Criteria for the development of effective university Web sites

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1 Introduction

The information superhighway, the World-Wide Web, the Net, downloads, browsers, e-commerce, e-mail and the Internet are the terms being bandied about in commercial and domestic circles. The Internet, which connects people through computers around the world, has grown in stature as a communication medium that is revolutionizing business. What was originally a tool for the American defence force to communicate with its troops in the event of a nuclear attack has now become the standard for global commerce.

The Internet is opening new markets for existing businesses. It is also creating new business models, such as the virtual organization. This organization does not exist in a traditional bricks and mortar building, but rather in space on a computer that links buyers and sellers electronically. Gone are the days of investing in land, buildings, human resources and inventory. The virtual corporation can be run from the confines of one's basement. With no labour except for the owner and one or two assistants, the virtual organization can still make large sums of money. The Internet is a mechanism for information dissemination and is a medium for collaboration and interaction between individuals and their computers regardless of geographic location.

The Internet is a valuable marketing tool in both industry and academia. With face-to-face interaction being a time-consuming and inconvenient form of communication, the Internet provides its various users with an easier, more convenient screen-to-face interaction. In this article, the effectiveness of this communication medium between student and university is

critically examined. The question of whether universities use Web resources to provide an effective and pragmatic interface between themselves and their users are investigated.

2 Literature review

Although there has been significant research of the factors that contribute to good design and improved usability of business-to-consumer Web sites, there is still very little known on design considerations for any other type of Web site that would make it successful. A university is a 'business' and the student is the 'customer'. However, the university is not a traditional retail business that extends its services by operating on-line and, therefore, has different target markets with different needs. When designing effective Web sites, a number of design elements must be considered. One of the most popular models that is used in Web site design is the 7Cs model of Rayport and Jaworski (2002:184).

2.1 7Cs framework for customer interface design

In e-commerce, a customer interface refers to the screen-to-customer interface, which includes the look and feel, content, transaction capability and community building aspects. According to Rayport and Jaworski (2002:184), there are seven design elements of the customer interface, namely context, content, community, customization, communication, connection and commerce. Using these seven design elements as a basis of evaluation, the study aimed at ascertaining whether a university Web site has an effective interface.

2.1.1 Context
Context deals with the layout, aesthetics and functional look and feel of a site, in other words, with the cyber impression. In e-business, one should observe the graphics, colours, design features, distinct branding freshness and ease of navigation of a Web site to establish whether this design element has been successfully met. Similar observations should be made when evaluating a university Web site in terms of context. The 'distinct branding freshness' of a university Web site is the message that the university is trying to convey. This would include showing pictures of the campus, the so-called 'halls of academia' or a picture of a graduate in cap and gown. The purpose of this is to encourage thoughts of an excellent learning environment, future academic excellence and success in the student, all thoughts that must make the student say 'I want to study here'. Such thoughts are also invoked by appearance of mottos and a mission statement.

2.1.2 Content
Content includes the different forms of digital media – links, graphics, audio, video, lists and text. On a university Web site, content is all important. Content focuses on what appears on the page in terms of information. Relevant links on a university Web site include links to information on scholarships and employment opportunities. Video and audio are not as important as links and text on a university Web site.

2.1.3 Community
Community deals with the interaction between site users, in other words, user-to-user communication. The community of a Web site consists of users who visit a particular site for the same intention or interest. These users are usually open to discussing their views with other users and, therefore, most Web sites provide this feature to give the customer a feeling of belonging to a particular group. Despite being a major drawing card for the site in terms of user friendliness, it is also an excellent way for people of similar interests to share their views and exchange ideas. In some cases, brilliant collaborations emerge. Most university Web sites provide a link to communicate with other students of the institution. However this

feature is only available to registered students. This design element features very strongly on Web sites for distance learning institutions, for example, the University of South Africa (Unisa). Unisa promotes this form of communication between students by having a separate Web page from the university home page called 'Students-on-Line'. This Web page has a link called 'Discussion Forums'. From a student's point of view, this is a breakthrough, as they are now able to seek help with assignments or share ideas on a research project with colleagues who they do not get to see on a regular basis.

2.1.4 Customization
Customization deals with a site's ability to be tailor made for each user. This involves providing users with the option of looking solely at what interests them. Unisa, for example, has this design element in place. A link called 'My Courses' provides registered students with information exclusively on their courses. This saves time and eliminates the frustration of scrolling through information that has no relevance to the user.

2.1.5 Communication
Communication refers to the interaction between the site and user. It can take three forms: site-to-user communication (for example e-mail notification), user-to-site communication (for example customer service request) or two-way communication (for example instant messaging). Most e-business Web sites have all three forms of communication. On a university Web site, the only form of communication is between Webmaster and user. Unisa, however, provides feedback and communication between lecturers and students.

2.1.6 Connection
Connection refers to links to other sites. Links to other universities and search engines are usually very useful.
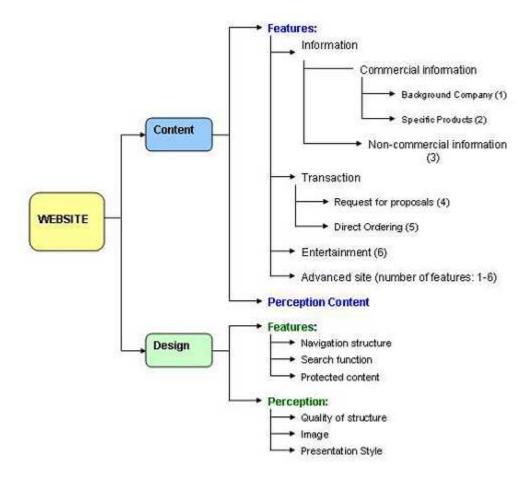
2.1.7 Commerce
Commerce refers to the sale of products or services on a site. Universities sell their product, namely education, by having links called 'Payment of fees' or 'Register for new modules' for the registered student.

Even though content is included as one of the seven Cs in the design model of Rayport and Jaworski (2000:184), it is still an isolated and complex issue in the Web site design arena. An empirical study of Huizingh (2000:123) on the content and design of commercial Web sites separates content from design to provide a more focused perspective for the Webmaster. The study therefore contributes to a more solid knowledge base for analysing Web activity.

2.2 Research framework of Huizingh

According to Huizingh (2000:123), the Internet is a fruitful tool for commercial purposes, but there is a lack of knowledge on how Web sites should be designed. Huizingh developed a framework that analyses and categorizes the capabilities of Web sites by distinguishing content from design. This framework is illustrated in Figure 1. Content refers to the information, features or services that are offered on a Web site, while design refers to the way in which the content is presented to the Web site user. In this research framework, content and design is divided into two aspects, namely features and perception.

Figure 1 Huizingh's research framework for content and design of Web sites (adapted from Huizingh 2000)

2.2.1 Content
The characteristics of the content of a commercial Web site include information, transaction, entertainment, features of an advanced site, and the perception of the content.

Information
The information on a commercial Web site can be categorized as either commercial information or non-commercial information.

Commercial information encapsulates information on the background of the company and the product or services offered. A company's background information includes a mission statement, a financial statement, a list of important customers and an overview of completed projects. The purpose of providing this information on a public domain is to present the organization to existing and potential customers or other stakeholders. On a university Web site, commercial information takes the form of a mission statement, information on the different degrees offered and the student fee schedule for the current academic year. The on-line availability of student fee information can be very useful to current or prospective students to help them make an informed decision on studying. In addition, the availability of this information provides the student with accurate comparative pricing. Presently, most South African universities do not publish their financial statements because of organization confidentiality. Student fee schedules are not available on-line, but the finance departments of most universities offer hard copies.

Non-commercial information relates to the company, its industry and its geographical location. On a university Web site, non-commercial information would take the form of current university news, information on events hosted on the campus, a map of the campus, details about its geographical location, links to academic and administrative departments, an electronic university telephone directory, information on the registration procedure, application forms, etc.

Transaction

Transaction-related features deal with on-line monetary transactions. In this model, a transaction is differentiated in terms of transaction complexity and level of interaction. A transaction can be a simple purchase or a complex purchase where the supplier and customer must interact several times before all the details of the order are agreed upon. Huizingh (2000:129) distinguishes between an ordering feature and a facility to request proposals. On a university Web site that provides on-line registration, these features appear under different naming conventions. The facility to request a proposal can cater for the student who merely wants a quotation of fees for the year, whereas the direct ordering feature can cater for the student who is ready to register for courses in the new academic year. Unisa only offers on-line re-registration and de-registration. A possible reason why most South African universities are not offering on-line registration is the low transaction rate and high transaction value of on-line payment of fees, as well as information security concerns from both the student and university.

Entertainment

Entertainment can be used to 'support the experiential flow, with intrinsic motivation, enduring involvement and hedonic benefits' (Huizingh 2000:130). Possible entertainment elements on a site include jokes, cartoons, pictures, games and videoclips. On a university Web site, elements of entertainment are minimal. The Web site of the University of Natal offers students the opportunity to download the video of their graduation ceremony. Other universities have pictures of top achievers at award ceremonies. A university Web site should exhibit and adhere to a certain degree of seriousness and, therefore, jokes, cartoons and games are highly inappropriate.

Advanced site

According to Huizingh (2000:125), the more functions a site has, the more advanced it is. The extent to which a Web site is advanced can be measured by the number of different features the site contains. By examining the abovementioned characteristics of the content of a commercial Web site, it is clear that most South African university Web sites are not advanced sites as they lack sufficient commercial information on their Web sites and do not offer on-line registration.

Perception of content

The perception of content is measured by the degree to which the Web site is considered to be informative. A university Web site should have a high degree of informativeness. Providing accurate, relevant and up-to-date information should be a primary function.

2.2.2 Design

The characteristics of the design of a commercial Web site include the navigation structure, search function, protected content, quality of structure, image and presentation style.

Navigation structure

According to Huizingh (2000:125), there are four different hyperlink navigation structure types: a tree; a tree with a return-to-home page button; a tree with a few horizontal links; and an extensive network. In a tree or horizontal structure, a page is linked to one or more pages at the next level and to only one page at the previous level. In a network structure, a page is linked to all other pages in the Web site. The network structure allows users to navigate through the information as they desire. However, there is still a high degree of complexity attached to this structure and therefore many university Web sites do not adopt this navigation structure in the design of their Web site. The tree structure with a return-to-home page features on most university Web sites as it caters for both the novice and expert user.

Search function

A search function is an excellent design feature that aids the user in finding specific information without having to go through the cumbersome process of navigating through a large hyperlink environment. The University of Natal has a search function on its Web site that aids the student in finding the details of a particular staff member or other information within the site.

Protected content
Protected content pertains to the security of information on the site against unauthorized users. On a commercial Web site, such as Pick 'n Pay, the home shopper must enter a password before beginning the process of on-line shopping. On a university Web site, a student must enter a password, which is usually the student number, to gain access to examination results. It is important to note that no two students can have the same password and therefore their student number or identity number is the unique identifier. This is referred to as protection of content. The content is the examination results and the method of protection is the password.

Quality of structure
This characteristic is totally dependent on the user's perception of the extent to which the navigation structure is logical. Most university Web sites have a very linear navigation structure, which contributes to excellent usability and functionality.

Image
According to Huizingh (2000:126), Web designers must find a balance between an attractive design and providing information. On a commercial Web site, the cost of downloading attractive content is very time consuming. Therefore, the Web page designer must take into account the cost of downloading when placing picture files on the site. Slow download speed makes a site unpopular because of the high costs that the user must incur in downloading a file from the site. On the other hand, a site that offers good content may be underestimated and may not receive as many hits if there are too few picture files. Fortunately, on a university Web site, picture files are not dominant and therefore this issue is not really a problem.

Presentation style
Presentation style should stimulate reading and facilitate the interpretation of the information. To stimulate flow, it is important that a similar presentation style is used for pages within the Web site. The presentation style includes the layout, colours, font, style, and size and placement of links. Presentation style is a very important characteristic of design on a university Web site as the value of quality information can be lost if information is not presented well. Consistency in presentation style should be maintained to preserve a particular theme.

Huizingh's (2000:123) framework for identifying the relevant aspects of content and design of Web sites is a relatively new method of evaluating a Web-based system. A more traditional method to evaluate an interactive system is the heuristic evaluation of Nielsen and Molich. This method has a very flexible application as it can be used to evaluate both an interactive company system and an interactive Web site, such as a university Web site.

2.3 Heuristic evaluation

A heuristic is a guideline or general rule of thumb for design decisions. It can also be used as a critique for a design decision that has already been made. A heuristic evaluation is a method developed by Nielsen and Molich for the purposes of structuring the critique of a system by using a set of relatively simple and general heuristics. A heuristic evaluation is related to the principles that support usability of an interactive system. A product of a

heuristic evaluation is the identification of potential usability problems.

2.3.1 Heuristic 1: visibility of system status

Visibility of system status pertains to the system that keeps the user informed of its current status through appropriate feedback within reasonable time. The concept of system honesty is a very important quality on an interactive system such as a university Web site. An example of this is a user clicking on an unavailable link and the message 'Page not available' appearing immediately to inform the student of the unsuccessful connection. A potential usability problem resulting from not informing the user of system status is user frustration and the user losing interest in further exploring the Web site.

2.3.2 Heuristic 2: Match between system and real world

The match between the system and the real world refers to the system using the language of the user as a form of communication between user and system. It involves the system using concepts, words and phrases from the user's world rather than system-specific jargon. This heuristic should feature very strongly on all the university Web sites to cater for all levels of user competency. A potential problem resulting from a system that uses complex programming terms is the user getting confused. The terminology on a university Web site should be simple, familiar and unambiguous.

2.3.3 Heuristic 3: User control and freedom

User control and freedom involves allowing the user the option of exiting an unwanted state of the system without having to go through an extended dialogue. This heuristic has a great deal to do with a logical navigation structure that is largely user-oriented, thus allowing user control and freedom on the Web site. An example of this is a button on the Web site that allows the user to return to the university home page while exploring any link.

2.3.4 Heuristic 4: Consistency and standards

Consistency and standards refer to action sequences in one part of the system that apply to other parts of the system. Platform conventions should be followed. The user should not have to wonder whether different words, actions or situations mean the same thing. A university Web site should adhere to pre-determined standards to maintain a certain level of quality.

2.3.5 Heuristic 5: Error prevention

Error prevention refers to the ability of the system to prevent the user from making errors. This could take the form of good error messages or a careful design that prevents the problem from occurring. The occurrence of errors while using a university Web site is minimal compared to using a company system or an on-line shopping site. The possibility of error is high when the user can register on-line or has to supply personal details and therefore a university Web site should have good methods of error prevention in place, such as the option of checking the details of the transaction before submission.

2.3.6 Heuristic 6: Recognition rather than recall

Recognition rather than recall involves the system making options, objects and actions visible. The user should not have to recall information from one part of the dialogue to another, and instructions for use of the system should be clearly visible as well as being easily retrievable. This heuristic is satisfied when a university Web site has all the main links available on a static frame and a separate active frame where the exploration of links takes place. By implementing this design feature, this heuristic is not only satisfied, but navigation also becomes very easy.

2.3.7 Heuristic 7: Flexibility and efficiency of use

Flexibility of use refers to the ability of a system to accommodate both the expert and novice user. A design feature invisible to the user, called accelerators, speeds up the interaction

between the user and the system, and contributes to efficiency of use. Both efficiency and flexibility of use are important and attractive qualities of an interactive system such as a university Web site, as the site could receive more hits.

2.3.8 Heuristic 8: Aesthetic and minimalist design

Aesthetic and minimalist design focuses on the design of the Web site and whether the information on the site is relevant. The amount of information should be minimal to make the page look relevant, but not busy. This heuristic has been discussed at length and it is evident from past research that good design forms an integral part of any Web site's success. A university Web site should publish information that is of great relevance to the user, but should simultaneously not jeopardize the layout and design of the Web site.

2.3.9 Heuristic 9: Help users recognize, diagnose and recover from errors

Users must be helped to recognize, diagnose and recover from errors. This involves the system expressing error messages in an understandable user language (i.e. not in code) to indicate a problem and constructively suggest solutions to the problem. As mentioned above, errors occur minimally on a university Web site that serves as an information source. Therefore, it is correct to state that university Web sites that do not have some form of on-line transactions should not be concerned about methods to assist users in recognizing, identifying and recovering from errors while using the interactive aspect of the Web site.

2.3.10 Heuristic 10: Help and documentation

Providing help and documentation is an important feature of a usable Web site. Help and documentation should feature very strongly on recently upgraded university Web sites to cater for both the novice and expert user.

3 Obstacles

Despite the Internet being a world-wide phenomenon and an amazing mechanism for information dissemination, there are still many issues that must be addressed. Singh (2001) identifies obstacles that prevent optimal Internet usage in e-business. These include fear, poor segmentation, insufficient advertising and poor site appearance. Regarding university Web site users, these obstacles are echoed as well.

3.1 Fear

In e-business, there is definite need to develop awareness programmes that promote the benefits of on-line transactions, as is the case in academia. Perhaps universities should also dispel the fear associated with on-line transactions by providing reassuring information on information security of on-line transactions like registration and payment of fees.

3.2 Segmentation

Segmentation involves the identification of market niches. In academia, the university Web site targets students who fall into the following categories: registered students, prospective undergraduate students and prospective postgraduate students. These different students need different types of information, which should be presented in an understandable format for each level. A very popular feature on Web sites is the link called Frequently Asked Questions (FAQs), which should appear on a university Web site to accommodate the variety of students.

3.3 Advertising

The Internet is not an effective marketing medium due to the fact that everything on the Net is invisible until one is made aware of its existence. This could possibly ring true for academia as well. Most students choose not to use university Web sites to search for information, such as employment opportunities. Basically, knowledge of what a university Web site has to offer is not advertised in an effective way that makes the site a preference for student use.

3.4 Site appearance

Site appearance pertains to the aesthetics, graphics and links on the site. Download speed is a major issue. Usually a cluttered site is a very time consuming site to use. On university Web sites, the links to relevant information may take a long time to load and, therefore, frustrate the user. This could contribute to the site not receiving as many hits as it should.

Of the obstacles identified above, site appearance is the easiest to overcome, hence the focus of this study on site design.

4 Methodology

It is evident that there are a number of useful models guiding the effective design of a Web site. Some of the common themes include flexibility, ease of use, help, consistency and quality content. However, for the purposes of this study, an adaptation of Rayport and Jaworski's (2002:184) model is used.

4.1 Aims and objectives

The aim of this article was to examine prospective postgraduate student perceptions of university Web sites and to determine whether these sites were providing students with relevant and accurate information.

The objectives of the study sought to answer the following questions:

- Are university sites user-friendly and interactive?
- Do these sites offer students relevant and accurate information?
- Is the information on these sites regularly updated?
- Is there any information on career development and employment opportunities?
- Is there any information on financial assistance for study purposes?
- What usability problems do students experience on these sites?
- Do universities use the Internet to market their products and services effectively?

4.2 Instrument

A questionnaire was used to collect data. According to Neuman (1997:56), a questionnaire is an instrument used to measure variables. Wellman and Kruger (1999:78) are of the opinion that a quality questionnaire design determines the quality of responses. To ensure quality responses, the questionnaire used for this study focused on the key dimensions of the study as stated in the objectives.

The questionnaire comprised dichotomous scale questions, in other words, yes or no type of questions and ordinal scale questions where respondents were required to use ranking. Itemized rating questions were used to allow the respondent to express his or her opinion on a particular experience. According to Sekaran (1992:237), respondents should be allowed to

comment freely on issues not discussed previously. For this reason, an open-ended question was included at the end of questionnaire, where respondents were asked to make suggestions for improving university Web sites.

Initially, the researcher conducted an evaluation of eight South African university Web sites for the purposes of determining what information was contained on these Web sites. The following types of information were prevalent on all or some of the sites:

- Information on employment opportunities
- Information on career development
- Information on undergraduate and postgraduate programmes
- Information on current university news and events
- Information on sponsorships or scholarships and other forms of financial assistance for study purposes
- Information on the academic departments within the university.

Owing to the limited time that students had access to the Internet, it was decided that only three sites would be evaluated. It took approximately 15 minutes to evaluate each site, which fitted conveniently into a 45-minute lecture period. For the purposes of this study, the following university Web sites were chosen for evaluation:

- University of Durban-Westville (UDW)
- University of Natal (UND)
- University of South Africa (UNISA).

The University of Durban-Westville was chosen because the site had not been evaluated previously. To avoid being biased, the other two university names were drawn from a hat containing the other seven sites that the researcher initially examined.

4.3 Study area

The survey was conducted at the University of Durban-Westville using a questionnaire to determine whether a South African university Web site met the needs of the prospective postgraduate student. The sampling method used was convenience sampling. Third year information systems and technology students were easily accessible to the researcher and were therefore chosen as the subjects for the study. Furthermore, information systems and technology students had access to computers and were Internet literate.
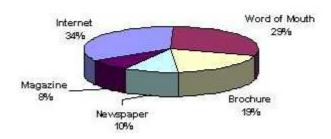
5 Results

5.1 Media used by respondents to gather information

Figure 2 shows the sources that students used to acquire postgraduate information. Of the students, 34% indicated the Internet as the most commonly used source of information, followed by word of mouth communications (29%). This reinforced the assertion that the Internet is indeed a valuable marketing tool. Students used the Internet more than any other medium to gather information about postgraduate studies. However, universities should not discount the traditional advertising media, as they are equally important in attracting students, as depicted in Figure 2. It is evident that customer satisfaction was a major source for registration of new students. Satisfied students were willing to endorse the institution as evidenced by word of mouth accounting for 29% of the responses.

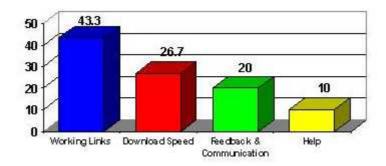**Figure 2** Sources used to obtain postgraduate information

5.2 Elements of a user-friendly Web site

Figure 3 represents elements of a user-friendly Web site that were rated as important. Of the students, 43,3% rated working links on a university Web site as being most important. This relates closely to Rayport and Jaworski's (2002:185) theory of connection. It is evident that respondents valued links that work.

Download speed was rated as being the second most important feature of a university Web site (26,7%). Web sites that take a long period of time to download usually bore the user, who becomes irritated and frustrated. Dial-up costs of Internet connection are very expensive, however, in the case of students using university services, this should not be a pressing problem.

According to Rayport and Jaworski (2002:185), one of the design elements of the customer interface is communication, which forms an important basis for evaluation of these Web sites. Communication refers to the interaction between the site and the user. Web sites should be more interactive, providing feedback from the users who have queries or require information. Help is also a form of communication. At night, when there is no one available to assist the site user, a help feature can be most useful.

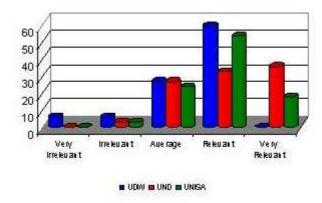**Figure 3** Elements of a user-friendly Web site

5.3 Relevance of Web site content

The Web site with the most relevant information was that of the University of Durban-Westville. Of the respondents, 58% rated the content of this site as being relevant. The possible reason for this is that a new improved Web site was launched prior to the survey. More relevant links were added to the new Web site.

According to Rayport and Jaworski (2002:184), one of the seven elements of the customer interface is content. On a university Web site, content is most important because it focuses

on what is actually appearing on the page in terms of information. The information on university Web sites must be relevant to students because they are the primary users of these sites. Graphics, video and audio output is not as important as useful links and text on a university Web site.
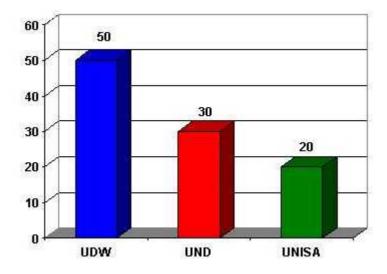
Figure 4 Relevance of the content of Web sites

5.4 Most popular university Web site

Students were asked to rate the university Web sites based on all the criteria given to them. The Web site that the students rated as being the most appealing in terms of all the criteria was that of the University of Durban-Westville. The possible reason for this is that a new improved Web site was launched prior to the survey as mentioned previously.

Most of the respondents liked this Web site because it was not cluttered and relevant information was easy to find. The context of the Web site, which deals with the layout, aesthetics and the functional look and feel, could have led to this site being rated the best Web site. The site holds a distinct branding freshness and easy navigation, which the respondents found appealing. The pictures of the campus and campus life portrayed a vibrant learning environment.

Figure 5 Rating of university Web sites

5.5 Important information on a university Web site

Of the respondents, 43% ranked links to prospective employers as being most important on a university Web site. The reason for this was that these students were prospective postgraduates who wanted to enter industry after completing their studies and needed information regarding their future prospects.

Being a third-year class, 20% expressed interest in pursuing a postgraduate qualification and therefore felt it was important for a university site to contain information on postgraduate study.

It is evident from Table 1 that university events and news was not 'Web worthy'. Registration at universities can be a long and laborious process. It is therefore surprising that only 3,3% of respondents thought on-line registration was important. According to Ranganathan and Ganapathy (2000:460), security still remains one of the major barriers to on-line shopping. This barrier is possibly echoed in on-line registration on university Web sites. A large number of respondents indicated in their response to the open-ended question that security of on-line registration was a major concern.

Table 1 Ranking of important information on a university Web site

Description	Percentage
Links to prospective employers	43
Information on postgraduate programmes	20
Advice on career development	17
Links to other academic departments	13
On-line registration and payment	3,3
University news and events	3,3

6 Recommendations

Some of the suggestions that the respondents made to improve a university Web site included important issues on Web site evaluation. These issues are discussed below.

6.1 Information security

According to Goldfinger (2001), security is a major obstacle to Internet banking. This obstacle in the banking world is echoed as one of the problems for users of any Web site. All respondents were concerned about unauthorized access to student records, student fee accounts, assignment marks and examination results. The procedure to access such data is very simple. However, with such simplicity comes the risk of jeopardizing the safety of personal data and transactions. A link to on-line registration and payment of fees did not exist on all sites chosen for evaluation. If such a link did exist, there was a lack of information on how to use it. Respondents expressed a great deal of fear with on-line payment of fees and de-registration of courses. Of the three universities that were evaluated, Unisa's Web site was the only Web site that allowed students the convenience of online de-registration of courses. However, this could prove very malicious and costly to reverse if an unauthorized user has knowledge of another user's student number and password. Most respondents felt that the university should dispel this fear by introducing a higher level of security. Cyber crime is on the increase. Therefore, organizations are increasingly attempting

to extend secure interactions with customers. Without efficient security in place, organizations will never achieve the full potential of e-business. Some of the technologies in place that can be used to increase security include electronic signatures in the form of smart cards, biometric fingerprinting and even voice recognition (Security in the spotlight 2002).

Other measures that deserve consideration include secure socket layer encryption methods to protect data being transmitted from the university to the student, regular upgrades of firewall hardware, and software and digital certificates. Another suggestion was to provide detailed instructions on the process of on-line payment of fees. In addition, an awareness programme to promote the benefits of on-line transactions, for example personal safety and convenience, should be introduced on campuses.

6.2 Accuracy and relevance of information on the Web site

As stated previously, content is most important on a Web site. Good content on a Web site is information that is both relevant and accurate and that acts as an effective guide in decision making. The respondents stated that accuracy of information could be achieved through regular updates of all the information that appears on a university Web site. As prospective postgraduate students, the respondents felt that all the university Web sites that were evaluated could achieve information relevance by including information that contributes to their student development and provides assistance in the decision to pursue postgraduate studies. In support of the decision to study further, respondents stated that information on financial assistance was very important. Another type of information that respondents felt should feature was guidelines on the difficult task of searching for a job. The type of information respondents felt should definitely appear on a university Web site was:

- Detailed information on postgraduate programmes, such as pre-requisite information for acceptance to study, cost of studying for a particular degree, number of modules in the degree, course content or syllabus and prescribed books for the modules
- Information on credits from other universities in South Africa when applying for acceptance to study at a specific university
- Information on part-time and full-time employment within the university and externally
- Contact information of recruitment agencies
- Information on graduate recruitment programmes in industry
- Information on scholarships, sponsorships and other means of student financial assistance
- Information on mentorship programmes
- Biographies on successful graduates to inspire and motivate students
- Information on social activities and safe recreational places available to students.

6.3 Web page design

Web page design is as critically important as content to a Web site. According to Dix, Finlay, Abowd and Beale (1998:603), excellent page design can make useless material look attractive, but it still remains useless material. Conversely, poor design can mean that potential readers never see excellent material, as they may become bored, intolerant and confused, and eventually abort their attempts at viewing the information.

Most respondents felt that viewing a cluttered Web site contributed to feelings of boredom, intolerance and confusion. Practicality should be a strong feature of Web page design, but pages should still look interesting and attractive if one is to spend time, effort and money when viewing the Web site.

6.4 User-friendliness of a Web site

In the study, the user-friendliness of a university Web site was determined by whether there were working links, good download speed, feedback and communication between the user and the site, and the presence of user assistance. Most respondents stated that working links were essential to improve the usability of the sites. On the issue of improving download speed, respondents felt that this could be remedied by reducing the number of graphics on the sites. To encourage feedback and communication between user and university, respondents felt that all universities should have discussion forums between members of the public and the university community. In addition, respondents felt that there should be more student involvement in the design of a university Web site, as ultimately the site is being designed for student use.

6.5 Web worthy links

In meeting the needs of a prospective postgraduate student, respondents suggested the appearance of the following links on all university Web sites:

- Links to search engines, on-line libraries, article databases and research sites to help in the completion of class projects and assignments.
- A link to free advertising on the university Web site where students could advertise clothes, second hand books, cars, study equipment, etc. With the increasing costs of advertising, this service can be very useful to the unemployed student.
- A link available to registered students to access their e-mail from a remote location.
- A link to access one's student record and fee statement.

The above links offer a certain degree of originality to the content on a university Web site. Furthermore, there are many benefits to be reaped by the student, such as support in their academic work. One of the many benefits the Internet offers is customer convenience, therefore the link to access one's student record and fee statement is very useful as it eliminates the student's frustration of standing in a long queue and the cost of paying a fee to acquire these documents.

7 Conclusion

This research aimed to find out how effectively South African universities market their product, namely education, through the Internet. The decision to change the way students see university Web sites rests upon academia and their Web developers. It is their responsibility to embrace the technology era and provide a more effective, convenient, reliable, secure and user-friendly interface that appeals to the modern student. This study has revealed a mixed response to the various sites that were evaluated. A number of problems were identified regarding the design, student expectations, usage and content. It is evident that universities are not using Web resources to provide an effective and pragmatic interface between themselves and their users.

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