. In order to evaluate the usability of the university's website using the heuristic evaluation method, two documents were developed: heuristic guidelines and a list of tasks. The heuristic guidelines document included a set of comprehensive heuristics, specific to educational websites. This was developed earlier by Hasan [6, 7] and was used as criteria in the evaluation of educational websites in Jordan. The adopted heuristics were organized into five major categories. Table 1 displays the categories and sub-categories of the adopted heuristics. The list of tasks document included ten tasks which represent the pages students usually visit on a university website (Figure 1).

Table 1. The categories and sub-categories of the adopted heuristic guidelines.

Category	Sub-categories
Navigation	Navigation support; effective internal search; working links; no broken links; no orphan pages.
Architecture/organization	Logical structure of site; no deep architecture; simple navigation menu.
Ease of use and communication	Quick downloading of web pages; easy interaction with a website; contact us information; foreign language support.
Design	Aesthetic design; appropriate use of images; appropriate choice of fonts; appropriate choice of colors; appropriate page design; consistency.
Content	Up-to-date information; relevant information; no under-construction pages; accurate information; information about the university; information about the colleges; information about the departments.

Five evaluators participated in this research: two usability specialists and three web experts. The evaluators were asked to visit all pages included in the list of tasks and to use the heuristic guidelines while evaluating the website. They were also asked to visit all pages related to all faculties and their corresponding departments on the studied website. The evaluation was carried out independently by each evaluator and completed over four months (July to September 2012). The heuristic evaluators' comments on the compliance of the site to each heuristic principle were grouped together and listed under the categories and sub-categories of the heuristic guidelines. Each heuristic sub-category was examined to identify problems with the site. These problems were classified and similar problems were grouped together to identify common usability problems on the website. Consequently, 28 common areas of usability problems

were identified which suggested identifying 28 problem sub-themes. These 28 problem sub-themes suggested identifying four main problem themes, based on the types of the identified problem. The four main problem themes related to: navigation, design, content, and ease of use and communication. The list of problem themes and sub-themes is explained in the results.

The identified problems were categorized into three levels in terms of their location on the websites. The first level is 'university'; this includes pages related directly to the main university website, such as: academic calendar, university services, and pages related to the registration unit. The second level is 'faculty'; this includes all pages related to a faculty sub-site. The third level is 'department' which includes pages related to a department sub-site. The 28 specific usability problems, with regard to these three levels, are described in the results.

6. Results and Discussion

This section presents the results obtained from the analysis of the evaluators' comprehensive comments. It is divided into five sub-sections. The first section describes the number of usability problems identified on the University of Jordan's website in terms of their type and location. The next four sub-sections present the usability problems identified in the website with regard to the four problem themes which emerged from the analysis of the data. At the end of each of these four subsections, the results are discussed in the light of the literature review.

6.1. Number of Usability Problems

The results show that the total number of usability problems identified by the evaluators on the University of Jordan's website was 2,926. Figure 2 shows the distribution of these problems in terms of the four usability problem areas identified in this research. It shows that the largest number of usability problems relates to design problems, while the lowest number of such problems relates to ease of use and communication problems.
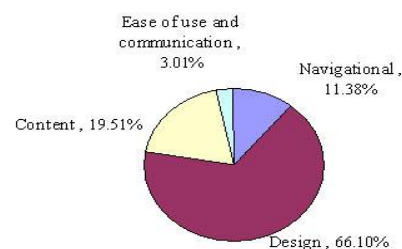

Figure 2. Distribution of usability problems with regard to the four areas.

Figure 3 shows the distribution of the number of usability problems identified on the University of Jordan's website, with regard to the four usability areas, in terms of their location. It shows that the navigational problems were identified on pages of the website related to the faculties and departments of the University of Jordan. It shows also that most of the design, content, and ease of use and communication problems were found on pages of the website related to the departments.
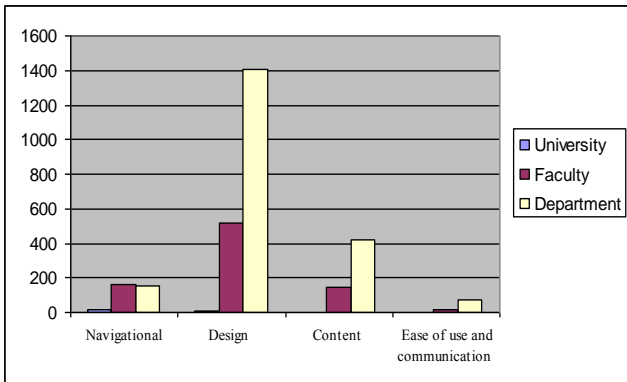

Figure 3. Distribution of usability problems identified on the website in terms of their location.

6.2. Navigational Problems

A total of seven navigational problems were identified on the University of Jordan's website on pages related to its faculties and departments. Table 2 shows and describes the seven specific navigational problems, together with their number in terms of their location.

The results show that the largest number of navigational problems found on the University of Jordan's website was related to broken links. For example, the telephone directory link, which was one of the items on the main menu for all the faculties and departments of the university, was broken. Also, the links to two faculties of the University of Jordan (Faculty of Law and Faculty of International Studies) were broken. Furthermore, the evaluators found that the programs' page, relating to many departments on the university's website, had broken links (e.g. Management Information Systems Department, Foundations of Religion Department, Counseling and Special Education Department, Arabic Language Department, Computer Engineering Department, Computer Science Department).

Also, the results show that there were other links on the University of Jordan's website that were not working properly. These links were classified into three specific problems (Problems 2-4, Table 2). Examples of these three problems are:

- The photo gallery link, which was located on the main menu of the Faculty of Engineering and Technology, was misleading. This opened an

unexpected page: the photo gallery of the Faculty of Agriculture.
- The faculty calendar link related to the Faculty of Medicine opened a page which displayed the calendar of the main university. Therefore, the main menu of the faculty disappeared.
- The proficiency exam, faculty reports and figures and facilities links, which were related to the Faculty of Medicine, did not open the corresponding destination pages; they remained on the same page (the home page).

Table 2. Description and number of navigational problems in terms of their location.

Navigational Problems	Description of the Problem	Occurrence of the Problem			Total
		U	F	D	
1. Weak navigational support	A page did not have a navigational menu or links to other pages in the site.	4	10	3	17
2. Misleading links	The destination page, which was opened by the link, was not expected by users because the link name did not match the content of the destination page.	4	28	17	49
3. Links causing the menu to disappear	The link, when selected, caused the disappearance of the corresponding main menu.	4	22	3	29
4. Links not opening the destination pages	The link did not work; it remained on the same page.	0	20	0	20
5. Broken links	The site had pages with broken links.	3	74	131	208
6. Orphan pages	The site had dead end pages that did not have any link.	2	4	0	6
7. Ineffective internal search	The internal search did not work properly.	2	1	1	4
Total Number of Navigational Problems		**19**	**159**	**155**	**333**
U: University; F: Faculty; D: Department					

Furthermore, the evaluators indicated that the University of Jordan's website had two internal searches which were ineffective, failing to provide useful results. The first one was the main internal search of the website, while the second was the faculty staff search which was designed to search for names and ranks of the faculty staff of the University of Jordan.

Finally, however, the evaluators found relatively few weak navigational support problems and orphan pages. One example is that the self-registration system sub-site did not have a link to the main university website (the University of Jordan's website). Examples of orphan pages are the course schedule and the "Calculate your GPA" pages.

Two out of the seven navigational problems that

were identified by this research were also identified by the heuristic evaluators on educational websites in earlier research [11, 19, 21, 24]. These two problems related to a lack of navigational support and ineffective search engines. The ineffective search function problem was also one of the usability problems that was identified by users on educational websites in the earlier research [4]. Furthermore, earlier studies showed that useful navigational support and effective search tools were two of the most preferred features on educational websites from the viewpoint of users [2, 7, 22]. With regard to these problems, this research uniquely identified a number of examples of these two problems with regard to their location on the tested website.

Furthermore, this research also uniquely identified and described five other navigational usability problems on the University of Jordan's website, as well as presenting a number of them with regard to their location on the tested website. These related to misleading links, links causing the menu to disappear, links not opening the destination page, broken links, and orphan pages. This research also provides a detailed clarification of the seven navigational problems identified on the University of Jordan's website and offered suggestions for fixing these navigational problems in order to improve navigation through the university's website. The owner and/or designer of the University of Jordan's website could give more weight to moves to improve the two navigational problems considered important by users (weak navigational support and ineffective internal search).

6.3. Design Problems

Figure 1 shows that the highest level of usability problems in the University of Jordan's website was found in this area (66.10%). Specifically, a total of 13 design problems were found on the website regarding its design, as shown in Table 3. The problems concerned four major issues: inconsistency (Problems no. 1-7); inappropriate page design (Problems no. 8-10); problems with the use of images (Problems no. 11-12), and problems with the choice of colors (Problem no. 13).

The results identified seven inconsistency problems on the University of Jordan's website. The largest number of these problems related to inconsistency in the language of the interface. This was related to either: links at the English interface of the site, which opened pages that displayed Arabic content and vice versa; or pages at the English interface which displayed English and Arabic content together. The most common pages on the website which had this type of problem were: The home page of most of the faculties (10 out of 16); events, news and

Table 3. Description and number of design problems in terms of their location.

Design Problems	Description of the Problem	Occurrences of the Problem			Total
		U	F	D	
1. Inconsistency in the language of the interface	Links at the English interface opened pages that displayed Arabic content and vice versa, or pages on the English interface displayed English and Arabic content.	7	75	56	138
2. Inconsistency in font case (capital and small)	The site's content was displayed using various styles, such as: sentence case, title case, lowercase, uppercase.	0	20	56	76
3. Inconsistency in the font size	The site's content was displayed using various font sizes.	0	15	35	50
4. Inconsistency in the font style (regular and bold)	The site's content was displayed using various font styles, such as: regular, italic, bold.	0	7	11	18
5. Inconsistency in the content	The site's content differed between the Arabic and English interfaces.	1	17	10	28
6. Inconsistency in the alignment of the header	The alignment of the headers on the site's pages was inconsistent: center, right or left.	0	4	15	19
7. Inconsistency in the font color	The font color of the site's content was inconsistent: blue, purple, red, black.	0	11	20	31
8. Ineffective text format	The information, figures and tables on the site's pages were not aligned correctly, or the font size of the headings of the site's pages was smaller than the font size of the paragraphs of the pages.	1	113	348	462
9. Inappropriate/ not representative heading of a page	The site had pages without headings, or with headings that were inappropriate (e.g. they did not represent the content of the page).	2	145	285	432
10. Inappropriate design of main menu	The items of the main menu could not be seen or selected since they appeared behind the content of a page.	0	41	60	101
11. Inappropriate quality of images	The site had images of poor quality.	0	3	16	19
12. Broken images	The site had broken images on some pages.	0	58	474	532
13. Inappropriate choice of color	The site used an inappropriate combination of background and font colors.	0	6	22	28
Total number of design problems		**11**	**515**	**1408**	**1934**
U: University; F: Faculty; D: Department					

announcement pages of seven faculties; and program pages of a number of departments. Figure 4 shows an example of this problem which was found on the home page of the Faculty of Educational Sciences. It shows that, despite the fact that this faculty had an English interface, five links were displayed on it in the Arabic language.

The evaluators also identified a large number of inconsistency problems related to the font case (capital and small) used on the site. This problem was commonly found in the items of the main menu of most of the faculties (15 out of 16), and departments (51 out of 91) on the University of Jordan's website. The items were written using two styles: sentence case and title case.
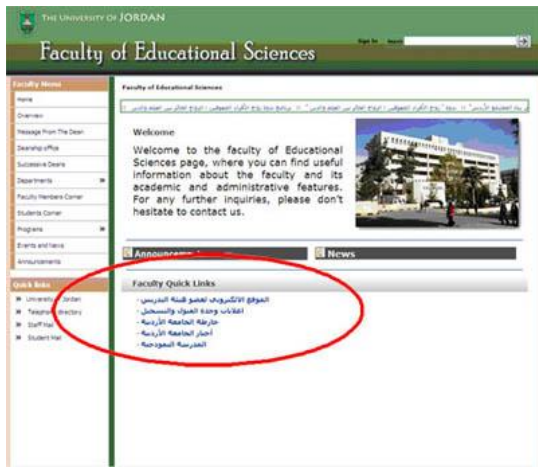

Figure 4. The home page of the Faculty of Educational Sciences, which displays Arabic content.

The results also shed light on three problems related to inappropriate design of the site's pages (Problems no. 8-10, Table 3), as follows:

- The first problem related to ineffective text format in the site's pages. Table 4 shows that the total number of such problems found on the University of Jordan's website was 462. For example, information, figures and tables on the site's pages were not aligned correctly. The pages on the website which had this type of problem in common were: overview, message from the chairman, and the vision and mission pages of departments 62, 42 and 44, respectively. Another example of ineffective text format related to the fact that the font size of the headings of some pages on the site was smaller than the font size of the paragraphs of the pages (e.g. in the overview page of 14 faculties and 56 departments).
- The second problem related to pages on the site without headings or with inappropriate headings. The pages that were found by the evaluators without headings were: message from the dean, deanship office and successive deans' pages for 14 (out of 16) faculties and department staff; vision and mission, and message from the chairman pages for

72, 65, 46 (out of 91) departments, respectively. Regarding inappropriate headings, the evaluators found that the overview page of the six departments in the Faculty of Agriculture had mission and vision headings which were unrepresentative.

- The third problem related to inappropriate design of faculties' and departments' menus. A common problem that was found regarding menus for all the departments of the university was related to the fact that the departments' main menu items disappeared when the photo gallery page was opened. The menu was designed to display its items behind the photos of the photo gallery page and therefore the items could not be accessed and selected.

With regard to the site's images, Table 4 shows that the University of Jordan's website had large numbers of broken images. These were commonly found on pages related to messages from the dean (5 faculties), messages from the chairman (13 departments), and department staff (41 departments). Furthermore, broken images were found on the upper header of some pages on the site, which should display the name of the university, the faculty and the department. Examples of this problem were found on all the pages related to one faculty (the Arabic interface of the Faculty of Arts) and two departments (the Departments of Computer Information Systems and Business Information Systems) (Figure 5). The evaluators also indicated that the site contained some poor quality images; these were commonly found on the overview page of five departments related to the Faculty of Science.
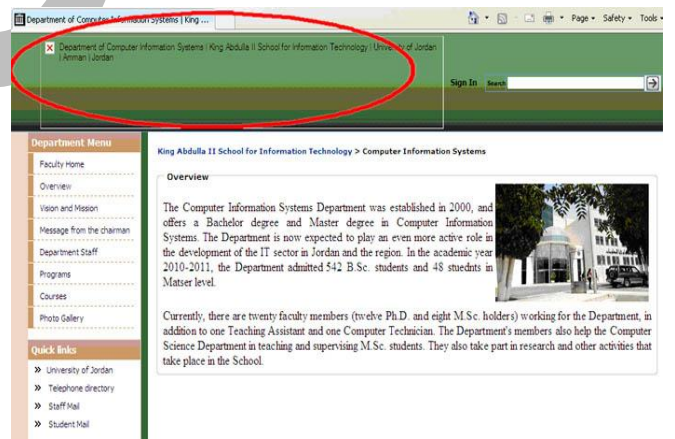

Figure 5. The home page of the Computer Information Systems Department, which had broken images in the upper header.

Finally, the evaluators found problems on the site's pages regarding an inappropriate choice of color (i.e., the combination of background and font colors). The pages which commonly had this type of problem were: overview, message from the chairman, and vision and mission pages related to various departments of two faculties (the Faculty of Science and the Faculty of Engineering and Technology).

This research, unlike earlier research that employed the heuristic evaluation method in evaluating the usability of educational websites [3, 11, 19, 21, 24], identified a large number of specific design problems on the University of Jordan's website. However, there is agreement between some problems identified by earlier research and the results of this research. Earlier research showed that the heuristic evaluators identified three problems on the educational websites which were related to: inconsistency problems, inappropriate page design, and inappropriate design of the menu [3, 11, 19, 21]. This research, however, identified seven specific inconsistency problems on the University of Jordan's website; it also presented details of three usability problems with regard to the design of the site's pages (Problems 8-10, Table 3), including inappropriate design of the main menu.

Some of the inconsistency problems identified by this research were also identified by users in earlier studies (Problems 1, 3, 7, Table 3) [6]. Also, users in earlier research, when asked to identify the most and least liked/important features on educational websites, listed two issues regarding the design of the sites: simple (not confusing) menus and good use of graphics and colors [2, 7, 22].

These results stress the importance of considering three usability problems that were identified in this research, while improving the overall usability of the University of Jordan's website. These three problems related to inconsistency, inappropriate design of the main menu, and an inappropriate choice of colors (Problems 1-8, and 13, Table 3).

This research also suggested taking into consideration other detailed design problems that were uniquely identified on the University of Jordan's website while attempting to improve the usability of site. These included: ineffective text format, inappropriate/not representative headings on pages, inappropriate quality of images, and broken images. The detailed clarification of these problems, together with their location and number, provides guidance for a manager and/or a designer of the University of Jordan's website with regard to areas of weakness that should be taken into consideration if the design of the University of Jordan's website is to be improved.

6.4. Content Problems

The heuristic evaluators identified six specific usability problems on the University of Jordan's website regarding its content, as shown in Table 4. The first is related to the fact that old information was presented on the site's pages. The pages on the website which commonly had this problem were: events and news (for eight faculties), the announcements page (for seven faculties), and faculty members' corner page (for two faculties). Figure 6 shows, for example, the announcements page of the Faculty of Business, which

displays an outdated announcement. The date of the latest announcement was 3/22/2011 while this study, as indicated in the methodology, was undertaken between the periods July to September 2012.

Table 4. Description and number of content problems in terms of their location.

Content Problems	Description of the Problem	Occurrence of the Problem			Total
		U	F	D	
1. Old information	The content of a page was old.	1	37	3	41
2. Incomplete information	The site has pages with missing information.	1	15	142	158
3. Empty pages	The site has pages with empty content.	0	49	193	242
4. Inappropriate content	The site has pages that displayed an unclear message, had repetitive content, or had concise content.	0	34	46	80
5. Punctuation errors	The site's content had punctuation errors.	0	13	26	39
6. Grammatical errors	The site's content had spelling errors and grammatical errors.	0	0	11	11
Total Number of Content Problems		**2**	**148**	**421**	**571**
U: University; F: Faculty; D: Department					

The heuristic evaluators also identified a large numbers of problems with regard to incomplete information, as shown in Table 4. Examples of this problem include:

• There was missing information regarding the name of the current dean and current chairman on the message from the dean and message from the chairman pages, respectively, for three faculties and 30 departments on the site.

• Few courses were displayed on the course pages of 18 departments. For example, the course page for the Health Recreation Department in the Faculty of Physical Education displayed information about only three courses (Figure 7).

• There were very few courses that had descriptions when selected from the course pages covering 16 departments.

• There was missing information about the faculty staff on the faculty staff pages of 75 departments; this related to all the faculties of the university.

The third problem related to empty pages. The pages which most commonly suffered from this problem on the University of Jordan's website were: the photo gallery pages of 50 departments relating to 13 faculties; the vision and mission pages of 18 departments; the message from the chairman pages of 16 departments; and the program pages of 11 departments.
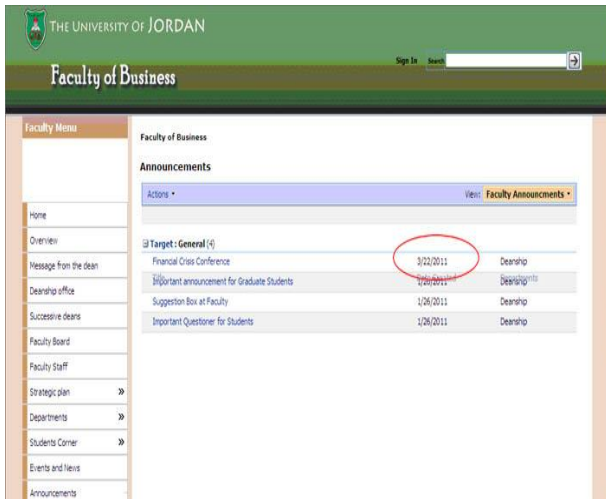
Figure 6. The announcements page of the Faculty of Business, which displays old information.

Table 5 shows that inappropriate content was the fourth most common problem that was identified by the evaluators on the website. Examples of these problems include: crowded pages (e.g. the home page of the University website); repetition of content (e.g. the overview, and vision and mission pages for the Faculty of Business had the same content); very concise content (e.g. the overview page of 9 departments, and the vision and mission page of 4 departments); and irrelevant information (e.g. the vision and mission pages of 3 departments displayed only the objectives of the departments).
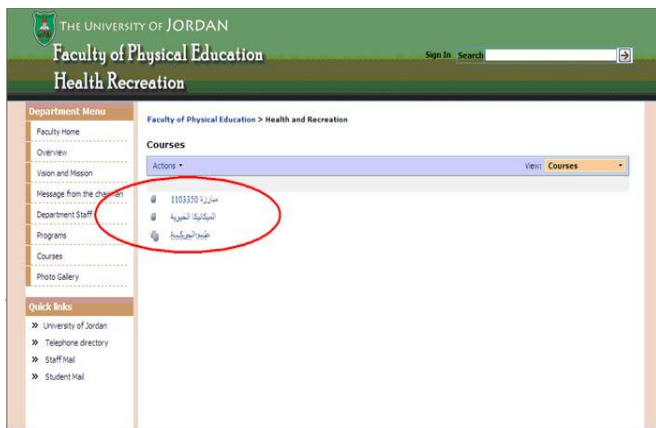

Figure 7. The course page of the Health Recreation Department, which had incomplete information about courses (e.g. few courses were outlined).

Finally, the evaluators identified two specific types of problem related to the written accuracy of the site's content in terms of punctuation and grammatical errors (the fifth and sixth problems, respectively, in Table 4). Examples of pages with spelling errors were all the pages related to the Department of Management Information Systems. The upper header and the upper path displayed on the pages of this department had spelling errors in the name of the department (Figure 8). "Managment" was written in the upper header instead of "Management", and "mangement" was

written in the upper path instead of "management". Another example related to the vision and mission page. For some departments (e.g. the Nutrition and Food Technology Department and the Theatre Arts Department), there was a spelling error in its header: "vission" was written instead of "vision".

Content is one of the most important factors of websites, especially educational websites. A recent study found that content was the most important factor from the viewpoint of 237 students in an evaluation of the usability of education websites [7]. The results of this research, which identified six specific types of content problem on the University of Jordan's website, are comparable with the few examples provided by earlier research. The studies that employed heuristic evaluators while evaluating the usability of educational websites identified three usability problems that were also identified in this research: old content, incomplete information (e.g. academic staff, administrative staff, departments, study plans), and language problems (misspelled words) [3, 19, 24]. The first two problems were also identified in studies which either employed users in the evaluation of the usability of educational websites [10] or those which investigated the most liked/important features on educational websites from the viewpoint of users [2, 7, 22].
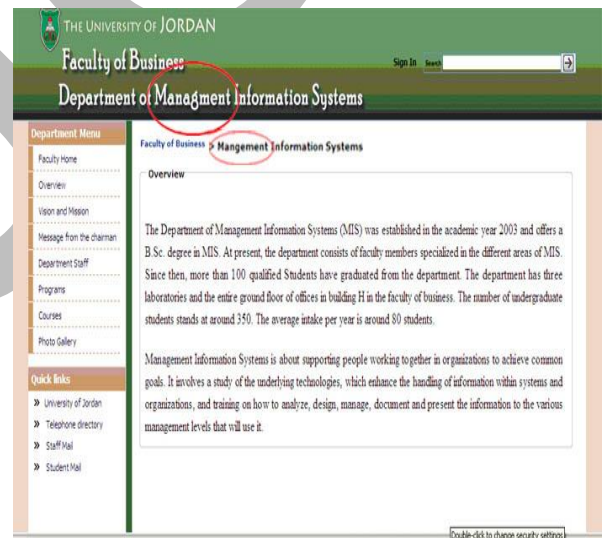

Figure 8. The overview page of the Department of Management Information Systems which had two spelling errors.

This research, however, uniquely provided detailed information regarding these important usability problems in terms of their number and location on the University of Jordan's website. Also, this research identified additional problems with the content of the website relating to empty pages and inappropriate content. Furthermore, this research identified other specific problems related to the grammatical accuracy of the content of the site.

This research suggests that the manager and/or designer of the University of Jordan's website should give more serious consideration to the content

problems identified here while improving the usability of the website. The manager and/or designer of the University of Jordan's website should focus on presenting current/updated information on the pages identified in this research; the missing information and empty pages should also be completed. This work also advises the manager and/or designer of the University of Jordan's website to consider the punctuation and grammatical errors identified in this research in order to improve the image presented by the site to its audience.

6.5. Ease of Use and Communication Problems

Two usability problems were identified on the University of Jordan's website regarding ease of use and communication, as shown in Table 5. The first problem relates to the fact that it was not easy to interact with the website in order to visit some pages. For example, it was not easy to visit the available courses page. A link to this page, which was presented at the home page of the registration unit sub-site, was one of three links (self registration, academic results and available courses) that were created as an animated image. The image keeps animating the three links and it was therefore difficult to select the link to the available courses.

Table 5. Description and number of ease of use and communication problems in terms of their location.

Ease of Use and Communication Problems	Description of the Problem	Occurrence of the Problem			Total
		U	F	D	
1. Difficult interaction with a website	It was not easy to visit pages or to find information on the site.	3	0	0	3
2. Arabic language support	The site did not display its content in the Arabic language.	0	14	71	85
Total number of ease of use and communication problems		**3**	**14**	**71**	**88**
U: University; F: Faculty; D: Department					

The second problem relates to the lack of support for the Arabic language. The University of Jordan's website had problems because it did not support the Arabic language since most of its faculties (16 out of 18) and their corresponding departments were presented only in English.

Earlier research, which only employed users in the evaluation of the usability of educational websites, also identified the two problems identified in this research: difficult interaction with a website, and lack of support for the Arabic language [4, 6]. These issues were also among the most important issues regarding educational websites from the viewpoint of users [2, 7, 22]. This research suggests that the manager and/or designer of the University of Jordan's website should address the problems concerning the difficulty of

interacting with the website. This research also suggests developing an Arabic interface for the website of the University of Jordan to include its faculties and their corresponding departments. Support for the Arabic language was one of the most important issues in terms of the usability of educational websites from the viewpoint of students in Jordan, as found in an earlier study [6]. Therefore, it is suggested that greater weight should be given to this problem while improving the usability of the University of Jordan's website.

7. Conclusions

This research addressed a gap noted in the literature regarding the lack of a comprehensive evaluation of an educational website, which used the heuristic evaluation method and which considered the pages most frequently visited by students on a university website. This research also addressed a gap related to the fact that there is a lack of research that has investigated the usability of Arabic educational websites.

This study investigated types of frequently visited pages on a university website from the viewpoint of 237 students. Then, it comprehensively evaluated the usability of the website of the oldest and largest university in Jordan (the University of Jordan) using the heuristic evaluation method, taking into account the most frequently visited pages identified by the 237 students. All the website pages related to the faculties and departments of the University of Jordan were investigated.

The results showed that the total number of the usability problems that were identified by the evaluators on the University of Jordan's website was 2926. Most of these problems related to the design of the website. More specifically, this research identified a total of 28 specific usability problems that were common on the University of Jordan's website. The results provide a detailed clarification of the 28 specific problems and also offer information in terms of their location. These problems related to four areas that were identified from the analysis of the results: navigation, design, content, and ease of use and communication.

This research suggested that the manager and/or designer of the University of Jordan's website should consider the 28 most common usability problems identified in this research in order to improve the overall usability of the university's website. The discussion shed light on eight problems out of the 28 which were identified previously by earlier research from the viewpoint of users. These could be given more serious attention while the usability of the website is being improved. These eight problems are related to: lack of navigational support, ineffective search engine, inconsistency problems, inappropriate

design of the menu, old content, incomplete information, difficult interaction with the website, and lack of support for the Arabic language.

The results provide evidence to the manager and/or designer of the University of Jordan's website regarding weak areas which need improvement in order to reap the advantages of having a user-friendly educational website. The results of this research could also be important for other universities, specifically in Jordan, which are willing to evaluate and improve the design of their websites. The 28 specific types of common usability problems that were identified in this research provide guidance regarding website features; these should be taken into consideration when designing and/or evaluating educational websites.

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