

A Survey of Website Key Quality Characteristics across Different Domains

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Abstract:- This study investigated five different website domains to identify the critical quality characteristics in each domain. The website domains investigated include e-commerce, e-banking, education, hospitality & tourism, and health websites. The quality characteristics critical in each of the domains were identified based on conceptual content analysis of existing literature. A five Likert-type questionnaire was developed to measure the degree of importance of the quality characteristics in each of the five domains based on academics and website developers/webcasters' views. The study reveals the key quality characteristics in each specific domain and those common across the five domains. The study results will be useful to website developers and quality evaluators and academicians in focusing on the need-to-include quality characteristics that impact the overall website quality of the domain of interest.

Keywords:- Website, Quality, Characteristic, Key, Identify, Factor.

I. INTRODUCTION

The website has become an indispensable tool for providing people's information needs of all works of life. People visit the website for various purposes ranging from information sourcing to online marketing of goods and services. It also serves as a means of communication and promotes organizational identities such that e-commerce success and growth have become dependent on it. Websites have also improved human interaction with computer systems by providing a rich interface for effective interaction.

The increasing role of the website in everyday activities calls for the evaluation of the quality of websites. Such evaluation examines the website against some quality requirements to provide useful feedback information necessary to aid the design and development of highly interactive and rich quality websites. Reference [14] defines quality as it applies to objects and refers to the degree to which a set of inherent characteristics fulfills a set of requirements. The intrinsic characteristics are the features that exist in an object or entity evaluated to ensure that it satisfies the users' needs. A quality characteristic represents the behavioral characteristics of the system [28]. These characteristics or factors constitute the non-functional requirements used to judge the websites' operations as perceived by the users, developers, or expert evaluators. The

quality characteristics differ from one website domain to another [27], [22], [6], [21]. It is, therefore, necessary to identify the quality characteristics that are critical to the different domains. Therefore, this study investigates five different website domains to identify the key quality characteristics in the various domains based on academics and website developers/webmaster's views. It also determines the quality characteristics that are common to all the domains. The intention is to compare the key quality characteristics as perceived by academics and website developers/webmasters. The findings will help website developers, quality evaluators, and academicians identify the need-to-include quality characteristics that impact website quality of the domain of interest.

II. RELATED WORK

Many attempts have been made over the years to identify the key quality characteristics in different website domains. Reference [27] conducted an inductive thematic analysis to examine users' perceptions of the importance of website design features in six different website domains, namely financial, e-commerce, entertainment, education, government, and medical. The five most essential features in each of the domains were identified and listed in the order of importance. The features for each of the domains include: for financial websites (up-to-date, accuracy, multiple sources, easy-to-navigate, and timeliness) and educational websites (easy-to-navigate, search tool, accuracy, comprehensiveness, and layout), government website (easy-to-navigate, layout, up-to-date, search tool, and accuracy), e-commerce (security, easy-to-navigate, appropriate explanatory text, search tool, and product/service concerns), health/medical (accuracy, easy-to-navigate, search tool, up-to-date, and comprehensiveness), and entertainment (visual design, easy-to-navigate, responsiveness, multimedia, and up-to-date. Their analysis revealed that website users perceived specific characteristics equally important among different domains, while other features were significant for one domain and extremely unimportant for another. Reference [26] expanded their previous study using Kano's model to test whether users can identify different quality types within a specific type of website domain and different domain types. Their findings indicated that customers in a website domain do not regard all quality characteristics as equally important. The rankings of important quality characteristics differ from one web domain to another. Still, specific characteristics were considered to be highly important across all the domains studied.

The investigation of [3] on the users' perception of e-commerce website quality showed that the accuracy of the website content, security, and usability were the most important quality characteristics in the e-commerce domain. On the other hand, [25] found that completeness and understandability of information were the most highly rated quality characteristics for health website contrary to security and ease of navigation reported in [27] and accuracy and security in [3]. Other dimensions for the health website proposed in [25] included relevance, depth of information, and accuracy.

In their analysis, [24] identified essential characteristics of the most successful websites from five different categories – retail, financial services, news & information, search engines & portal, and entertainment. The findings showed six critical characteristics of websites and that their relative importance varies across categories. The dimensions included information content, ease of navigation, usability, download speed, customization, and security. Search engines and portals' most important characteristics were information quality, usability, and speed, whereas, for retailing websites, security was rated most important. Security and customization were considered most important for financial websites, while for entertainment websites, they included usability (interesting, exciting) and security. However, [17] identified usability and security as important dimensions for e-banking, followed by information quality, access, trust, reliability, flexibility, responsiveness, service recovery, and presentation.

The different evaluation methods and the elements used in various services offered on the internet were reviewed in [11]. The common quality dimensions were summarized according to the services that a website provides. The dimensions were identified for five website domains: e-business & e-commerce, education, banking, government, and auctions & e-shopping. The dimensions for e-business & e-commerce include currency, accuracy, comprehensiveness, value-added content, ease of use, reliability, availability, download speed, customization, internal search, security and privacy, and attractiveness. The typical dimensions for educational websites consist of currency, accuracy, comprehensibility, ease of use, layout, and attractiveness. Similarly, for e-banking websites, the factors include: ease of use, customization, internal search, security, aesthetic, and interaction. Also, government website dimensions included response time, up-to-date, accuracy, search tool, easy to understand, and security. In contrast, the dimension for auction & e-shopping websites consisted of design, content, security, support, and ease of use. In a similar study, [16] identified reliability and navigability as the most crucial quality dimension for education websites than currency and accuracy specified in [11]. Other dimensions for university website evaluation proposed in [16] include responsiveness, efficiency, functionality, usefulness, ease of use, accuracy, and web appearance.

Reference [10] also investigated the most widely used criteria for the evaluation of hotel websites. The study revealed that impression, content, usefulness, accuracy, navigation, accessibility, online reservation, and timeliness of information were the most important dimension for evaluating hotel websites. Some of these dimensions are similar to [13] dimensions for health websites, namely, accessibility, navigability, and content quality, while speed was added as a dimension in the latter. Also, the most widely used website quality dimensions were investigated in [7]. Thirty six scientific papers in the International Journal dealing with empirical measurements on website quality were analyzed based on the website's perception of visitors or users. The findings showed that the most widely used website quality dimensional measurement is privacy or security and information quality in as many as 16 studies, followed by reliability/ fulfillment, service quality, and quality system.

The key website quality characteristics have often been measured based on the views of users/customers [3], [16], [15], [20], developers [12], users and developers [2],[4], users and experts [1], website owners [8], visitors, developers and website owners [19], and students and lecturers [23]. However, the combined views of academics and website developers/webmasters have not been considered. Academics teach website development and quality assurance, while website developers/webmasters are often the training products. Therefore, it is vital to investigate the key quality characteristics perceived by the academics and the developers/webmasters who are the implementers of website quality. An understanding of the quality characteristics that are most important to the website developers who are most often in touch with end-users will assist the academics in focusing on the key quality characteristics that are important to end-users.

III. METHODS

The study was based on the existing literature survey in five website domains: e-commerce, e-banking, education, hospitality & tourism, and health website domains. The existing literature in the selected domains was reviewed to identify the domains' quality dimensions. The quality characteristics were identified based on the Conceptual (thematic) Content Analysis (CCA) method. The method involves establishing the existence and frequency of concepts that are most often represented by words or phrases in a text [5]. Synonymous quality characteristics were coded the same. The Adobe Acrobat Reader search engine was used to count the frequency of each of the identified quality characteristics in each of the domains. The frequency counts were then sorted in descending order for each domain. According to [9], a count of two or more occurrences of the quality characteristics indicated the importance of the characteristics. However, in this study, quality characteristics with three frequency counts and above were selected for the survey to determine their significance in the respective domains. Consequently, for each domain, the quality characteristics that met this criterion were selected as

follows: e-commerce (20), e-banking (12), education (20), health (18), and hospitality (18).

A five Likert-type questionnaire was developed to measure the degree of importance of the selected quality characteristics in the five domains. The Likert-type item ranges from very important (5) to very unimportant (1). The questionnaire was divided into five sections, a section for each domain. The respondents consisted of ten academics and ten website developers/webmasters with at least two years experience and academic qualifications ranging from B.Sc to Ph.D. degree. The weighted score (wt_score) for each quality characteristics in each domain was computed as follows:

$$Wt_Score = \text{weight} \times \text{frequency}$$

Where:

Weight is the value assigned to the Likert-type item, which ranges from 5 (very important) to 1 (very unimportant), while frequency is the number of responses for each Likert-type item

IV. RESULTS AND DISCUSSIONS

The academics' and developers' ratings of the important quality characteristics for the e-commerce domain are represented in the bar chart shown in Figure 1.

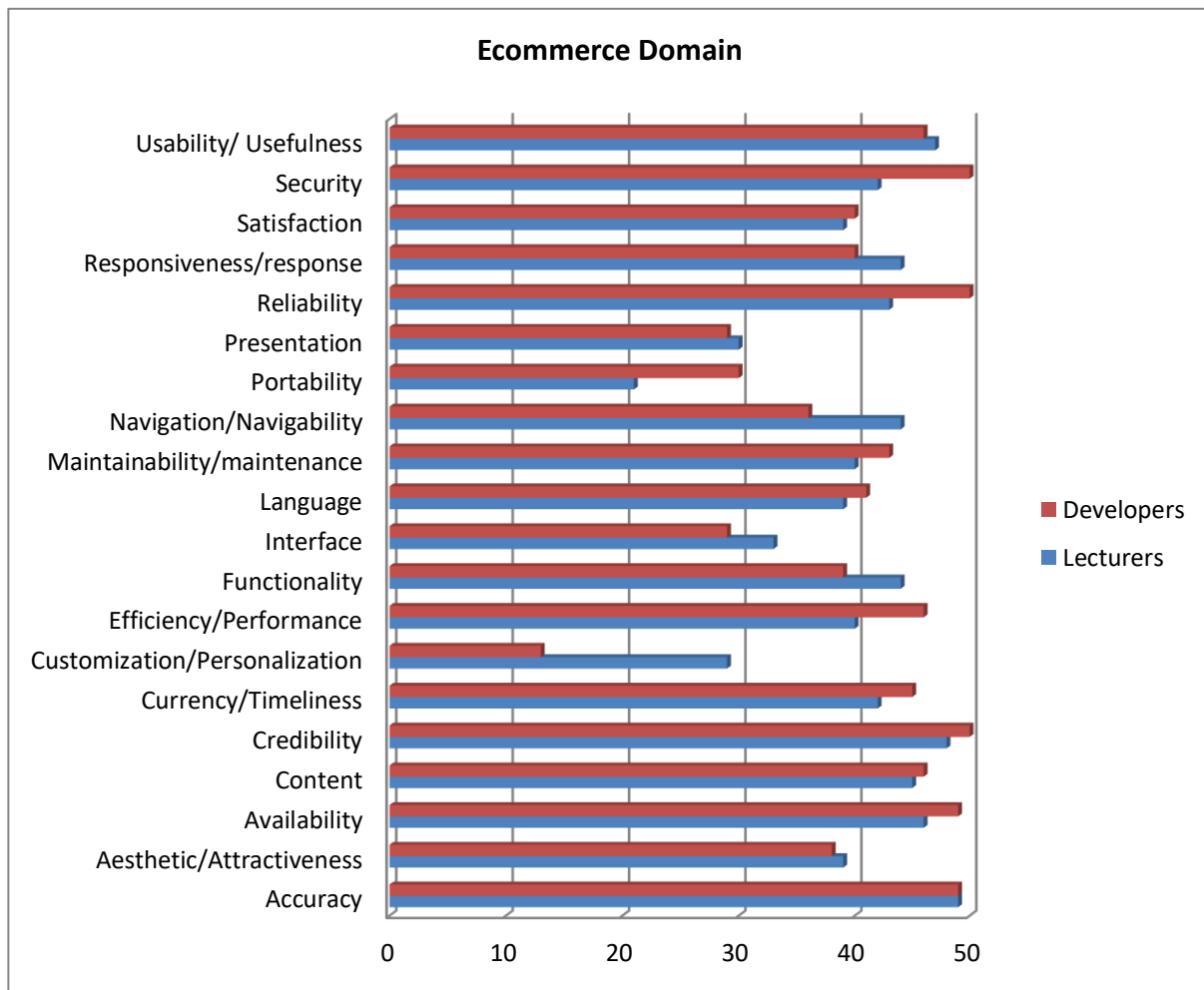


Fig 1. E-commerce domain quality characteristics

Figure 1 shows the rating of academics and developers of the important quality characteristics for the e-commerce domain. It revealed that accuracy, credibility, usability, availability, and content were the top five quality characteristics considered more important by academics. In contrast, the developers considered credibility, reliability, security, accuracy, and availability as high priority quality characteristics in this domain. It also revealed that the developers viewed portability as a more important characteristic than the academics, who were more concerned with customizing the site. Furthermore, academics considered the site's navigation more important than

developers who were more concerned with maintainability. Each of the quality characteristics, navigability, and maintainability, addresses a different aspect of the website. Navigability quality helps users find information of interest without getting lost [23], while maintainability relates to the ease with which a software component can be modified. It is also observed that functionality was ranked higher by the academics than the developers, while the developers ranked efficiency higher than academics. These two characteristics have been identified to conflict with each other [18]. Providing more functions requires more system facilities and time to perform additional functions, thereby reducing

efficiency. The developers may have likely considered the impact of functionality on system efficiency than academics.

When the quality characteristics with a 40 weighted score (i.e., 80% benchmark) and above were considered, it was observed that the two groups shared common characteristics indicating their importance in this domain.

The quality characteristics include accuracy, availability, credibility, content, currency, efficiency, maintainability, reliability, responsiveness, security, and usability.

Figure 2 shows the academics' and developers' ratings of the important quality characteristics in the e-banking domain.

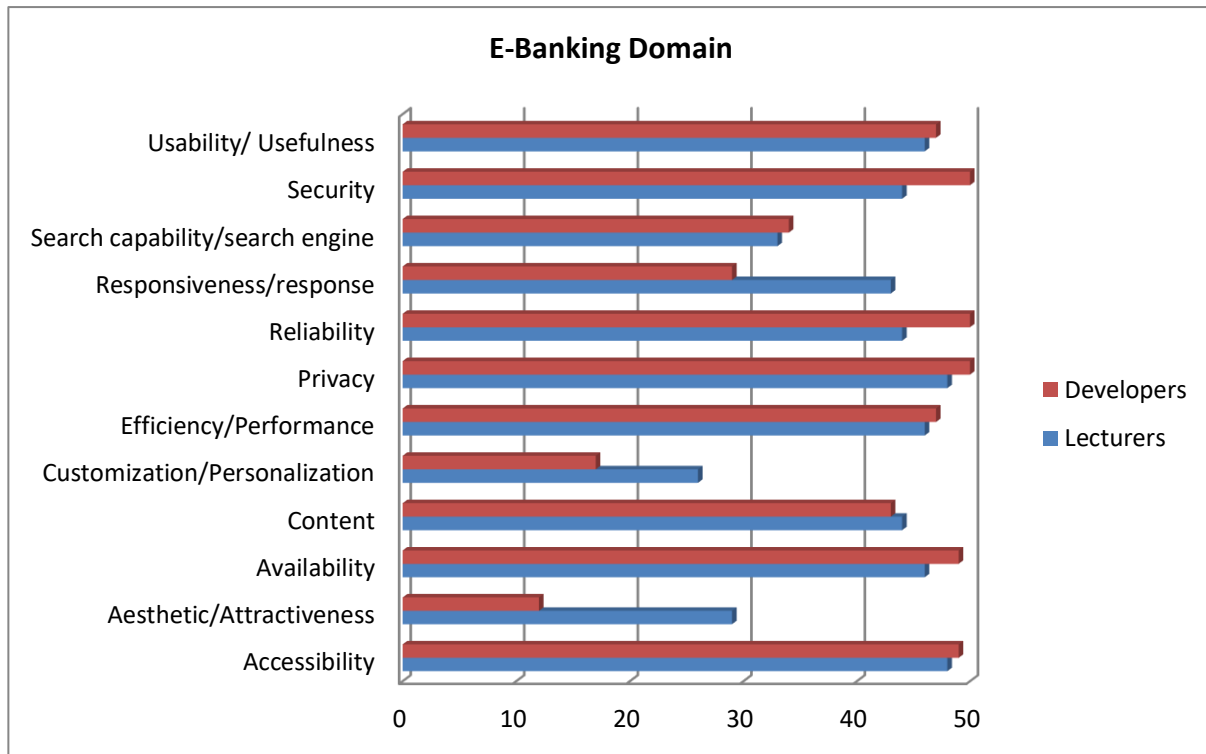


Fig 2. E-banking Domain Quality Characteristics

As shown in Figure 2, academics' top-ranked characteristics include accessibility, privacy, availability, efficiency, and usability. Others include content, reliability, and security. On the other hand, the developers ranked privacy, reliability, and security as top characteristics. Others include accessibility, availability, efficiency, and usability. It was observed that aesthetics and customization were ranked low by the two groups, indicating that these characteristics may not be considered vital characteristics while rating the e-banking domain. Nevertheless, the two quality characteristics were ranked higher among academics than developers suggesting that the academics are more

concerned with the visual appeal (aesthetic) and tailoring (customization) of e-banking sites than the developers.

The quality characteristics with a 40 weighted score and above, as shown in Figure 2, include accessibility, availability, content, efficiency, privacy, reliability, security, and usability. These constitute the key quality characteristics for the e-banking domain since they were ranked high by both groups.

Figure 3 presents the ranking of education domain quality characteristics by academics and developers.

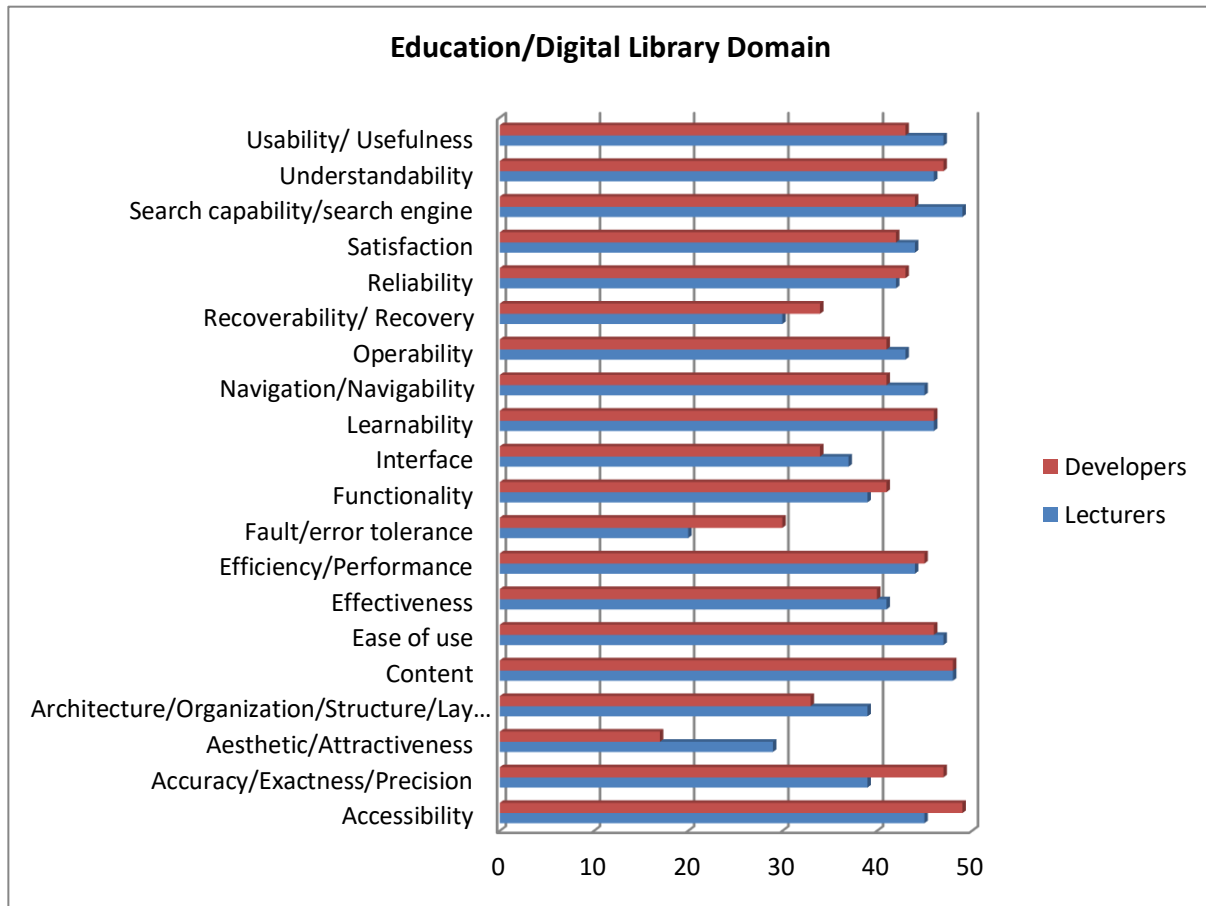


Fig 3. Education/Digital Library Domain Quality Characteristics

Figure 3 indicates that both groups considered search engine, content, ease of use, usability, learnability, understandability, accessibility, and navigability as the top-ranking quality characteristics in the education domain. However, the developer considered accessibility as the top priority characteristic, while academics considered the search engine a top priority. Content and learnability of site information have the same priority among the two groups, while aesthetic and error tolerance were ranked low. However, the developers considered error tolerance more important than academics, whereas academics ranked aesthetics higher than the developers.

The quality characteristics with a 40 weighted score and above for the two groups, as shown in Figure 3, include accessibility, content, ease of use, effectiveness, efficiency, learnability, navigability, operability, reliability, satisfaction, search engine, and usability. The high ranking of these characteristics by the two groups suggests that they constitute the education domain's key quality characteristics.

Figure 4 shows the ranking of health domain quality characteristics by academics and developers.

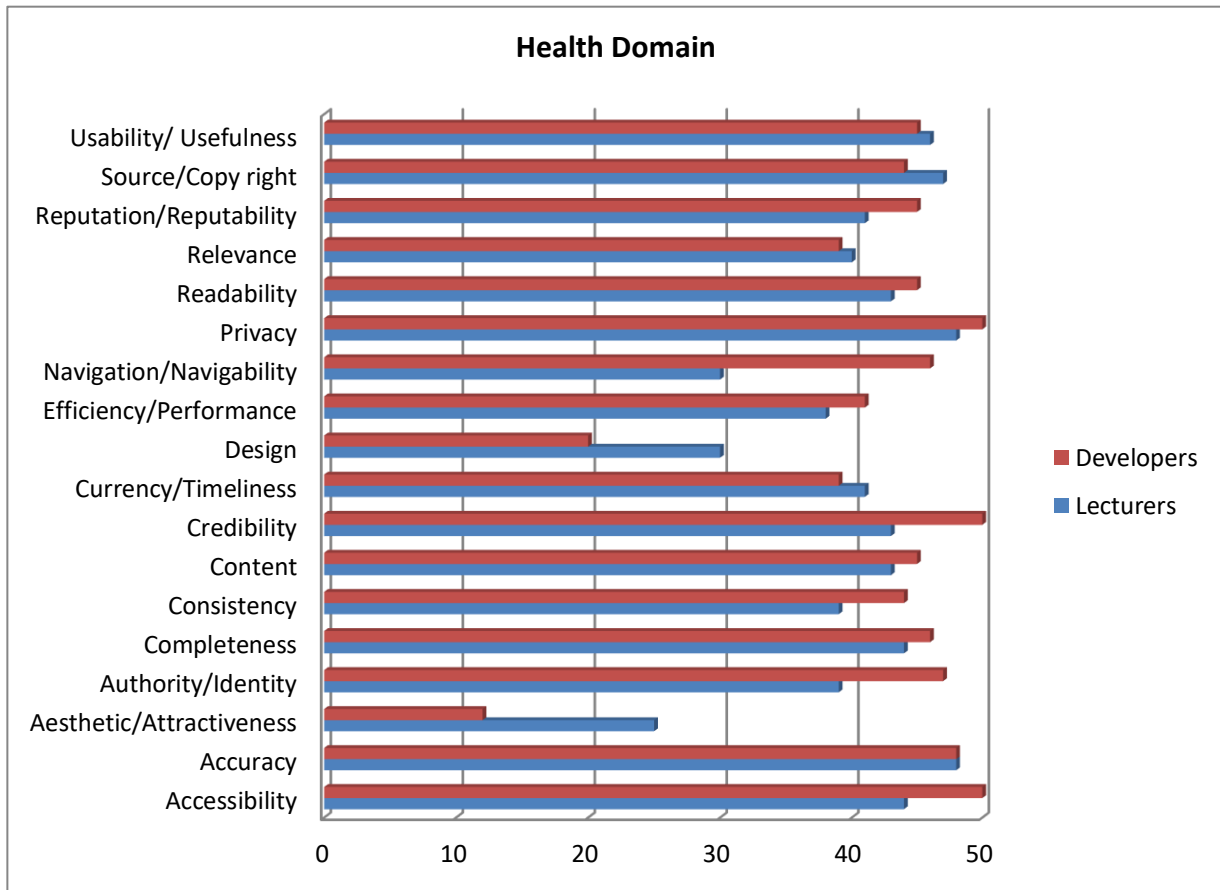


Fig 4. Health Domain Quality Characteristics

Figure 4 revealed that accuracy and privacy were considered top priority characteristics among academics, whereas the developers considered accessibility, credibility, and privacy as principal characteristics in the domain. It also shows that accuracy has the same priority among the two groups. The academics have a high priority for authority, completeness, consistency, navigability, information source, and usability than the developers. Aesthetics was ranked low by the two groups but ranked higher among academics.

In the health domain, the quality characteristics with a 40 weighted score and above by the two groups as shown in Figure 4 include accessibility, accuracy, completeness, content, credibility, privacy, readability, reputability, source/copyright, and usability. These quality characteristics were highly rated by both groups indicating their importance in this domain.

Figure 5 shows the ranking of hospitality domain quality characteristics by academics and developers.

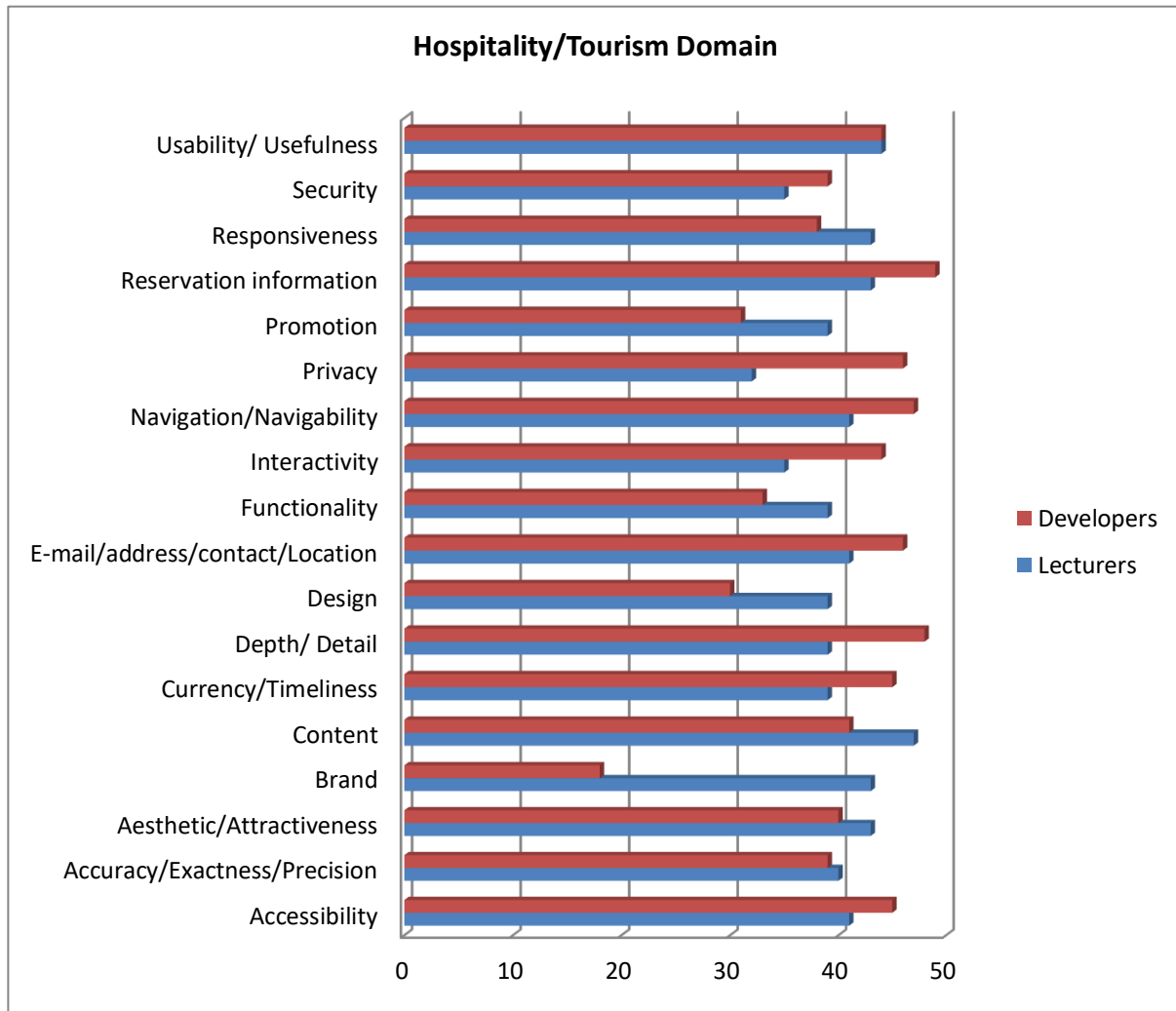


Fig.5. Hospitality/Tourism Domain Quality Characteristics

Figure 5 revealed that reservation information ranked by the developers as the most important characteristics was ranked third in the same order as aesthetic, brand, and responsiveness among academics. Among developers, depth of information ranked second, followed by navigability, contact, privacy, accessibility, and currency. Usability was considered equally important by the two groups. Aesthetic is considered more important in this domain than in the other four domains of study.

Figure 5 also revealed the quality characteristics that hit/cross 40 weighted score benchmark and above for both

groups. These include accessibility, aesthetics, content, navigability, reservation information, and usability. The high rating of these characteristics by the two groups indicates that they are the critical quality characteristics in the hospitality/tourism domain.

Table 1 shows the summary of the quality characteristics, arranged in alphabetical order, that were considered vital characteristics by both groups in each of the five domains.

Table 1: Key domain quality characteristics common to both groups

Ecommerce	e-Banking	Education	Health	Hospitality
accuracy availability credibility content currency efficiency maintainability reliability responsiveness security usability	accessibility availability content efficiency privacy reliability security usability	accessibility availability content efficiency privacy reliability security usability	accessibility, accuracy, completeness, content, credibility, privacy, readability, reputability, source/copyright, usability	accessibility aesthetic content navigability reservation usability

It was observed from Table 1 that content and usability were considered as the key characteristics in the five domains, same as accessibility except for the e-commerce domain. Also, availability, reliability, and security, were regarded as important characteristics in three domains, namely, e-commerce, e-banking, and education. Similarly, three domains, namely, e-banking, education, and health, viewed privacy as key characteristics. The variations in the lists (Table 1) of the five domains' most important characteristics suggest that quality characteristics are not equally important in all the domains.

V. CONCLUSION AND FUTURE WORK

This study surveyed the key website quality characteristics in five domains: e-commerce, e-banking, education, hospitality & tourism, and health websites. The key quality characteristics in each domain have been identified, and their importance investigated from the academics' and website developers' perspectives. The findings revealed that both scholars and developers shared some commonalities in the high priority quality characteristics indicating their significance in each of the domains (Table 1). However, it is essential to investigate whether the identified key quality characteristics in each of the five domains compare with website owners' and users' quality needs. Such an investigation will help to determine the critical quality characteristics that are most important to all the stakeholders.

ACKNOWLEDGMENT

The authors appreciate the team of lecturers and webmasters who participated in the completion of the questionnaire.

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