Measuring University Web Site Quality: A Development of a User-Perceived Instrument and its Initial Implementation to Web sites of Accounting Departments in New Zealand's Universities

By

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Abstract

The emergent popularity of Web technologies and their applications have created vast opportunities for organisations, including institutions of higher education, to stretch out for broader customers and create greater networking relationships. The global and far-reaching nature of the Web, its various interactive capabilities, and the rapid growth of the Web use worldwide have made university Web sites more essential for promotion and commercial purposes. However, it has been acknowledged that in order to gain the benefits from Web utilisation, a well-designed Web site is needed. Previous studies on quality of Web sites are not lacking, but most of them have been focussed mainly on business Web sites. Empirical research that focuses on the Web site quality of institutions of higher education has been scarce. In this study, an instrument for measuring university Web site quality was developed and validated by taking into account both the perspectives of the users and the importance of its informational content. The instrument was subsequently put to the test by implementing it for measuring and ranking the quality of Web sites of Accounting Departments in New Zealand's universities. The results from this initial application substantiated the validity and reliability of the instrument.

Keywords: University Web sites; Web site quality; Instrument development; Accounting Department Web sites ranking

1. Introduction

Commercialisations of the Internet, Web technologies and their applications in the 1990s have brought a phenomenal development in business-to-customer (B2C) electronic commerce (Lin & Lu, 2000; Liu & Arnett, 2000; Ranganathan & Ganapathy, 2002). Organisations use the Web for many purposes such as marketing, promoting, transacting products or services, or simply delivering a selected quantity of quality content to a target reader. This target reader can be the organisation's customers, prospective customers, employees, prospective employees, or other stakeholders of the organisation, including the general public.

It has been suggested that the Web is a valuable tool for commercial purposes (Huizingh, 2000). Web technologies enable organisations to reach out for broader customers and create more networking opportunities. However, the benefits of Web site utilisation are rather hard to pin down. Almost always there are many alternating Web sites that users or customers can go to. Simply using Web sites does not guarantee a success. Electronic commerce relies on its ability to attract and keep both existing and potential customers, and hence an understanding of the online users' mindset is critical to designing a usable Web site. The chances of gaining the benefits from the implementation of Web technologies are higher if careful emphasis is put in place on the quality of the Web sites (Cao *et al*., 2005; Liu & Arnett, 2000; McMurdo, 1998; Wan, 2000).

A Web site should be designed to suit a relevant target user. While there has been some research done in the B2C Web site quality (Cao *et al.*, 2005; González & Palacios, 2004; Liu & Arnett, 2000; Ranganathan & Ganapathy, 2002), empirical research that focuses on the Web site quality of institutions of higher education has been scarce. The use of

commercial Web sites by institutions of higher educations emerged when domain name *.edu* (dot edu) began to be used by universities (Brody, 1999). The purposes of a university Web site are both informational and promotional – it tells students, academic and administrative staffs about courses, timetables, and other relevant information, and it tells prospective students and prospective employees about the university and its programs.

In recent years, institutions of higher education globally have experienced a number of significant changes taking place in the political, economic, social and technological environment. One of the major changes is the squeeze of government funding given to universities. As a result, universities have to behave as rival firms and compete intensely for market share and revenue (Caruana *et al*., 1998; Scott, 2003; Soutar & Turner, 2002). With this in mind, it is quite obvious that the issues of performance, accountability, and marketing strategies have become ever more important. It has been suggested that universities that are more market or customer orientated can perform better (Caruana *et al.*, 1998). Currently, there are three main clusters of university market: international students (offshore and onshore), high-school leavers, and mature-age students (Soutar & Turner, 2002). The global and far-reaching nature of the Web, its various interactive capabilities, and the rapid growth of the Web use worldwide have made university Web sites more essential for promotion and commercial purposes (Ranganathan & Ganapathy, 2002). All these have re-emphasised the importance and the need for a good instrument to critically measure the university Web site quality.

The main objective of this study is to develop and validate an instrument for measuring university Web site quality from the perspectives of the users, and to perform an initial implementation of the proposed instrument. First, the conceptual background of Web site

quality is reviewed. Second, the process in developing and validating the instrument is explained. This includes various steps involved in the measurement and scale development. Third, the proposed instrument is used to measure the quality of Web sites of Accounting Departments in New Zealand's universities. From this initial implementation, the ranking and the quality scores of Web sites of Accounting Departments in New Zealand's universities are described. Finally, concluding remarks are provided.

2. Web site quality

Web site quality can be approached from many different viewpoints. No particular body of literature specifically addresses the concept of Web site quality (Cao *et al.*, 2005). Computer and information specialists may focus on the technical aspects of the Web, such as how to develop tools to retrieve information from the Web or how to make a Web site works properly (Arasu *et al*., 2001; Kleinberg, 1999; Nel *et al.*, 1999). Behavioural scholars may be more interested in the issue of why and what users use the Web for or how Web technologies affect the behaviour of users (Burnett & Marshall, 2003; Rogers & Marres, 2000; Wellman *et al.*, 2001). From a management point of view, it is interesting to see how organisations make the most of the emerging Web technologies and their applications (Huang, 2005; Liu & Arnett, 2000; Norton & McGovern, 2001; Wakefield, 2002; Wan, 2000).

The basic goal of a Web site is to provide information (Angehrn, 1997; Bhatti *et al.*, 2000). Information refers to processed data that is organized, meaningful, and useful to the users (Cushing & Romney, 1994). There are different dimensions of information quality according to the context it is being referred to (Fox *et al.*, 1994). However, as a basis of any information quality initiative, the quality of information is commonly assessed via

evaluation of its generic characteristics (Xu & Koronios, 2005). These characteristics have been consistently found to be similar across various previous studies, although some studies may make out more attributes than the others. For example, Ballou and Pazer (1982) defined four fundamental dimensions of information quality: accuracy, timeliness, completeness, and consistency. Burk and Horton (1988) identified three attributes of information quality: accuracy, comprehensiveness, and currency. Rai *et al.* (2002) described three attributes that can be used to measure information quality: accuracy, content and format.

In evaluating quality of a Web site, information criteria were traditionally applied. Alexander and Tate (1999), for example, suggested five Web site evaluation criteria that were focused on information quality: authority, accuracy, objectivity, currency, and coverage. However, more recent studies have emphasised that Web site quality has to go beyond information quality (van Iwaarden *et al.*, 2004; Xu & Koronois, 2004). Web operates in a cyber environment, and hence there is no direct human contact offered through a Web site. This makes Web site quality contextually different than information quality.

Information quality in the virtual environment captures the issue of content, which was conventionally considered as the most important factor of a Web site. 'Content is king' used to be a well-known slogan (McCarthy, 1995; Huizingh, 2000). Consequently, there have been many previous studies that emphasise on using mainly information quality criteria in evaluating and designing a Web site (McMurdo, 1988; Tate & Alexander, 1996; Huizingh, 2000). However, more recent emphasis has been on the users or customers as the major foundation in designing and evaluating Web site quality. Norton and McGovern

(2001) said that content is not king on the Web site, the reader is king. Saying 'content is king' is like saying the product is king, rather than the customer (McGovern, 2000). Katerattanakul (2002) proposed a definition of Web site quality as the Web site's fitness for use by users. All these indicate the importance of user-perceived quality.

There have been a few studies that try to accommodate both the 'content' and 'user' perspectives in the process of exploring the dimensions of Web site quality. Liu and Arnett (2000), for example, identified four factors that are critical to Web site success in electronic commerce: information and service quality, system use, playfulness, and system quality. However, these attributes were deduced from the responses received from 119 webmasters of Fortune 1000 companies. Hence they do not represent the perception of the users.

A few other studies have applied a different approach by collecting responses from participants that were selected to match a profile of a certain target Web user. Ranganathan and Ganapathy (2002) examined the dimensions of B2C Web sites based on a survey of 214 online shoppers. They found four key dimensions: information content, design, security, and privacy. Aladwani and Palvia (2002) based their study on the academic literature about Web site quality, and applied thorough processes in developing and validating an instrument for measuring user-perceived business Web site quality. They collected responses from 101 Web users during their design process, and came up with four variables of Web site quality: content quality, specific content, technical adequacy, and Web appearance. They continued with a normalisation process and collected responses from another 127 Web users. These Web users were assigned to four different groups and asked to evaluate the Web sites of a bank (25 students), a bookshop (31 students), a car

manufacturer (34 students), and an electronics retailer (37 students). Cao *et al.* (2005) also did a similar but smaller study as Aladwani and Palvia (2002). They asked 71 first and second year university students to express their perceptions of three online bookshops: amazon.com, biggerbooks.com, and half.com. They found four constructs that relate to Web site quality: information quality, service quality, playfulness, and system quality. These three studies, among others, confirm that in the perception of users, content or information quality is only one dimension of Web site quality. Therefore, the design and evaluation of a Web site should be assessed using a multi-item instrument that combines all of the users' or customers' values rather than mainly its informational content.

3. The design of an instrument for measuring user-perceived university Web site quality

As a starting point, we used Aladwani and Palvia's (2002) 25-item instrument for measuring Web site quality. There were two main reasons for this. Firstly, as previously described in section 2, not only this instrument has been derived from users' perspectives, it has also encompassed the importance of 'content'. Secondly, this instrument has been developed and validated systematically in their study. They started with a conceptualisation process in delimiting the domain of the constructs and identifying indicators of each construct based on academic literature. It was then followed by a scale design step that analysed the validity and reliability of the constructs and their respective indicators. Finally a normalisation process was performed to verify and validate the constructs.

Nonetheless, while the development and validation processes applied to this instrument have been extensive and solid, the focus of the instrument was more on measuring Web

site quality of businesses. Therefore, in this study we made a few adjustments to suit the instrument for evaluating university Web sites. Subsequently, we followed Churchill's (1979) recommendations by applying a reliability analysis and a normalisation process to ensure the validity and reliability of the adjusted instrument.

The first adjustment to Aladwani and Palvia's (2001) 25-item instrument was an exclusion of the security indicator. While many university Web sites were promotional (Brody, 1999), they practically did not involve much the carrying out of transactions (e.g. used of SSL, digital certificates, etc.) The second adjustment to the instrument was fine-tuning the specific content of a few indicators to suit academic environment (e.g. owners were changed to academic and administrative staffs, products and/or services were changed to courses and/or subjects, etc.) The result of the adjustment was a 24-item instrument consisting of four constructs: technical adequacy, information quality, service ability, and Web appearance (see Table 1).

Table 1. Web site quality constructs and indicators

Construct	*Indicators*
Technical adequacy	Ease of navigation, search facilities, availability, valid links, personalisation or customisation, speed of page loading, interactivity, ease of accessing the site
Information quality	Usefulness, completeness, clarity, currency, conciseness, accuracy
Service ability	Finding contact information, finding general information, finding courses/subjects details, finding academic policies, finding research information
Web appearance	Attractiveness, organisation, proper use of fonts, proper use of colours, proper use of multimedia

3.1. *Reliability analysis*

To evaluate the unidimensionality of the indicators and distinguish the appropriate indicators for each construct, a reliability analysis was conducted. The list of the 24 items was administered to third year accounting students at a business school who had experiences in using the Web. Students were selected since they represent one of the major users of university Web sites. They especially fitted the profile of the target readers for promotional and marketing purposes. The students were asked to rate the importance of each item for measuring university Web site quality. Each item was measured using a seven-point scale from 1 being 'extremely not important' to 7 being 'extremely important'. There were 126 participants, and 118 responses were usable. 56% of the respondents were female and 44% were male. 68% of the respondents accessed Web more frequently (more than three times a week), and 32% less frequently (less than three times a week).

From data that were collected, a reliability test was conducted using Cronbach's alpha. The alpha values for technical adequacy, information quality, service ability, and Web appearance were 0.68, 0.93, 0.72, and 0.87, respectively. Since the alpha value for technical adequacy did not achieve the common acceptable value of 0.7, an analysis of individual indicators was conducted. It was found that interactivity indicator had a low corrected item-total correlation of -0.28. Hence, the indicator was removed. This screening made up an alpha value of 0.89 for technical adequacy - hence, showed an improved level of reliability. At the end of this process, 23 indicators were kept.

The next step involved a factor analysis to discover whether the four constructs could be explained largely or entirely in terms of their respective indicators. We applied a factor analysis procedure with varimax rotation and used a cut-off point of 0.5, which was

considered as a significant loading (Hair *et al.*, 1995). The results of the factor analysis, which are shown in Table 2, were consistent with Aladwani and Palvia's (2002) findings. There were four Web site quality constructs explaining 65.22% of the variance in user-perceived Web site quality. Each of these four constructs matched all of its respective indicators, and therefore, all 23 indicators were retained.

Table 2. Principal component analysis with varimax rotation

Indicator	*Component*				
	Factor 1	*Factor 2*	*Factor 3*	*Factor 4*	*Factor 5*
Ease of navigation	0.25	0.51	0.02	0.09	0.49
Search facilities	0.13	0.87	0.05	0.02	-0.11
Availability	0.02	0.63	-0.04	-0.02	0.29
Valid links	-0.06	0.87	-0.12	-0.01	0.13
Personalisation or customisation	0.02	0.73	-0.09	0.04	0.23
Speed of page loading	0.18	0.82	0.15	-0.05	-0.24
Ease of accessing the site	0.09	0.87	0.25	-0.01	-0.22
Usefulness	0.62	-0.04	0.29	0.11	0.41
Completeness	0.85	0.05	0.22	0.03	0.09
Clarity	0.91	0.08	0.19	0.05	-0.12
Currency	0.67	0.13	0.10	0.16	0.27
Conciseness	0.91	0.11	0.20	0.09	-0.12
Accuracy	0.91	0.11	0.19	0.08	-0.13
Finding contact information	0.08	-0.13	0.38	0.54	0.36
Finding general information	0.07	0.27	-0.02	0.77	0.21
Finding courses/subjects details	0.08	0.00	0.07	0.82	-0.03
Finding academic policies	0.11	-0.22	0.20	0.69	-0.29
Finding research information	0.38	0.00	0.00	0.51	-0.55
Attractiveness	0.08	0.03	0.77	0.03	0.07
Organisation	0.42	0.08	0.78	0.06	-0.08
Proper use of fonts	0.48	-0.03	0.71	0.15	-0.12
Proper use of colours	0.44	-0.05	0.78	0.09	-0.21
Proper use of multimedia	0.07	0.11	0.67	0.16	0.34
Eigen value	4.96	4.33	3.31	2.40	1.56
Variance explained	0.215	0.188	0.144	0.105	0.068

3.2. *Normalisation of constructs and indicators*

Normalisation process was conducted to verify and validate all four constructs in the instrument. This process was similar to conducting a pilot test to ensure the validity of a questionnaire. Oppenheim (1966, p.29) said that "respondents in pilot studies should be as similar as possible to those in the main inquiry" A similar point was also mentioned by Sudman and Bradburn (1983, p.282), "pilot-test on small sample of respondents similar to the universe from which you are sampling". Therefore, a different group consisted of 48 third year accounting students (27 females and 21 males) was asked to participate. Each of the participants was asked to evaluate a Web site of an Accounting Department of a university in Australia using the 23-item instrument as shown in Table 3. Each item was measured on a seven-point scale with 1 being 'strongly disagree' and 7 being 'strongly agree'. To evaluate the validity of the instrument indicators and constructs, exploratory analyses were conducted. Two tests were conducted in these analyses: individual item reliability and composite reliability. The results of these analyses are presented in Table 4.

Table 3. The user-perceived university Web site quality instrument

		Strongly disagree						Strongly agree
1	The Web site looks easy to navigate through	1	2	3	4	5	6	7
2	The Web site has adequate search facilities	1	2	3	4	5	6	7
3	The Web site is always up and available	1	2	3	4	5	6	7
4	The Web site has valid links (hyperlinks)	1	2	3	4	5	6	7
5	The Web site can be personalised or customised to meet one's needs	1	2	3	4	5	6	7
6	Web pages load fast in the Web site	1	2	3	4	5	6	7
7	The Web site is easy to access (i.e. has a reflective and widely registered name)	1	2	3	4	5	6	7
8	The content of the Web site is useful	1	2	3	4	5	6	7
9	The content of the Web site is complete	1	2	3	4	5	6	7
10	The content of the Web site is clear	1	2	3	4	5	6	7
11	The content of the Web site is current	1	2	3	4	5	6	7
12	The content of the Web site is concise	1	2	3	4	5	6	7
13	The content of the Web site is accurate	1	2	3	4	5	6	7
14	In the Web site, one can find contact information (e.g. email addresses, phone numbers, etc)	1	2	3	4	5	6	7
15	In the Web site, one can find general information (e.g. goals, academic and administrative staffs, facilities, etc)	1	2	3	4	5	6	7
16	In the Web site, one can find details about courses and/or subjects	1	2	3	4	5	6	7
17	In the Web site, one can find information related to academic policies	1	2	3	4	5	6	7
18	In the Web site, one can find information related to research	1	2	3	4	5	6	7
19	The Web site looks attractive	1	2	3	4	5	6	7
20	The Web site looks organised	1	2	3	4	5	6	7
21	The Web site uses fonts properly	1	2	3	4	5	6	7
22	The Web site uses colours properly	1	2	3	4	5	6	7
23	The Web site uses multimedia features properly	1	2	3	4	5	6	7

Table 4. Correlations between constructs and indicators

Indicator	Construct			
	Technical adequacy $\alpha = 0.84$	Information quality $\alpha = 0.81$	Service ability $\alpha = 0.86$	Web appearance $\alpha = 0.93$
Ease of navigation	0.624	0.416	0.062	-0.107
Search facilities	0.686	0.538	0.210	0.335
Availability	0.890	0.274	0.292	0.082
Valid links	0.908	0.144	0.374	0.255
Personalisation or customisation	0.671	0.298	0.316	0.467
Speed of page loading	0.713	0.146	0.435	0.205
Ease of accessing the site	0.638	0.106	0.528	0.394
Usefulness	0.442	0.671	0.146	0.138
Completeness	0.367	0.751	0.160	0.245
Clarity	0.266	0.741	0.269	0.437
Currency	0.314	0.727	0.324	0.378
Conciseness	0.201	0.785	0.140	0.384
Accuracy	0.053	0.715	0.212	0.269
Finding contact information	0.418	0.226	0.798	0.609
Finding general information	0.318	0.056	0.870	0.698
Finding courses/subjects details	0.277	0.414	0.662	0.297
Finding academic policies	0.412	0.142	0.834	0.564
Finding research information	0.370	0.199	0.768	0.526
Attractiveness	0.232	0.464	0.598	0.909
Organisation	0.316	0.394	0.510	0.609
Proper use of fonts	0.261	0.323	0.639	0.951
Proper use of colours	0.296	0.273	0.665	0.952
Proper use of multimedia	0.296	0.273	0.665	0.952

In general, for each indicator, a standardised loading of more than 0.7 is considered to be reliable, because it ensures that at least 50% of the variance of the indicator is explained by the construct that the indicator intends to measure (Bagozzi, 1994). In other words, a standardised loading of more than 0.7 ensures that each indicator distributes more variance with the construct score than with error variance. In studies where the indicators are not well developed, a loading of 0.5 or 0.6 is acceptable (Chin, 1998). The exploratory analyses showed that all 23 indicators had loadings above 0.6 on their particular constructs (as shown in Table 4). Additionally, it showed that in each block of indicators, each

loading in the block related to its respective construct was higher than its loadings related to other constructs or other block of indicators. Therefore, all indicators were considered as reliable and were retained as indicators of their respective constructs.

To ensure the estimation of the composite reliabilities of the blocks of indicators, Cronbach's alpha was used to assess the internal consistency for each block of indicators. It was found that alpha values for technical adequacy, information quality, service ability, and Web appearance were 0.84, 0.81, 0.86, and 0.93, respectively. These values were above the acceptable value of 0.7, and hence, indicated that the composite reliabilities estimated by these measures were satisfactory. Having undergone thorough development and validation processes, we believe that the instrument is sound for measuring university Web site quality.

4. Measuring the quality of Web sites of Accounting Departments in New Zealand's universities

To see how the 23-item instrument worked in practice, we did an initial implementation of the instrument and used it to evaluate and rank Web sites of Accounting Departments in New Zealand's universities. There were eight universities in New Zealand. All of them had an Accounting Department, either as a standalone department or as a part of a collective department. These Accounting Departments were as follows: (1) Department of Accounting and Finance, Business School, University of Auckland; (2) Accounting Discipline, Faculty of Business, Auckland University of Technology; (3) Accountancy, Finance and Information Systems Department, College of Business and Economics, University of Canterbury; (4) Centre of Accounting Education and Research, Commerce Division, Lincoln University; (5) School of Accountancy, College of Business, Massey

University; (6) Accountancy and Business Law Department, School of Business, University of Otago; (7) School of Accounting and Commercial Law, Faculty of Commerce and Administration, Victoria University of Wellington; and (8) Department of Accounting, Waikato Management School, University of Waikato. All eight Web sites of these Accounting Departments were evaluated.

To increase confidence that values of Web site quality found from this study were due to Web site quality constructs rather than user effects, two groups of students were used as respondents. The first group consisted of 33 third year accounting students (19 females and 14 males), and the second group consisted of 41 first year accounting students (21 females and 20 males). Each respondent was asked to evaluate Web sites of all eight Accounting Departments using the 23-item instrument. Each item was measured on a seven-point scale with 1 being 'strongly disagree' and 7 being 'strongly agree'.

The results based on the responses from all respondents are reported in Tables 5 and 6. It can be seen in Table 5 that the Web sites of Accounting Departments in the University of Auckland, the University of Otago, and Victoria University of Wellington are the top-three Web sites overall. From Table 6, it can be seen that in terms of all constructs (the technical adequacy, information quality, service ability, and Web appearance), the Web site of Accounting Department in the University of Auckland is consistently in the first position, and the Web site of Accounting Department in the University of Waikato is consistently in the last position. There are slight variations of ranks in the remaining six Web sites, but in general the Web sites of Accounting Departments in the University of Otago, Victoria University of Wellington, and Massey University are consistently in the second to fourth positions, except for the Web appearance construct where the Web site of Accounting

Department in Massey University is in the fifth position. Concurrently, the Web sites of Accounting Departments in the University of Canterbury, Lincoln University, and Auckland University of Technology are consistently in the fifth to seventh positions, except for the Web appearance construct where the Web site of Accounting Department in Lincoln University is in the fourth position.

Table 5. Ranking of the Web sites of Accounting Departments in New Zealand's universities

Rank	Web site of Accounting Department	Overall Mean	Std. Dev
1	University of Auckland	5.78	.33
2	University of Otago	5.57	.37
3	Victoria University of Wellington	5.46	.30
4	Massey University	5.35	.29
5	University of Canterbury	4.95	.26
6	Lincoln University	4.89	.28
7	Auckland University of Technology	4.74	.25
8	University of Waikato	4.14	.27

Table 6. Ranking and descriptive statistics of the Web sites of Accounting Departments in New Zealand's universities based on each Web site quality construct

Web site of Accounting Department	Technical adequacy			Information quality			Service ability			Web appearance		
	Mean	Rank	Std. Dev	Mean	Rank	Std. Dev	Mean	Rank	Std. Dev	Mean	Rank	Std. Dev
University of Auckland	5.71	1	.46	5.83	1	.50	5.69	1	.58	5.87	1	.51
University of Otago	5.66	2	.44	5.60	3	.62	5.45	4	.54	5.57	2	.68
Victoria University of Wellington	5.39	4	.47	5.62	2	.66	5.52	3	.53	5.30	3	.56
Massey University	5.64	3	.45	5.36	4	.51	5.53	2	.51	4.87	5	.54
University of Canterbury	5.20	5	.45	5.09	5	.50	4.98	6	.48	4.54	6	.50
Lincoln University	4.98	7	.44	4.59	6	.55	5.02	5	.52	4.96	4	.63
Auckland University of Technology	5.09	6	.40	4.35	7	.59	4.98	7	.55	4.53	7	.52
University of Waikato	4.09	8	.48	4.11	8	.63	4.15	8	.53	4.21	8	.57

We also provide the ranking and descriptive statistics based upon each group of respondents in Table 7. There are four groups of respondents, which include (1) third year students; (2) first year students; (3) female students; and (4) male students. It can be seen that the ranking in each group is generally consistent with the overall ranking based upon responses from all respondents. The Web site of Accounting Department in the University of Auckland is consistently in the first position. Concurrently, the Web sites of Accounting Departments in the University of Otago, Victoria University of Wellington, and Massey University are in the second to fourth positions. The Web sites of Accounting Departments in the University of Canterbury, Lincoln University, and Auckland University of Technology are in the fifth to seventh positions. Finally, the Web site of Accounting Department in the University of Waikato is consistently in the last position.

Table 7. Ranking and descriptive statistics of the Web sites of Accounting Departments in New Zealand's universities based on each group of respondents

Web site of Accounting Department	Third year student respondents			First year student respondents			Female student respondents			Male student respondents		
	Mean	Rank	Std. Dev	Mean	Rank	Std. Dev	Mean	Rank	Std. Dev	Mean	Rank	Std. Dev
University of Auckland	6.03	1	.24	5.57	1	.23	5.79	1	.33	5.76	1	.32
University of Otago	5.88	2	.23	5.32	3	.27	5.57	2	.41	5.57	2	.33
Victoria University of Wellington	5.62	3	.25	5.33	2	.28	5.50	3	.32	5.41	3	.28
Massey University	5.50	4	.29	5.23	4	.24	5.36	4	.29	5.34	4	.30
University of Canterbury	5.06	5	.24	4.86	6	.24	4.99	5	.29	4.91	6	.22
Lincoln University	4.72	7	.22	5.02	5	.25	4.86	6	.32	4.92	5	.22
Auckland University of Technology	4.81	6	.24	4.68	7	.25	4.77	7	.24	4.71	7	.27
University of Waikato	4.04	8	.24	4.22	8	.27	4.11	8	.31	4.17	8	.21

The results of this initial implementation show that the 23-item instrument is able to differentiate the qualitative value of each university Web site. Hence, it is a valid instrument. Simultaneously, the instrument is also been able to provide consistencies of the results across a diverse range of respondents. Hence, the instrument is also reliable. Nonetheless, chances for further improvement to the instrument are always open and any future change for the better is certainly enviable.

5. Concluding remarks

Web sites have been widely used commercially throughout industry, government, education, and in practically any other types of institutions (Liu & Arnett, 2000). It has been acknowledged that in order to gain the benefits from utilisation of Web technologies, a well-designed Web site is needed. Previous studies on quality of Web sites are not lacking. However, most of the previous studies have been focussed mainly on business Web sites. In this study, an instrument for measuring university Web site quality was developed and validated by taking into account both the perspectives of the users and the importance of its informational content. The generated instrument has four main constructs with a total of 23 indicators. It has been subsequently put to the test by implementing it for measuring and ranking the quality of Web sites of Accounting Departments in New Zealand's universities. The results from this initial application have corroborated the validity and reliability of the instrument.

The results of the study provide some important guidelines for the design and evaluation of university Web sites. Hence, not only they contribute to the existing empirical literature, but may also assist the decision makers and the webmasters in universities. The 23 university Web site quality indicators can be used as a foundation for the design and

development of a more effective university Web site. The results of the initial implementation of the proposed instrument can also be useful. The ranking and the quality scores of Web sites of Accounting Departments in New Zealand's universities provide an illustration about the value and attractiveness of each Web site in the eyes of the users. The quality scores from the respondents give an indication of which Web site dimensions should be maintained and which dimensions should be improved. The best-performing Web site can also be used as a benchmarking model. It should be noted though that changes constantly take place in the economic, social and technological environment. Therefore, it is important to continuously monitor these changes and keep updating the instrument as necessary.

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