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## Quality evaluation of university web portals: a student perspective

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**Abstract:** Web portals have become popular among higher education institutions for a variety of reasons, chief among which is the competitive advantage such portals offer by facilitating a single point of access to multiple web services. Despite their critical importance, there has been relatively little research devoted to evaluating best-practice concepts in the design and content of web portals vis-à-vis user satisfaction. In an attempt to contribute to the abovementioned research domain, this paper proposes an evaluation instrument – the University Portal Usability Assessment Index (UPUAI) – which rates the quality of university portals in four areas, namely: (1) informational content, (2) transactional content, (3) website design and (4) student satisfaction. The UPUAI's evaluation procedures are discussed in detail and, by way of validation, the UPUAI was used to assess the quality of the web portals of the top five accredited universities in the United Arab Emirates. The conclusions and implications derived from this study are presented with a view to providing education professionals with a reliable measurement instrument to assess the quality of their university web portals.

**Keywords:** university web portal; usability; evaluation; user satisfaction.

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## 1 Introduction

At the generic level, the evaluation of web pages/websites is a mature discipline with well-established assessment protocols and regulatory mechanisms (Barnes and Vidgen, 2002; Evans and King, 1999; Liu and Arnett, 2000). Such generic assessment normally focuses on issues of usability and content – e.g. the relevance and visual formatting of the information published in the website under review (ISO Copyright Office, 2008; Nielsen, 1994). Despite its obvious importance, this type of generalised website evaluation often proves to be insufficient when assessing *web portals* which cater to specific interest groups, such as educational institutions and their respective *stakeholders*. In this context, a web portal is defined as a website that provides a starting point or gateway to other resources on the internet or an intranet (Sahney et al., 2004); a stakeholder is regarded as 'any individual or group who can affect or is affected by the actions, decisions, policies, practices or goals of the organisation' (Freeman, 1984).

This study reports on the development of a protocol to evaluate the usability of university web portals, particularly those of universities operating under the jurisdiction of the Ministry of Higher Education and Scientific Research (hereafter referred to as the MHESR) of the United Arab Emirates (UAE). In the UAE, there are 73 universities which have been accredited by that country's relevant regulatory body (Commission for Academic Accreditation, MHESR, 2011). All of these institutions are expected to provide internet access to their various services and facilities. Apart from being a legal requirement, it is generally recognised that internet access is of critical importance for the academic and socio-economic activities of university-level tertiary institutions (Chaparro, 2008; Laudon and Laudon, 2009; Liu and Arnett, 2000; Looney and Lyman, 2000). Such internet-based information access is typically implemented in the form of a web portal; in

recognition of this trend among university institutions towards presenting information in web portal format, the authors of this current study have developed a *University Portal Usability Assessment Index* (UPUAI) assessment tool which integrates certain protocols to assist website designers in evaluating and predicting the quality of web portals. Section 2 details previous work done in relation to web portal assessment.

## 2 Previous work in web portal evaluation

As mentioned in Section 1, the evaluation of web portals is still an emergent science which seeks to define best-practice design principles that incorporate both low-level user-interface implementation guidelines and high-level information retrieval concepts based on the requirements of the web portal's specific domain; the protocols proposed by Evans and King (1999) may be regarded as one of the earliest attempts to devise a standardised 'fitness-for-purpose' evaluation tool for web portals. The combination of task-based and heuristic assessment procedures formulated by Barnes and Vidgen (2002) has served as the paradigm which subsequent investigations have emulated, like the review by Apostolou and Economides (2008) which employed a series of tests to assess the quality of the web portals of 30 major international airlines. Apostolou and Economides proposed five broad evaluation categories, namely:

- 1 interface design
- 2 site navigability
- 3 information content
- 4 reliability of embedded software functions
- 5 appropriateness of technical implementation.

Alwahaishi et al. (2009) adapted Apostolou and Economides' categorisation, proposing instead four categories in their assessment of the web portal quality of various Arabian airlines; these four categories were:

- 1 site navigability and logical structure
- 2 web portal compliance with various W3C design criteria for web pages (ISO Copyright Office, 2008)
- 3 the relevance of a web portal's information content vis-à-vis pertinent governmental regulatory standards
- 4 the inclusion of functionality to facilitate transactions – like online student registration – which are deemed highly important for the optimal functioning of the host university.

In addition to the aforementioned assessment criteria, both Tate et al. (2007) and Chaparro (2008) incorporate a series of user-oriented tasks for the purpose of indirectly measuring the targeted web portals' functionality and usability. A variation of this task-

based evaluation technique has also been adopted by Mohiuddin and Hj (2007) for the purpose of assessing web portals in the cultural domain. Mohiuddin and his group define a series of what they term as *inspection tasks* – collectively referred to as the EQT4Web – which are hierarchically structured such that specific tasks within the collection address a cross section of high-level to low-level user-interface features and/or information transaction services. In terms of actually defining what these services should be for tertiary educational institutions, the study by the Collegiate Project Services group (2010) proposes that all university web portals should offer a core set of ‘must-have’ functionalities, including the storage of student grades, the implementation of online fora to facilitate collaboration between university stakeholders and the publishing of information relating to academic programmes.

Of course, the minimum web portal functionality proposed by this study differs to some degree from the minimum functionality stipulated by previous investigations. It would be useful, therefore, to establish some form of standard benchmark criteria for web portal evaluation. The authors of this study propose such benchmark criteria, the high-level functional requirements of which are based on the norms of the relevant national and/or international regulatory bodies. Section 3 describes the extraction and definition of such normative standards for universities which fall under the auspices of the UAE’s MHESR.

### 3 Methodology

Given that, previous web portal evaluation studies have used sample sizes ranging from 5% to 15% of the target population, a total of five university web portals were selected for assessment in relation to the following content categories<sup>1</sup>:

- 1 publication of the main institutional strategic goals and identity of the key stakeholders – among which are typically the student body and the MHESR
- 2 implementation of transactional sub-systems such as admission and registration.

This study has chosen to adopt a student-centred perspective vis-à-vis formulating assessment criteria for university web portals. To this end, a questionnaire was developed according to the criteria discussed in Section 3.1.

#### 3.1 Criteria sources

The Commission for Academic Accreditation (CAA) of the MHESR is the regulatory body of all tertiary education institutions operating in the UAE. The standards for licensure and accreditation stipulated by the CAA for UAE-based universities are explicitly set forth in a series of documents which are available on their web portal (Commission for Academic Accreditation, MHESR, 2011). These criteria, along with the usability guidelines listed in ISO 9241-151:2008(E) (ISO Copyright Office, 2008), were used to design and develop a questionnaire – hereafter referred to as the UPUAI

questionnaire – for the purpose of eliciting the opinions of a selected group of students regarding the quality of the web portals of five leading UAE universities, namely:

- 1 The Abu Dhabi University (AU) ([www.adu.ac.ae](http://www.adu.ac.ae)).
- 2 The Ajman University of Science and Technology (AUST) ([www.ajman.ac.ae](http://www.ajman.ac.ae)).
- 3 The Al Ain University of Science and Technology (AAUST) ([www.alainuniversity.ac.ae](http://www.alainuniversity.ac.ae)).
- 4 The American University of Sharjah (AUS) ([www.aus.edu](http://www.aus.edu)).
- 5 The University of Sharjah (UoS) ([www.sharjah.ac.ae](http://www.sharjah.ac.ae)).

These universities were chosen on the basis of the size of their student populations and variety of accredited academic programmes they offer, as detailed in Table 1.

The total number of students enrolled in these five universities is 31,834 or 49% of total number of students in the 73 accredited universities in the UAE for the 2010–2011 fall semester (Commission for Academic Accreditation, MHESR, 2011).

The questionnaire's items were initially formulated according to the guidelines predicated by Alwahaishi et al. (2009) in relation to user-centric evaluation protocols for web portals. The specific content of the question items (the particulars of which are presented in Table 2) are based on those of Evans and King (1999) who conducted a student-centred evaluative study of North American university web portals. As mentioned previously, the assessment instrument developed in this study is also student-centred. The methodology used to recruit the survey respondents are discussed in Section 3.2.

**Table 1** Student enrolment statistics for five selected UAE universities

	<i>UoS</i>	<i>AUST</i>	<i>AUS</i>	<i>AU</i>	<i>AAUST</i>
Established	1997	1988	1997	2000	2004
Number of students (2010–2011)	9,694	8,735	5,524	4,006	3,875
Undergraduate diploma	5	0	0	0	0
Graduate diploma	2	1	1	1	1
Bachelor	41	24	25	24	24
Master	15	8	13	8	8
Doctorate	2	0	0	1	0
Total	65	33	39	34	33

### 3.2 Recruitment of survey respondents

A group of 50 final-year undergraduate students were selected from the College of Computing of the Al Ghurair University in Dubai, UAE. All of these students were enrolled in an E-Commerce Technologies course (400 level) during the fall semester of the 2010–2011 academic year. Prior to participating in the survey, all of the subjects underwent a period of training/orientation concerning the objectives of the investigation (i.e. assessing web portal content and usability) and the procedures for completing the questionnaire items while browsing the web portals under review.

**Table 2** Weighting of questionnaire items as per informational content category

<i>Category (I)</i>	<i>Factors</i>	<i>Weighting % (Total = 20)</i>
<i>Informational content</i>		
Relevant and accurate information concerning the university's strategic vision, mission and goals	Strategic goals	2
Relevant and accurate information (typically in the form of a contact directory) concerning key university personnel such as academic and administrative staff	Contact directory	1
Relevant and accurate information concerning programmes for continuous education and training	Continuous education and training	1
Relevant and accurate information concerning the output of the university's research activities, e.g. hosting of conferences and the scholarly publications of faculty members	Research	1
Relevant and accurate information concerning the university's accreditation status	Accreditation	1
Relevant and accurate information concerning the university's academic programmes offered	Academic programmes	3
Relevant and accurate information concerning job and career opportunities for alumni	Future jobs	1
Relevant and accurate information concerning housing and transportation fees	Student services	1
Relevant and accurate information concerning all online library facilities	Online library	2
Relevant and accurate information concerning access to the web mail services	Web mail	3
Relevant and accurate information concerning access and utilisation of online learning support systems	Online learning tools	2
Relevant and accurate information concerning the university's policies regarding information privacy	Privacy policy	1
Relevant and accurate information concerning current events	News and events	1

### 3.3 Development of the questionnaire instrument

As mentioned previously, the questionnaire instrument developed by Evans and King (1999) served as a model for the UPUAI questionnaire. Of course, it was necessary to make certain moderations to the Evans and King instrument since there is an appreciable difference in terms of socio-cultural context between Middle Eastern and North American universities; in an effort, therefore, to ensure that the UPUAI questionnaire

items – and the selected university web portal themselves – were fully appropriate for evaluation according to UAE national standards, *content validity* analysis was used as per the following criteria:

- 1 Each of the selected web portals was checked to ensure that their content complied with the guidelines of disclosure as stipulated by the MHESR. It was ascertained that all of the web portals were fully compliant in publishing essential information relating to strategic goals, for the following activities:
  - a teaching and learning
  - b scientific research
  - c continuous education/training.
- 2 Prior to participating in the survey, a recruitments capture was performed by extensively interviewing the recruited student assessors to ascertain their expectations in relation to web-based online functionality for services such as:
  - a student admission and registration
  - b e-learning
  - c online discussion fora
  - d internet access to library facilities
  - e student-related social services, like counselling.
- 3 The initial collection of questionnaire items (resulting from the process described in the preceding paragraph) was submitted to the survey participants for final verification; these participants were invited to rate the importance of every item<sup>2</sup> and recommend the addition and/or removal of questionnaire items as deemed appropriate. Based on the user group's recommendations for inclusion/omission of items, the final selection of items was effected using the *content validity ratio* (CVR) measure (Carmines and Zeller, 1979; Kiess, 2001). The CVR rejection threshold of this ratio may be defined as:

$$\text{CVR} = \frac{(n_e - N / 2)}{N / 2}$$

whereby  $n_e$  is the number of experts who rate a given questionnaire item as being 'essential' and  $N$  corresponds to the total number of survey participants who also assign a rating to the same item. A questionnaire item is retained if its CVR rating is at least 0.75. Tables 2–5 detail the weighting allocation (as a percentage) of the UPUAI questionnaire items according to specific content categories.

The CVR analysis was also instrumental in determining the weighting of the questionnaire categories which, of course, constitute the *raison d'être* of the UPUAI instrument. The per-category weighting of the various questionnaire items is detailed in Tables 2–5.

**Table 3** Weighting of questionnaire items as per transactional/functionality category

<i>Category (2)</i>	<i>Factors</i>	<i>Weighting %</i>
<i>Transactional/functionality</i>		<i>(Total = 30)</i>
Facilities to support online searches for information related to academic programmes (e.g. course title, syllabus and content)	Search	5
Facilities to support online searches for library items	Online library	3
Online enrolment and registration	Enrolment	6
Facilities to support online payment of fees	Payment	3
On-campus and off-campus access to the university's web mail system	Communication	6
Tools to supporting e-learning and communication	Learning	7

**Table 4** Weighting of questionnaire items as per website design category

<i>Category (3)</i>	<i>Factors</i>	<i>Weighting %</i>
<i>Website design</i>		<i>Total = 25</i>
Single point of access for a variety of information and services	Single location	2
Support for online collaboration and communication	Communication	2
Clarity of site organisation and site map/directory	Site map	1
Secure access	Security	2
Site search/search engine	Search engine	3
Customised/personalised website	Customised	1
The website was designed based on the university strategic goals	Support goals	4
Online interactive human resources system	Employment	1
The site exists in more than two languages (native and English)	Languages	2
Clear and helpful instructions	Helpful	1
Interactive feedback/evaluation system to improve the quality	Interactive	2
Avoidance of website features that annoyed customers like pup-up ads	Comfortable	2
Alternative navigation to the same content	Navigation	1
Website compatibility with the most popular browsers	Browsers	1



**Table 5** Weighting of questionnaire items as per overall student satisfaction category

<i>Category (4)</i>	<i>Factors</i>	<i>Weighting % (Total = 25)</i>
<i>Student overall satisfaction</i>		
Easy to use	Easy to use	3
Simple to complete tasks effectively	Effective	4
Simple to complete tasks efficiently	Efficient	2
Amount of time it took to complete tasks	Fast	2
Support information provided (e.g. online help, messages and documentation)	Guided	2
Design is appealing/pleasant	Appealing	2
Quality and quantity of information	Informed	3
Updated information	Updated	2
Fits to the user idea of the ideal university website	Expected	1
Overall satisfaction	Satisfactory	4

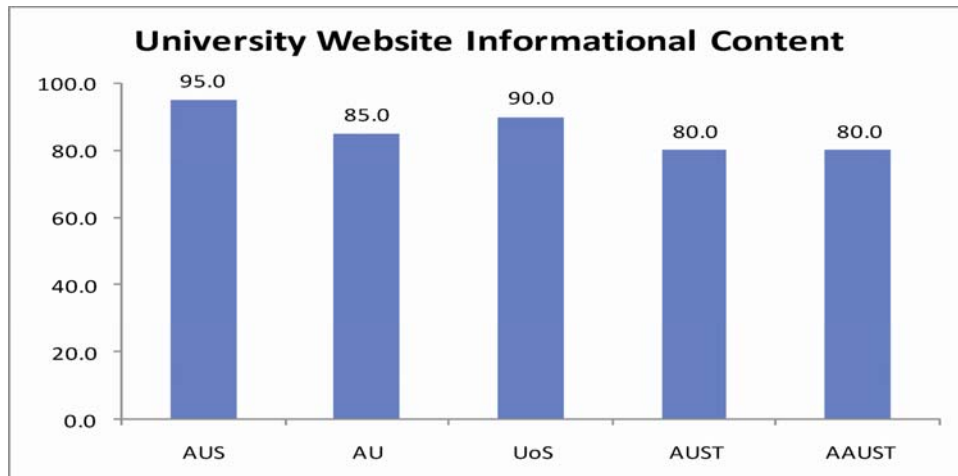
#### 4 Survey results

The AUS's web portal consistently received the highest ratings for all four of the categories evaluated by the student group (see Table 6). This outstanding performance is, in all likelihood, an indirect result of this university's unique status in the sample group: it is the only one of the five reviewed universities which has accreditation by international regulatory organisations such as Association to Advance Collegiate Schools of Business (AACSB, <http://www.aacsb.edu>) and Accreditation Board for Engineering and Technology (ABET, <http://www.abet.org/>). The effort required to gain such international accreditation would almost certainly have had the supplementary effect of improving the quality of that university's web portal. It is to be noted that the greatest difference between universities in evaluation rating occurs in the area of transactional functionality (where the highest rating is more than one and a half times greater than that given to the lowest-scoring web portal). This would appear to indicate that – for university web portals – transactional functionality is the most critical factor in predicting student satisfaction (Figures 1–4).

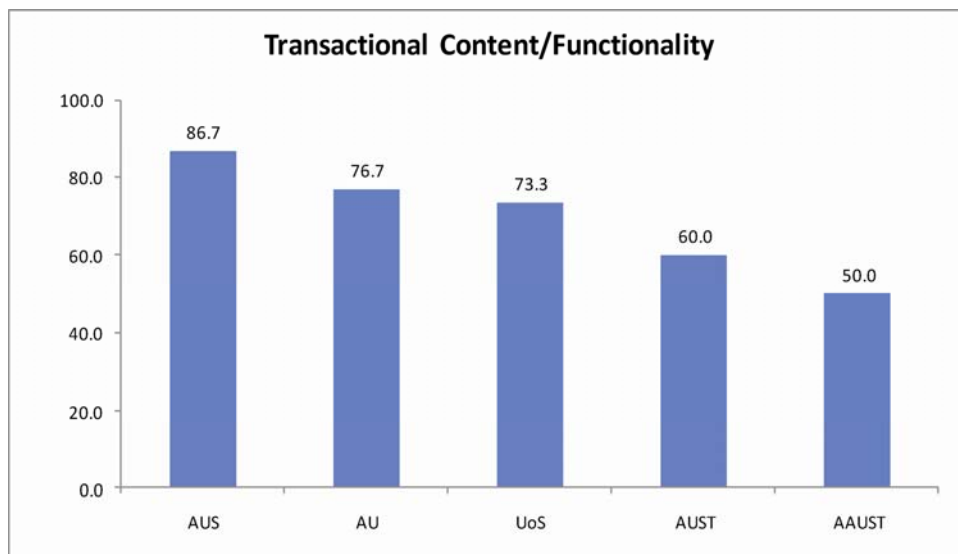
**Table 6** UPUAI evaluation of selected university web portals

<i>University</i>	<i>Categories</i>				<i>Total %</i>
	<i>Informational content (max = 20)</i>	<i>Transactional/ functionality (max = 30)</i>	<i>Website design (max = 25)</i>	<i>Student's overall satisfaction (max = 25)</i>	
American University (AUS)	19	26	23	23	91
Abu Dhabi (AU)	17	23	21	21	82
Sharjah (UoS)	18	22	20	21	81
Ajman (AUST)	16	18	19	18	71
Al Ain (AAUST)	16	15	18	17	66

**Figure 1** UPUAI informational content ratings assigned to the selected web portals (see online version for colours)

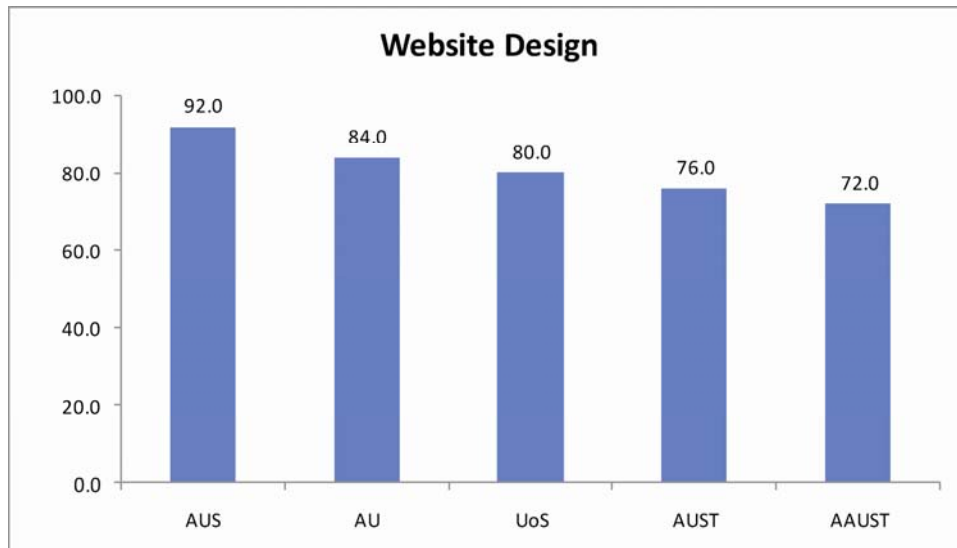


**Figure 2** UPUAI ratings assigned to the transactional/functionality of the selected web portals (see online version for colours)

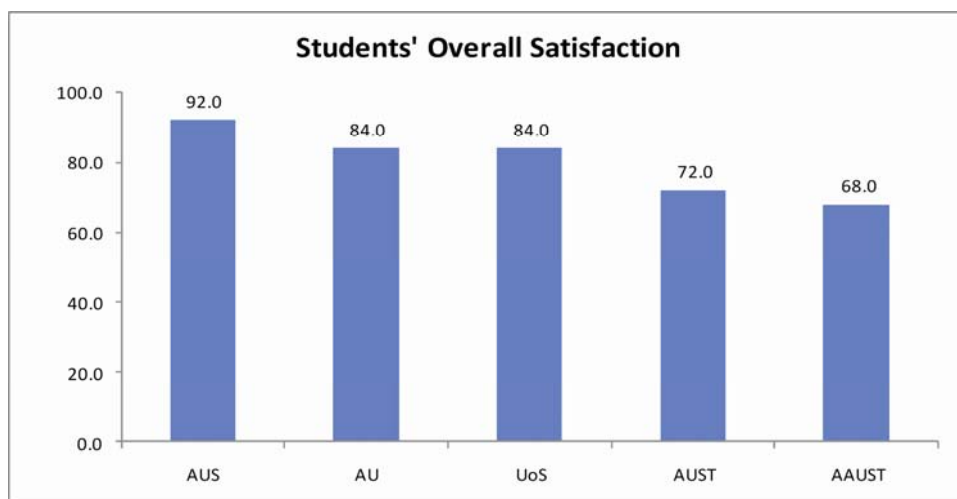


It is noteworthy that in the category of informational content (Figure 1), all five of the reviewed universities have achieved at least an 80% student satisfaction rating. Such consistent quality may in large part be due to the fact that the MHESR stipulations are particularly rigorous regarding information disclosure.

**Figure 3** UPUAI website design ratings assigned to the selected web portals (see online version for colours)



**Figure 4** UPUAI assessment of overall student satisfaction for the selected web portals (see online version for colours)



## 5 Discussion

The UPUAI ratings accorded by the student evaluators for the four assessment categories would appear to indicate that the following sub-items were perceived to be the most important:

- 1 The ready accessibility of web mail services.
- 2 Relevant and updated information concerning academic programme content and delivery.
- 3 The provision of online library services and learning tools.
- 4 The availability of an online registration system which is capable of completing the registration process with minimal manual intervention.
- 5 The provision of online intranet (i.e. within the web portal) search facilities.
- 6 The rendering of the web portal's information content in at least two languages, typically Arabic and English.

In addition to the foregoing, all members of the user group indicated that ease of use was the factor which most influenced their rating of the various web portal components and services.

It would be misleading, however, to consider 'ease of use' to be a single factor in relation to subjective evaluations of web portal quality: e.g. if a web portal's information content was largely inaccurate, it would be unlikely that the resultant user satisfaction ratings would be high, regardless of how well-designed and easy to use that portal's user interface might be. It would therefore be more instructive to consider the other factor – i.e. transactional content – which the user group rated as being of exceptional importance. It is to be noted that four of the six 'critical importance' items mentioned in the preceding paragraph are, in fact, some form of transactional web service. Furthermore, although rating informational content as being a highly important category, the majority of the student user groups accorded low scores to such informational content items such as research, accreditation and data protection policies. This result is not surprising considering that the user group providing the feedback was composed entirely of undergraduate students who would not give high priority to issues which do not directly impact upon their academic performance and progress.

## 6 Conclusions and recommendations for future work

In this investigation, an assessment tool has been developed to predict student satisfaction in three aspects of university web portal quality, namely:

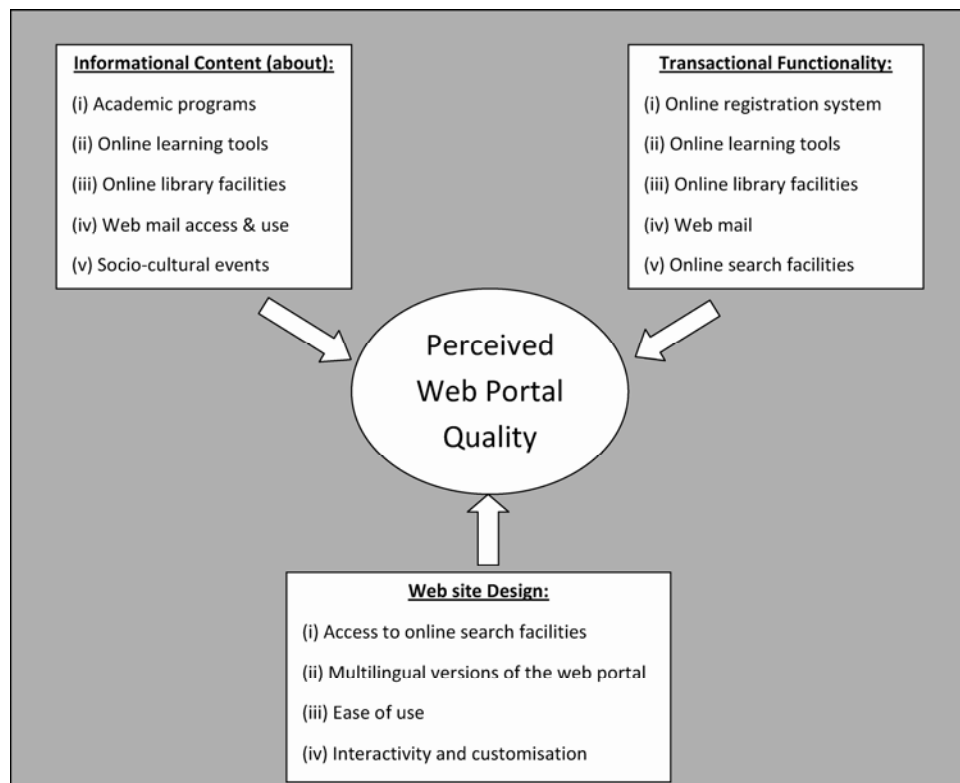
- 1 informational content
- 2 transactional content
- 3 website design.

It has been demonstrated that the better quality in these three areas of web portal engineering, the more likely it is that undergraduate student users will have a favourable impression of the web portal's quality (see Table 6).

To summarise, the UPUAI's assessment protocols demonstrate that a web portal's architectural design (i.e. navigation pathways connecting the portal's various services) and transactional functionality are the two most important factors determining student satisfaction vis-à-vis subjective assessment of a university web portal. Figure 5 presents a schema depicting the most influential factors affecting perceptual judgements of web portal quality.

In terms of extending this research effort, the authors of this investigation would recommend that it would be of great interest to solicit and document the requirements of other principal stakeholders in tertiary education, in particular the interests of academic staff, programme administrators and those responsible for institutional governance. Of course, the process of governance requires a range of automated *decision support systems* (DSS) and it would be beneficial to more closely link such DSS with web portal infrastructures. Finally, it must be emphasised that soliciting the feedback and interaction of the aforementioned stakeholders should be a continuous exercise, so that the designers and administrators of university web portals are provided with the most current and pertinent information concerning best-practice principles for design and implementation.

**Figure 5** Most influential factors affecting perceptual judgements of university web portal quality



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**Notes**

- 1 These categories were defined by reference to the web content requirements stipulated by the MHESR at their website: <https://www.caa.ae/caa/images/Standards2011.pdf>, Accessed on 26 June 2011.
- 2 The rating was effected via a three-point scale, wherein each questionnaire item could be rated as 'essential', 'useful but not essential' or 'not necessary'.