

Major and minor issues affecting the user experience on e-commerce websites



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ABSTRACT

This research evaluated the user experience (UX) of the top three most visited e-commerce websites in Malaysia and identified the main and important issues (related to utilitarian and hedonic features) that affect the user experience while interacting with such websites. Specific criteria were developed to evaluate the user experience of e-commerce websites, consisting of 27 metrics to evaluate utilitarian features and 13 metrics to evaluate hedonic features. The evaluation was conducted in two stages using questionnaires and semi-structured interviews based on the developed criteria. Several major and minor issues were identified from the users' point of view that affect the user experience on e-commerce websites. Specifically, the users identified seven major usability problem areas on the websites, including "lack of detailed information about the products, inaccurate and unclear information about the delivery dates, slow downloading of the website pages, and lack of alternative methods for delivery of the order." Users also identified two unique major hedonic problem areas on only one of the sites tested, related to: "Not an enjoyable experience" and "Not meeting user expectations." In addition, users identified seven minor utilitarian problem areas and nine minor hedonic problem areas on the sites. Detailed specific issues related to these problem areas were identified and explained. Based on the results of this research, recommendations were proposed to achieve positive experiences on e-commerce websites from the users' point of view.

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1. Introduction

The continuous growth in information and communication technology affects our lifestyles, including the way we shop, with traditional shopping increasingly being replaced by online shopping via e-commerce. E-commerce is defined as "Using the Internet and intranets to purchase, sell, transport or trade data, goods or services" (Turban et al., 2015). In Malaysia, there are growing numbers of both Internet users and e-commerce opportunities. The number of Internet users in Malaysia is about 30 million, with an Internet penetration rate of 93.8%. Also, e-commerce in Malaysia is expected to continue growing in the future (Chan et al., 2018). According to Global Data, e-commerce in Malaysia is expected to reach MYR 51.6 billion (US\$12.6 billion) by 2024,

growing at a compound annual growth rate (CAGR) of 14.3% between 2020 and 2024. The COVID-19 pandemic is considered to be one of the factors that has accelerated the growth of online shopping globally and specifically in Malaysia in 2020, as it caused the closure of physical stores during the lockdown and resulted in social distancing (Kaur et al., 2021).

The growth of Internet penetration and e-commerce in Malaysia requires e-commerce companies to consider the critical factors that help in the success and competitiveness of their websites. One of these factors is User Experience (UX) (Bonastre and Granollers, 2014; Vila et al., 2021). User experience is defined as "A person's perceptions and responses resulting from the use and/or anticipated use of a product, system, or service." According to this definition, UX includes a system's functionality and performance as well as users' beliefs, preferences, perceptions, and emotions while interacting with the system. Usability is "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a

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specified context of use.” It is one of the key attributes of user experience (O’Brien, 2010; Minge and Thüring, 2018; Ferreira et al., 2020) and it can be used to evaluate aspects of user experience and not the whole user experience. This is related to the fact that usability methods aim to improve users’ performance while user experience methods aim to improve users’ satisfaction (Bevan, 2009).

User experience includes two aspects or perspectives of a product (system): utilitarian (pragmatic/functional) quality and hedonic quality (Mtebe, 2020). The utilitarian (pragmatic/functional) quality describes the functional characteristics/attributes of the product, its utility, and usability, or the perceived ability to achieve its goals (Hassenzahl, 2008; Hassenzahl et al., 2008). Examples of utilitarian quality include learnability, informativeness, efficiency, customer support, and simplicity (Hellianto et al., 2019). However, hedonic quality describes the emotional experience, customer satisfaction, and responses that result from using the product/system (Minge and Thüring, 2018; Hassenzahl, 2018; Díaz-Oreiro et al., 2021). Examples of hedonic quality include attractiveness, entertaining features, and novel functionality (Hellianto et al., 2019; Febriandika et al., 2020; Hassenzahl, 2001). Customers are concerned about both the utilitarian and hedonic quality of any e-commerce website; once utilitarian quality is achieved, hedonic quality can differentiate the website (Febriandika et al., 2020).

Research has shown the benefits of positive user experience on e-commerce websites. These include increased perceived trust of customers (Febriandika et al., 2020; Hassenzahl, 2001; Huang and Wang, 2022); increased interest and customers’ intention to purchase (Hellianto et al., 2019; Sudiana et al., 2021); increased intention to revisit the website (Hellianto et al., 2019; Febriandika et al., 2020); increased revenue (Sudiana et al., 2021; Liu et al., 2013); and increased customer loyalty (Hellianto et al., 2019). However, there is a lack of research that develops and suggests specific criteria/guidelines to be used as heuristics to evaluate users’ experience of e-commerce websites. Also, there is a lack of research that evaluates the user experience of e-commerce websites and explains in detail the utilitarian and hedonic issues on such sites that affect the user’s experience while interacting with them. The aim of this research is to identify the major and minor issues, related to utilitarian and hedonic features, on the top most frequently visited e-commerce websites in Malaysia which affect users’ experience (UX) while interacting with them. The specific objectives for the research are:

1. To identify the top three most frequently visited e-commerce websites in Malaysia;
2. To develop specific criteria to evaluate users’ experience of e-commerce websites;
3. To develop questionnaires based on the developed criteria to evaluate the user experience of the top most frequently visited e-commerce websites;
4. To conduct semi-structured interviews based on the results obtained from the questionnaires (Objective 3) to evaluate the user experience of e-commerce websites;
5. To compare and contrast utilitarian and hedonic issues on the websites that affect users’ experience while interacting with them, together with their severity (major, minor);
6. To identify common and unique major utilitarian and hedonic issues, as well as common and unique minor utilitarian and hedonic issues on the tested websites that affect the experience of users.
7. To suggest recommendations to obtain a positive user experience on e-commerce websites.

2. Related works

Earlier research recognized the importance of user experience in e-commerce websites and identified certain features or attributes that contribute to positive user experience on such sites. For example, Vila et al. (2021) investigated the influence of website design variables (content, usability, functionality, and branding) on user experiences of tourism e-commerce websites. The results showed that usability (personalization, interactivity, privacy, and security) and branding (information about tourism products and services) had significant effects on the user experience.

Also, Febriandika et al. (2020) investigated the influence of hedonic (attractive designs, entertaining features, and gamification) and utilitarian features of an e-commerce website on user experience. Their work also investigated the influence of positive online experience on trust and loyalty to e-commerce websites. The results proved that the hedonic features of an e-commerce website affected the online experience significantly, and the hedonic features significantly affected trust in e-commerce, also proving that a positive online experience also significantly affected trust in e-commerce. The study of Febriandika et al. (2020) recommended paying more attention to hedonic features compared to utilitarian features to improve the online experience of an e-commerce website.

Furthermore, Hellianto et al. (2019) investigated the relationship between hedonic quality and pragmatic (utilitarian) quality on an e-commerce website in Indonesia. The work also investigated the effect of pragmatic (functional) quality and hedonic quality on the perceived user experience (UX) on the website. The results showed that hedonic quality had a positive and significant relationship with the utilitarian quality of an e-commerce website. Also, the results proved that the utilitarian (functional) quality had a positive and significant relation to the perceived UX. The utilitarian (functional) quality variables that affected the UX included directness (the practicality of using the website so that a user becomes more confident in interacting with it), simplicity, and informativeness. The hedonic quality variables that affected the UX included delicacy and

attractiveness. It was found also that pleasure and self-satisfaction had a great influence on the UX.

Alternatively, [Sudiana et al. \(2021\)](#) investigated the key success factors for a better user experience on e-commerce websites using the systematic literature review approach. A total of 43 key factors that could be considered to make a positive user experience of e-commerce websites were identified. These included visual design, information quality, navigation, ease of use, and speed and loading time. Similarly, [Bonastre and Granollers \(2014\)](#) suggested a set of 64 heuristics that might be used to evaluate the level of user achievement on e-commerce websites. The heuristics were identified based on functional requirements and other quality factors of e-commerce websites; these were categorized into six groups based on the stages of the buying decision process. However, the identified heuristics were not used to review any e-commerce website to prove its efficiency.

[Bascur et al. \(2021\)](#) also presented a set of heuristics to address usability and user experience factors that should be considered to create a good user experience on e-commerce websites. The factors included whether the site was: useful, usable, desirable, valuable, findable, accessible, and credible. Furthermore, [Hinderks et al. \(2018\)](#) suggested a user experience questionnaire to measure user experience for both web- and mobile-based applications. This consisted of six scales or user experience variables. These included: attractiveness, efficiency, perspicuity, dependability, stimulation, and novelty.

Alternatively, [Bozzi and Mont'Alvão \(2020\)](#) investigated the user experience obtained from the interaction of female apparel e-commerce websites in Brazil using an online questionnaire and interviews. The results showed that the most significant problem faced by the users which affected their user experience was the lack of information regarding the fit and size of the products.

The literature showed that there is a lack of research that suggests comprehensive criteria to evaluate the user experience of e-commerce websites taking into consideration specific utilitarian and hedonic features of such sites ([Sudiana et al. 2021](#); [Bascur et al., 2021](#); [Bozzi and Mont'Alvão, 2020](#)). The literature also showed that there is a lack of research that evaluates the user experience of e-commerce websites in general and, more specifically, in Malaysia and which provides a detailed explanation regarding specific major and minor issues, related to utilitarian and hedonic features, users face while interacting with these websites.

3. Methodology

3.1. Selection of the e-commerce websites

In order to identify the top three most frequently visited e-commerce websites in Malaysia, the Alexa website ranking, which is one of the major global ranking websites, was used (www.alexacom). This

uses web traffic data to rank millions of websites in order of website popularity. The list of the top 50 most visited websites in Malaysia provided by Alexa was investigated and then only local Malaysian e-commerce websites with the extension of .my were considered. The top three e-commerce websites with the highest ranking provided by Alexa for April 2022 were: Shopee.com.my, Lazada.com.my, and PGMall.my. In this paper, we will refer to the three websites as website 1, website 2, and website 3, respectively for simplicity. Three websites were chosen to keep the research at a manageable size for the participants and the researcher.

3.2. Development of user experience (UX) criteria

The UX evaluation criteria were developed to evaluate comprehensively the UX of e-commerce websites in terms of measuring the utilitarian quality and hedonic quality of any such site due to the lack of user experience (UX) criteria to evaluate specifically the user experience of e-commerce websites, with specific metrics ([Bonastre and Granollers, 2014](#); [Sudiana et al., 2021](#); [Bascur et al., 2021](#); [Yusof et al., 2022](#)). It is worth mentioning that some studies were found in the literature that suggested heuristics or key factors regarding user experience or the usability evaluation of e-commerce websites ([Bonastre and Granollers, 2014](#); [Sudiana et al., 2021](#); [Bascur et al., 2021](#); [Hasan and Morris, 2017](#)). However, these studies focused on measuring utilitarian quality and ignored measuring or evaluating the hedonic quality of e-commerce websites. For example, a study conducted by [Bascur et al. \(2021\)](#), suggested a set of user experience heuristics for e-commerce websites (ECUXH), adapted from Nielsen's heuristics. The ECUXH is too general and does not specify metrics to evaluate the utilitarian and hedonic qualities of e-commerce websites. Alternatively, [Morville \(2004\)](#) suggested a model which includes the main factors that should be considered to create a good UX. The factors related to a site being useful, usable, desirable, valuable, findable, accessible, and credible. However, this model is general and does not include specific metrics to evaluate the utilitarian and hedonic quality of e-commerce websites. Similarly, [Yusof et al. \(2022\)](#) suggested a conceptual user experience evaluation model for online systems. However, metrics to measure user experience were not identified. These studies, however, were considered to develop the first part of the suggested UX criteria, which related to utilitarian quality. [Table 1](#) shows the suggested metrics to measure the utilitarian quality of any e-commerce website, together with the references.

To develop the second part of the suggested UX criteria, which related to the hedonic quality, other research, which suggested metrics to measure the hedonic quality of online applications, was considered. For example, the research suggested by [Hasan \(2021\)](#), which developed UX evaluation

criteria to evaluate the user experience of an e-learning system, was considered. Specifically, some usability and hedonic metrics of the suggested UX evaluation criteria, which suited the evaluation of e-commerce websites, were adopted from her research (Table 1). Other studies which either employed or adapted the User Experience Questionnaire (UEQ) to evaluate the user experience of various online applications were considered (Hinderks et al., 2018; Al-Hunaiyyan et al., 2021; Schrepp et al., 2017; Atoum et al., 2021) in the identification of the hedonic metrics, as shown in Table 1. Furthermore, other research studies which investigated the influence of the various design variables on the user experience of e-commerce websites were considered in the identification of utilitarian and hedonic metrics, including those of Helliando et al. (2019), Vila et al. (2021), Febriandika et al. (2020), and Hassenzahl et al. (2003). Also, the study conducted by Zarour (2020), which developed a user experience evaluation method, was considered; this was general and not specific to e-commerce websites. Table 1 shows the 40 suggested metrics to measure the UX of e-commerce websites and the corresponding references for each metric. This includes 27 metrics to measure utilitarian quality and 13 metrics to measure the hedonic quality of any e-commerce website.

3.3. Data collection and analysis

In order to evaluate the user experience (UX) of the three e-commerce websites from the users' perspectives using the suggested UX criteria (Table 1), data were collected in two stages using questionnaires and semi-structured interviews, respectively. The questionnaire was employed in the first stage to identify issues concerning users' experiences while interacting with the tested websites. The interview method was then employed in the second stage since it is one of the most common methods to evaluate the UX, and to provide rich and in-depth details regarding the identified issues users faced in the first stage (Mtebe, 2020).

Four questionnaires were developed. The first questionnaire was designed to collect information on participants' backgrounds and online shopping experiences. The other three questionnaires were designed to collect data regarding users' experience using the three selected e-commerce websites (i.e., Shopee, Lazada, and PGMall); one questionnaire for each website. Specifically, each of the three questionnaires, which were intended to collect data regarding the utilitarian quality and hedonic quality of each website, included 40 questions, one question for each of the UX metrics (utilitarian quality and hedonic quality) (Table 1). The students were asked to rate their agreement on each of the 40 statements using a seven-point Likert scale. In addition, for each of the identified UX problems (i.e., disagreements with any statement), space was provided at the end of each statement (UX metric) for open-ended

responses where the students could describe the specific problem(s) relating to that statement.

Requests for voluntary participants were sent to the students of the School of Computing at UTM University via Email, WhatsApp, and Telegram applications. In these requests, it was announced that an honorarium of RM50 would be given to each participant. Interested participants were instructed to send a message privately to the researcher asking to be sent the detailed procedure that would be followed and to allocate time for the interview. It was announced also that the responses of the participants would be anonymous.

The following procedure was sent to each participant to follow in order to evaluate their experience while interacting with the three selected e-commerce websites:

1. Fill in the background and experience questionnaire.
2. Visit website 1 (one of the three selected e-commerce websites was specified for each participant (i.e., Shopee, Lazada, and PGMall)); the order of the websites was changed for each participant.
3. Explore the selected website for a maximum of 10 minutes and then try buying anything from the site. After the exploration, fill in the questionnaire related to the website to reflect your experience of it.
4. Take a break of 10 minutes before beginning to test the second website.
5. Follow the same procedure (explained in points 2, 3 and 4) to evaluate your experience with website 2 and website 3. (The other two selected e-commerce websites (Shopee, Lazada, and PGMall) were specified for each participant.)
6. After you have completed the four questionnaires, please contact the researcher to arrange an interview to discuss your experience of the websites.

The responses from the questionnaire were analyzed and UX problems related to utilitarian quality and hedonic quality were identified. Based on the results obtained from the responses to the questionnaires, semi-structured interviews were conducted with the students who had participated in the research and had completed the developed questionnaires (the second stage of the data collection). A total of 22 questions were asked in the semi-structured interviews based on the identified problems on the three websites obtained from the qualitative analysis of the questionnaires, see Appendix A. The interviews clarified and provided more details regarding the issues raised in the questionnaires, and identified more UX problems. Furthermore, the students were asked to categorize each of the identified UX problems (utilitarian and hedonic) into major or minor problems. Major problems related to errors that would prevent the user from navigating throughout the website and purchasing from it successfully, while minor

problems related to issues where a user might make an error but he/she would be able to recover and complete navigating throughout the website and purchasing from it successfully (Hasan and Morris,

2017). The semi-structured interviews were conducted within two weeks. An honorarium of RM50 was given to each student who participated in the interview sessions.

Table 1: The suggested UX evaluation criteria for any e-commerce website and the corresponding reference for each metric

The UX evaluation criteria		References
Metrics to measure the utilitarian quality		
1	The navigation is obvious throughout the website	(Bonastre and Granollers, 2014; Vila et al., 2021; Hasan and Morris, 2017; Morville, 2004)
2	The website has a clear logical structure/hierarchy	(Bonastre and Granollers, 2014; Vila et al., 2021; Hasan and Morris, 2017; Hassenzahl et al. 2003)
3	The website has an effective internal search engine	(Bonastre and Granollers, 2014; Hasan and Morris, 2017)
4	The checkout process includes a progress indicator at the top of the checkout pages	(Bonastre and Granollers, 2014)
5	The website clearly displays the "call to action buttons" including: "Add to Cart" or "Buy Now"	(Bonastre and Granollers, 2014)
6	The new products or special offers are prominently advertised	(Bonastre and Granollers, 2014)
7	The website provides detailed information about the product	(Bonastre and Granollers, 2014; Vila et al., 2021; Hasan and Morris, 2017)
8	The website content is up-to-date	(Bonastre and Granollers, 2014; Hasan and Morris, 2017)
9	The order charges, such as taxes and shipping costs, are specified as soon as possible in the purchasing process	(Bonastre and Granollers, 2014)
10	Information about the delivery dates is clearly presented	(Bonastre and Granollers, 2014; Hasan and Morris, 2017)
11	The website recommends products related to (or complementing) the selected product	(Bonastre and Granollers, 2014)
12	The download of the website's pages is quick	(Bonastre and Granollers, 2014; Hasan and Morris, 2017; Bascur et al., 2021; Al-Hunaiyyan et al., 2021)
13	The website has a shopping cart which is accessible from all the pages	(Bonastre and Granollers, 2014; Hasan and Morris, 2017)
14	If registration is required, the process is short and simple and it requires only essential information	(Bonastre and Granollers, 2014; Hasan and Morris, 2017)
15	The website provides alternative methods for the delivery of the order	(Bonastre and Granollers, 2014; Hasan and Morris, 2017)
16	The website provides alternative methods for payment	(Bonastre and Granollers, 2014; Hasan and Morris, 2017; Bascur et al., 2021)
17	The website's interface is consistent	(Bonastre and Granollers, 2014; Vila et al., 2021; Hasan and Morris, 2017; Bascur et al., 2021)
18	The website provides an easy-to-order process	(Bonastre and Granollers, 2014; Hasan and Morris, 2017; Morville, 2004)
19	The website is easy to learn	(Bonastre and Granollers, 2014; Vila et al., 2021; Hasan and Morris, 2017; Morville, 2004; Bascur et al., 2021; Hellianto et al., 2019; Al-Hunaiyyan et al., 2021; Hasan, 2021; Hinderks et al., 2018; Schrepp et al., 2017; Atoum et al., 2021)
20	The website is efficient	(Vila et al., 2021; Hasan and Morris, 2017; Bascur et al., 2021; Hellianto et al., 2019; Al-Hunaiyyan et al., 2021; Hasan, 2021; Hinderks et al., 2018; Hellianto et al., 2019; Schrepp et al., 2017; Yusof et al., 2022; Atoum et al., 2021)
21	If personal information is required, the Privacy Policy is available on the website	(Bonastre and Granollers, 2014; Vila et al., 2021; Hasan and Morris, 2017)
22	The website presents the shipping, return, or exchange policy and other shopping rules	(Hasan and Morris, 2017)
23	The website has visible contact information	(Bonastre and Granollers, 2014; Hasan and Morris, 2017)
24	The website has a Frequently Asked Questions (FAQ) section that covers common customer questions	(Bonastre and Granollers, 2014; Hasan and Morris, 2017; Hellianto et al., 2019)
25	If an error occurs while interacting with the website, the website displays simple and clear error messages and suggests a solution to get out of the error	(Bascur et al., 2021; Bascur et al., 2021; Zarour, 2020)
26	The website is secure; for example, it shows security logos in the checkout such as FedEx, UPS, Visa, PayPal, SSL, etc.	(Bonastre and Granollers, 2014; Vila et al., 2021; Hasan and Morris, 2017; Bascur et al., 2021; Al-Hunaiyyan et al., 2021)
27	The website provides foreign language and currency support	(Hasan and Morris, 2017)
Metrics to measure the hedonic quality		
28	My experience with the website is enjoyable	(Hasan, 2021; Hinderks et al., 2018; Schrepp et al., 2017; Febriandika et al., 2020; Atoum et al., 2021)
29	I was pleased to interact with the website	(Bascur et al., 2021; Hellianto et al., 2019; Hasan, 2021; Hinderks et al., 2018; Febriandika et al., 2020; Atoum et al., 2021; Bascur et al., 2021; Zarour, 2020; Hassenzahl et al. 2003)
30	The website is visually attractive	(Hellianto et al., 2019; Al-Hunaiyyan et al., 2021; Hasan, 2021; Hinderks et al., 2018; Hellianto et al., 2019; Schrepp et al., 2017; Febriandika et al., 2020; Atoum et al., 2021; Zarour, 2020; Yusof et al., 2022; Hassenzahl et al. 2003)
31	The website meets my expectations	(Al-Hunaiyyan et al., 2021; Atoum et al., 2021)
32	The website is exciting	(Bonastre and Granollers, 2014; Al-Hunaiyyan et al., 2021; Hinderks et al., 2018; Schrepp et al., 2017; Atoum et al., 2021)
33	The website is interesting	(Al-Hunaiyyan et al., 2021)
34	The website is motivating	(Hinderks et al., 2018; Schrepp et al., 2017; Atoum et al., 2021; Hunaiyyan et al., 2021; Hassenzahl et al. 2003)
35	The website is creative	(Al-Hunaiyyan et al., 2021; Hinderks et al., 2018; Schrepp et al., 2017; Atoum et al., 2021; Hassenzahl et al. 2003)
36	The website is inventive	(Al-Hunaiyyan et al., 2021; Hinderks et al., 2018; Schrepp et al., 2017)
37	The website has innovative features	(Al-Hunaiyyan et al., 2021; Hinderks et al., 2018; Schrepp et al., 2017; Hassenzahl et al. 2003)
38	The website has desirable design elements that evoke emotion and gratitude	(Morville, 2004)
39	The website has novel functionality: it is new or unusual in an interesting way	(Hellianto et al., 2019; Al-Hunaiyyan et al., 2021; Hasan, 2021; Hellianto et al., 2019; Hassenzahl et al. 2003)
40	The website allows users to engage in their tasks	(Hasan, 2021)

Descriptive analysis was used for the first questionnaire to describe the characteristics of the students; this is presented in the Results Section. Likert scores were calculated for each statement in each of the three questionnaires related to the three e-commerce websites to describe students' responses to the 40 statements. The Likert score was calculated as follows: For each statement on the questionnaire, the total number of responses for each sentiment level was calculated. Then, the total was added and divided by the total number of respondents.

For the purpose of the analysis, a Likert score of 1-3 was regarded as a negative response, 5-7 as a positive response, and 4 as a neutral one. The Likert scores for the statements are presented in [Appendix B](#). The Likert scores and the qualitative data obtained from the open-ended questions for each of the 40 statements in each of the three questionnaires relating to the three e-commerce websites were analyzed. As a result, various UX problems were identified on each of the three e-commerce websites. These results were used to structure the interview sessions with each student, as mentioned before. The qualitative data obtained from the interview sessions were analyzed based on the categories and sub-categories of the suggested UX criteria ([Table 1](#)). It resulted in confirming and providing more details regarding the identified UX problems on each of the three e-commerce websites. Also, it resulted in categorizing the identified utilitarian and hedonic quality problems into major and minor problems from the viewpoint of the students. After this, common and unique UX problems on the e-commerce websites were identified. These are presented in the Results Section.

4. Results

4.1. Background and experience results

A total of 20 students participated in this research. The age for all the participants were between 18 to 22 years old. Most of the participants (90%) were males, while females numbered only 2 (10%). Regarding their academic level, 65% were in their second year of study, 25% in their first year, and 10% in their third year. Concerning the participants' online shopping experience, all the participants had browsed websites 1 and 2 before this research while only one participant had browsed website 3. All the participants used the Internet for purchasing products; most of them (70%) used it monthly for purchasing whereas 30% of them used it weekly. The first time for most of the participants (80%) to buy a product from the Internet was over two years ago. The last purchases for the participants included: face mask, hair spray, tumbler, gaming keyboard, food, flight ticket, guitar strings, shirt, and shoes. Regarding the website that the participants used for their last purchase from the Internet, most of the participants (80%) used Website 1, 15% used Website 2, and one of them

used Traveloka Application. Regarding the device or devices used by the participants to purchase online, 40% used "mobile and laptop"; 30% used "PC, mobile and laptop"; 20% used only mobile; and 10% used "mobile, tablet and laptop."

4.2. Questionnaire results

The results obtained from the analysis of the questionnaires showed that the three websites had several problems that affected users' experience while interacting with them. Specifically, the quantitative results obtained from calculating the Likert scores, shown in [Appendix B](#), showed that the participants were:

- Satisfied with most of the identified utilitarian and hedonic features provided by websites 1 and 2, as shown in [Appendix B](#). The Likert scores for most of the statements were positive, except for three statements which were negative.
- Less satisfied with the utilitarian and hedonic features provided by website 3 compared to websites 1 and 2, as shown in [Appendix B](#). The Likert scores were negative for 6 out of the 27 identified utilitarian benefits and one out of the 13 identified hedonic benefits.

The qualitative results obtained from the analysis of the open-ended questions for each of the statements regarding utilitarian and hedonic features identified more problems compared to the quantitative data obtained from the questionnaires. It identified 12 problems on the websites related to utilitarian features, and 10 problems related to hedonic features, as shown in [Appendix A](#).

4.3. Interviews results

The results obtained from the analysis of the questionnaires were used to structure the interview sessions. The interview sessions provided rich and detailed explanations regarding the problems faced by the participants while interacting with the three e-commerce websites. They also identified new problems and helped in determining the severity (major, minor) of these problems from the participant's point of view. [Fig. 1](#) shows that the largest number of problems that affected the user experience on the test websites related to minor hedonic problems, and the lowest number of problems that affected the user experience on the websites related to major utilitarian problems. [Fig. 1](#) also shows that the websites had approximately a similar number of problems related to major and minor utilitarian features.

[Fig. 2](#) shows the distribution of the utilitarian and hedonic problems on the three e-commerce websites in terms of their severity. It shows that website 1 had the least number of major and minor utilitarian and hedonic problems, while website 3 had the largest number of major and minor utilitarian and hedonic problems. [Fig. 2](#) also shows that website 3

was the only website that had major hedonic problems.

The results obtained from the analysis of the interview sessions resulted in identifying the following utilitarian and hedonic problem areas on the e-commerce websites:

- Seven major utilitarian problem areas
- Seven minor utilitarian problem areas.
- Two major hedonic problem areas
- Nine minor hedonic problem areas

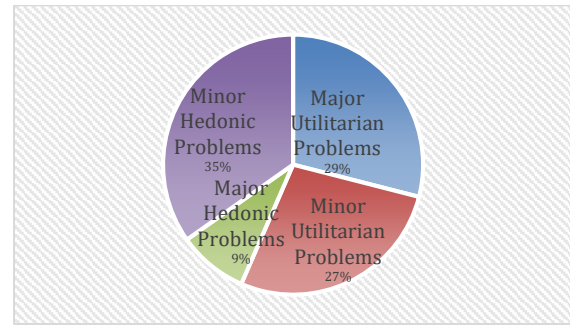


Fig. 1: Major, minor utilitarian, and hedonic problems identified on the three e-commerce websites

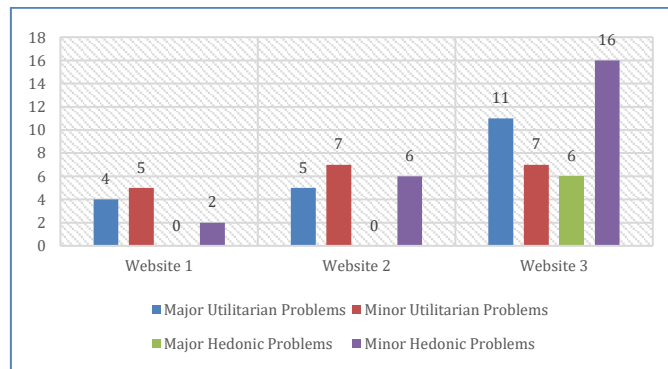


Fig. 2: Number of major and minor utilitarian and hedonic problems identified on the three e-commerce websites

The following explains in detail the identified utilitarian and hedonic problem areas that affected the user experience on the tested e-commerce websites.

- Major utilitarian problem areas: Seven major utilitarian problem areas were identified on the websites, as shown in Table 2; these included four common problem areas and three unique problem areas. The total number of problems identified on the websites related to the seven problem areas was 20; 14 common problems and 6 unique problems. Table 3 shows the number of problems on each website regarding each of the seven problem areas.

The four common major utilitarian problem areas are related to:

- “Lack of providing detailed information about the products.” This problem was identified on the three websites and is related to the fact that detailed information about the products displayed on the websites depends also on the seller; not all sellers provided accurate and detailed information about their products, such as materials or size.
- “Inaccurate and unclear information about the delivery dates.” This problem was identified on the three websites. This is also related to the fact that the delivery of the products is based on the supplier. The participants identified two specific sub-problems related to this problem area on the three websites; these related to:

- a. Unexpected late delivery for some of the products which they bought from the websites.

- b. Canceling the order without informing the customers and without giving them a voucher.

- “Slow downloading of the website’s pages.” This problem was identified on websites 2 and 3. The participants indicated that this problem was frustrating as this made it difficult for them to interact with the website and buy what they wanted.
- “Lack of providing alternative methods for the delivery of the order.” This issue was identified on the three websites. All the websites provided only one standard method of delivery.

The three unique major utilitarian problem areas were identified only on website 3. These related to:

- “Ineffective internal search engine function.” This problem is related to two specific sub-problems, which related to:

- a. The internal search provided redundant results.
- b. The internal search provided inaccurate results. For example, when searching for products that were available on the website, it gave a “no products found” message.

- “Lack of recommending related or complementary products.” This website suggested products from the same shop/supplier and not related products from other shops or suppliers.
- “Inefficient website.” The participants identified three specific sub-problems which explained the reasons for this being an inefficient website. These related to:

- a. The poor organization of the website;
- b. The inefficiency of its internal search function which resulted in difficulty in finding products;
- c. The very slow download speed of website 3 also made it inefficient for users.

Table 2: Number of major utilitarian problems affecting user experience on the three websites

No.	Utilitarian problem areas	W1	W2	W3
1	Ineffective internal search engine function			2
2	Lack of providing detailed information about the products	1	1	1
3	Inaccurate and unclear information about the delivery dates	2	2	2
4	Lack of recommending related or complementary products			1
5	Slow downloading of the website's pages		1	1
6	Lack of alternative methods for the delivery of the order	1	1	1
7	Inefficient website			3
	Total Number of Problems	4	5	11

W1: Website 1; W2: Website 2; W3: Website 3

- Minor utilitarian problem areas: Seven minor utilitarian problem areas were identified on the websites, as shown in Table 3; these included five common problem areas and two unique problem areas. The total number of problems identified on the websites related to the seven problem areas was 19; 15 common problems and 4 unique problems. Table 3 shows the number of problems on each website with regard to each of the seven problem areas.

The five common minor utilitarian problem areas are related to:

- “Unclear and illogical structure (organization).” This problem was identified on the three websites. The participants indicated that all the websites had similarly messy designs. This requires more time to navigate through the website to find what to buy.
- “Lack of progress indicator at the top of the checkout pages.” This problem was identified on all the websites. The participants would prefer the addition of a progress indicator which would inform them of their progress while buying from the website.
- “Lack of suggesting solutions if an error occurs while interacting with the website.” This issue was identified on the three websites. The participants indicated that when they faced problems that were not supported by the websites, they would leave the website and enter it again. They preferred the websites to provide clear instructions regarding how to recover from the problem they faced.
- “Inaccurate foreign language support.” This was identified on the three websites. This is related to

the fact that, when the language of the interface of the websites is changed, for example, from English to Malay, the menu(s) and most of the elements displayed on the interface are displayed in English and not Malay. Only a few elements are displayed using the Malay language.

- “Lack of foreign currency support.” This problem was identified on the three websites and is related to the fact that the prices of the products are only displayed in Malaysian Ringgit (RM). The participants indicated that they would prefer the websites to offer an option to display the prices of the products in other international currencies, such as US Dollars (US).

The two unique minor utilitarian problem areas were identified on websites 2 and 3, with one problem area on each website. These related to:

- “Not easy to navigate throughout the website.” The participants identified two specific sub-problems related to the navigation on website 3. These related to:
 - a. The navigation throughout this website was not obvious.
 - b. The cluttered interface of its home page (too many buttons in one place) made it difficult to navigate.
- “Inefficient website.” The participants identified two specific minor sub-problems on website 2 which made it inefficient. These related to:
 - a. The slow download speed of website 2 compared to website 1; and
 - b. The use of many pop-ups disturbed users.

Table 3: Number of minor utilitarian problems affecting user experience on the three websites

No.	Utilitarian problem areas	W1	W2	W3
1	Not easy to navigate the website			2
2	Unclear and illogical structure (organization)	1	1	1
3	Lack of progress indicator at the top of the checkout pages	1	1	1
4	Inefficient website		2	
5	Lack of suggesting solutions if an error occurs while interacting with the website	1	1	1
6	Inaccurate foreign language support	1	1	1
7	Lack of foreign currency support	1	1	1
	Total Number of Problems	5	7	7

W1: Website 1; W2: Website 2; W3: Website 3

- Major hedonic problem areas: Two unique major hedonic problem areas were identified on website

3, as shown in Table 4. The total number of problems identified on website 3 related to the

two problem areas was 6. Table 4 shows the number of problems on website 3 with regard to the two problem areas.

The two unique major hedonic problem areas are related to:

- “Not an enjoyable experience.” The participants identified three specific sub-problems behind them not having an enjoyable experience; these related to:
 - a. The small font size is used in the website. They explained that when they used zoom options (zooming in) to make the elements on the webpage larger, some of the elements on the page were not displayed (i.e., did not become visible);
 - b. The structure was illogical;
 - c. The inefficient internal search function of the website made their experience not enjoyable.
- “Not meeting user’s expectations.” The participants indicated that the website did not meet their expectations due to the three major problems they faced while interacting with the website which related to:
 - a. The ineffective internal search engine function;
 - b. The poor organization of the website;
 - c. The slow downloading of the website’s pages.

Table 4: Number of major hedonic problems affecting user experience on the three websites.

No.	Hedonic problem areas	W1	W2	W3
1	Not an enjoyable experience			3
2	Not meeting user’s expectations			3
	Total Number of Problems			6

W1: Website 1; W2: Website 2; W3: Website 3

- Minor hedonic problem areas: Nine minor hedonic problem areas were identified on the websites, as shown in Table 5; these included four common problem areas and five unique problem areas. The total number of problems identified on the websites related to the nine problem areas was 24; 12 common problems and 12 unique problems. Table 5 shows the number of problems on each website with regard to each of the nine problem areas.

The four common minor hedonic problem areas are related to:

- “The user was not pleased to interact with the website.” Four specific sub-problems were identified on websites 2 and 3, which were the reasons behind having displeased users. Regarding website 2, the sub-problems related to:
 - a. It was inefficient and was not easy to return products to the seller after purchase;
 - b. Unreliable customer service; and
 - c. Too many pop-up advertisements were used by the website.

Regarding website 3, the sub-problem related to:

- a. The lack of displaying many products. One of the participants stated: “Not many products were displayed on the website compared to the other websites.”
- “Not visually attractive.” This problem was identified on all the websites. The participants indicated that the design of the websites was very simple and not visually attractive. They would prefer the websites to have a creative design to make them more attractive.
 - “Not creative website.” This problem was identified on the websites 2 and 3. The participants indicated that the websites failed to create a positive, unique or memorable experience to keep them engaged when they interacted with them. For example, they did not provide gaming features.
 - “Lack of desirable design elements which evoke emotion and gratitude.” This issue was identified on all the websites and related to the fact that the websites’ designs were very simple, not creative, and not of a sufficiently high quality to evoke their emotion and gratitude. The participants suggested that the websites should be more interesting. One of the participants for the second time mentioned this problem on website 2 which related to the excessive use of advertisement pop-ups which disturbed her a lot.

The five unique minor hedonic problem areas were identified on website 3. These related to:

- “Not a motivating website.” The participants identified three specific sub-problems which explained why the website was not motivating to interact with. These related to:
 - a. The lack of displaying many products;
 - b. The color and the small font size used for the design of the website;
 - c. The poor-quality design of the advertisements.
- “Not an inventive website.” The participants explained the reason behind this problem related to the lack of continuous improvements of their services to satisfy their customers. The participants suggested the quality and services of the website should be continuously improved to create unique features to engage its users.
- “Lack of innovative features.” The participants indicated that the website does not have creative or unique features, and identified the following three specific sub-problems related to the lack of innovative features, which included:
 - a. Lack of having monthly lucky draw feature;
 - b. Not taking action by blocking sellers who cheated buyers; and
 - c. Lack of a customized internal search function.

- “Lack of novel functionality which is new or unusual in an interesting way.” The participants explained the reasons behind this problem which related to the failure to provide new or unusual features in an interesting way. They indicated that the vouchers offered by this website involve a very complicated procedure which made them difficult to obtain.
- “Not allowing users to engage in their tasks.” The participants indicated that because this website

has a lot of problems, these prevented them from being engaged in their tasks. The participants identified the following four specific sub-problems which affected their engagement with the website:

- Ineffective internal search engine function;
- Lack of recommending related or complementary products;
- Slow downloading of the website’s pages; and
- The problem of inefficient customer service.

Table 5: Number of minor hedonic problems affecting user experience on the three websites.

No.	Hedonic problem areas	W1	W2	W3
1	The user was not pleased to interact with the website		3	1
2	Not visually attractive	1	1	1
3	The website was not motivating			3
4	It was not creative		1	1
5	It was not inventive			1
6	Lack of innovative features			3
7	Lack of desirable design elements that evoke emotion and gratitude	1	1	1
8	Lack of novel functionality that was new or unusual in an interesting way			1
9	Not allowing users to engage in their tasks			4
	Total Number of Problems	2	6	16

W1: Website 1; W2: Website 2; W3: Website 3

5. Discussion

This research uniquely developed specific comprehensive criteria to evaluate user experience (UX) on e-commerce websites and used them to investigate user experience on the top three most frequently visited e-commerce websites in Malaysia. The results of this research uniquely identified the major and minor issues (related to utilitarian and hedonic features) on the websites that affected users’ experience while interacting with the sites. Specifically, the results of this research identified major and minor (optional) utilitarian and hedonic features that should be considered on e-commerce websites to achieve positive user experiences based on the major and minor problems identified on the tested e-commerce websites from the point view of the participants.

Based on these results, this research recommends considering the following key utilitarian features on e-commerce websites to create positive user experiences with the websites:

- Provide detailed information about the products;
- Present accurate and clear information about the delivery dates of the products;
- Ensure that the downloading speed of the website’s pages is fast;
- Provide alternative methods for the delivery of the order;
- Include an effective internal search engine function;
- Recommend related or complementary products;
- Ensure that the website is efficient.

This research also recommends considering the following minor or optional utilitarian features on e-commerce websites to support the creation of positive user experiences:

- Ensure that the website has a clear and logical structure (organization);
- Present a progress indicator at the top of each of the checkout pages;
- Suggest solutions if an error has occurred while interacting with the website;
- Support foreign languages accurately;
- Support foreign currencies;
- Support navigation throughout the website.

Regarding the major and minor hedonic features that were identified in this research, it was found that the utilitarian quality of the e-commerce websites affected the hedonic quality of the websites. For example, the participants identified two major problem areas related to the hedonic quality of website 3. These related to: “not an enjoyable experience” and “not meeting users’ expectations.” The participants in the interview sessions explained the main reasons behind the identification of these problems which related mainly to the major utilitarian problem areas found on the websites. These included: the illogical structure and the inefficient internal search function of the websites. Furthermore, the reasons behind identifying most of the minor hedonic problem areas on the websites related to the utilitarian problem areas identified on the sites, as shown in the Results Section.

Based on these results, this research recommends improving the major and minor (optional) utilitarian features on e-commerce websites, then considering the following minor or optional hedonic features on e-commerce websites to support the creation of positive user experiences:

- Provide an enjoyable experience: for example, ensure that the content of the website is presented using an appropriate and readable font size;

- Ensure there is efficient and reliable customer service which helps customers return products to the seller after purchase;
- Do not use many pop-up advertisements on the website;
- Display a sufficient number of interesting products;
- Make the website visually attractive;
- Design the website creatively;
- Include desirable/unique design elements that evoke emotion and gratitude;
- Include novel functionalities: elements that are new or unusual in an interesting way (e.g., vouchers).

Despite the fact that this research uniquely investigated the user experience of the most frequently visited websites in Malaysia and identified utilitarian and hedonic issues that affected user experience from users' points of view, the results of this research are comparable to earlier research which investigated factors that affected positive user experiences on e-commerce websites. For example:

- The results obtained from Vila et al. (2021) research showed that information about tourism products and services was one of the factors that had a significant effect on the user experience. Hellianto et al. (2019) research also found that informativeness was one of the functional quality variables that affected the user experience on e-commerce websites. Furthermore, Bozzi and Mont'Alvão (2020) research showed that the lack of presenting detailed information about products was the most significant problem faced by the users which affected their user experience on the e-commerce websites. This research also showed that a "lack of providing detailed information about the products" was one of the major common problem areas identified on the three websites.
- The research of Sudiana et al. (2021) suggested that speed and loading time were key success factors for a better user experience on e-commerce websites. This research also identified that the "slow downloading of the website's pages" was a common major problem area on websites 2 and 3.
- Hinderks et al. (2018) research suggested the efficiency of e-commerce websites was one of the key factors that affected user experience. This research also identified that an "inefficient website" was one of the major problem areas related to utilitarian quality.

This stresses the importance of presenting detailed information about products on e-commerce websites, considering the speed of downloading the website's pages and considering the efficiency of e-commerce websites as they all affect the user experience while interacting with such sites. Consequently, these might affect users' intention to proceed and buy from the website. Regarding the hedonic attributes of e-commerce websites, the

research of Hellianto et al. (2019) found that attractiveness is one of the hedonic quality variables that affect the user experience on e-commerce websites. Furthermore, Hinderks et al.'s (2018) research suggested attractiveness and novelty as key factors that affected user experience on such websites. This research also identified the following minor problems related to the hedonic quality of the tested e-commerce websites: "not visually attractive" and "lack of novel functionality which was new or unusual in an interesting way." These results shed light on the importance of hedonic quality which should be taken into consideration to create positive user experiences on e-commerce websites.

The results obtained from the analysis of the methods employed in this research proved that the interview method was more useful and effective compared to the questionnaire method (both quantitative and qualitative data were collected using the questionnaires) in identifying issues of e-commerce websites that affected users' experience while interacting with the websites. The results showed that the interviews provided rich and detailed information and explanations. A comparison between the results obtained from the quantitative and qualitative data from the questionnaire with the results obtained from the interview sessions showed that:

- The quantitative data obtained from the questionnaire identified the least number of user experience problems on the e-commerce websites (6 utilitarian problems and one hedonic problem).
- The qualitative data obtained from the open-ended questions related to each statement of the questionnaire identified a greater number of user experience problems on the e-commerce websites compared to the quantitative data: 12 utilitarian problems and 10 hedonic problems.
- The qualitative data obtained from the semi-structured interviews identified the largest number of detailed user experience problems on the e-commerce websites compared to the quantitative and qualitative data obtained from the questionnaire: 14 utilitarian problem areas (consisting of 39 specific sub-problems) and 11 hedonic problem areas (consisting of 30 specific sub-problems). Also, using this method, the problems were prioritized by the participants according to their severity: major and minor (7 major and 7 minor utilitarian problem areas and 2 major and 9 minor hedonic problem areas).

6. Conclusion

The rapid growth of e-commerce websites and the number of Internet users suggest the importance of considering user experience on such sites as it is one of the key factors for successful and competitive e-commerce websites. This research developed specific criteria to measure the user experience (UX) of e-commerce websites; this included 27 metrics to measure utilitarian benefits and 13 metrics to

measure the hedonic benefits of any e-commerce website such site. Based on the developed criteria, the user experience (UX) on the top three most frequently visited e-commerce websites in Malaysia (i.e., Shopee, Lazada, and PGMall) was evaluated. The questionnaire method was used first to obtain quantitative and qualitative results. Then, based on the results of the questionnaires, semi-structured interviews were conducted to confirm the results, to obtain new results, and to classify the issues that affected users' experience according to their severity (major, minor) from the point of view of users. The results proved the importance of the utilitarian features on e-commerce websites and showed that they affected users' evaluation of the hedonic features of the websites. The results also proved the usefulness and effectiveness of the interview method in identifying important and detailed issues related to the user experience on each e-commerce website. Furthermore, the results identified seven major user experience problem areas related to the utilitarian quality; seven minor user experience problem areas related to the utilitarian quality; two major user experience problem areas related to the hedonic quality; and nine minor user experience problem areas related to the hedonic quality. Based on the results, recommendations were suggested regarding utilitarian and hedonic features that should be considered in order to create positive user experiences on e-commerce websites.

Despite the fact that this research concerned the three top most frequently visited e-commerce websites in Malaysia, the results can be generalized to other websites in other countries based on the detailed issues that were identified in this research. However, this research had some limitations. For example, only two methods were employed in this research: questionnaires and interviews. Other methods were not used, for example, a focus group to discuss the identified problems in groups of participants. Another limitation is related to the

sample used in this research; which was small and skewed (90% of the respondents were men). Also, the age of the participants, which was between 18 to 22 years old, was minimal.

The results of this research have both academic and managerial implications. The academic implication relates to the developed criteria suggested in this research. These criteria can be used by researchers, designers, or developers of e-commerce websites to evaluate or design sites that offer a positive user experience. Another academic implication relates to the provision of empirical results regarding the effectiveness of the methods employed in this research to measure user experience on e-commerce websites. These showed the effectiveness of the interview method in identifying important and detailed user experience problems on e-commerce websites. They also showed that the quantitative questionnaire method was less effective in identifying user experience problems on e-commerce websites.

The managerial implications relate to the detailed user experience issues identified in this research on the top three most frequently visited e-commerce websites in Malaysia: Shopee, Lazada, and PGMall. The results of this research could help the managers of the tested e-commerce websites to improve the user experience of their websites by addressing problems, thereby obtaining the benefits of positive user experiences.

Appendix A. Identified problems on the three websites from the qualitative analysis of the questionnaire

A total of 22 problems were identified on the websites; 12 problems related to utilitarian features, and 10 problems related to hedonic features (Table A1).

Table A1: Identified problems on the three websites from the qualitative analysis of the questionnaire.

	Utilitarian quality	W1	W2	W3
1	The navigation is obvious throughout the website			✓
2	The website has unclear/illogical structure/organization	✓	✓	✓
3	The website has an ineffective internal search engine			✓
4	Lack of progress indicator at the top of the checkout pages	✓	✓	✓
5	Lack of providing detailed information about the products	✓	✓	✓
6	Lack of recommendation-related or complementary products on the website			✓
7	Slow downloading of the website's pages		✓	✓
8	Lack of alternative methods for the delivery of the order	✓	✓	✓
9	The website is inefficient		✓	✓
10	Lack of suggesting solutions if an error has occurred while interacting with the website	✓	✓	✓
11	Inaccurate foreign language support	✓	✓	✓
12	Lack of foreign currency support	✓	✓	✓
	Hedonic quality			
13	The user's experience with the website was not enjoyable			✓
14	The user was not pleased to interact with the website		✓	✓
15	The website was not visually attractive	✓	✓	✓
16	The website did not meet the user's expectations			✓
17	The website was not creative		✓	✓
18	The website was not inventive			✓
19	The website did not have innovative features			✓
20	The website did not have desirable design elements which evoked emotion and gratitude	✓	✓	✓
21	The website did not have novel functionality: it was not new or unusual in an interesting way			✓
22	The website did not allow users to engage in their tasks			✓

W1: Website 1; W2: Website 2; W3: Website 3

Appendix B. Likert scores of user experience questionnaire with the three websites

A Likert score of 1-3 was regarded as a negative response, 5-7 as a positive response, and 4 as a

neutral one. The Likert scores showed that the three websites had several problems that affected users' experience while interacting with them (Table B1).

Table B1: Likert scores of user experience questionnaire with the three websites.

	Utilitarian quality	Likert scores		
		W1	W2	W3
1	The navigation is obvious throughout the website	6.6	6.1	5.5
2	The website has a clear logical structure/hierarchy	6.3	5.9	5.5
3	The website has an effective internal search engine	6.5	6.0	3.5
4	The checkout process includes a progress indicator at the top of the checkout pages	3.4	3.1	3.1
5	The website clearly displays the "call to action buttons" including: "Add to Cart" or "Buy Now"	6.6	6.7	6.3
6	The new products or special offers are prominently advertised	6.7	6.3	5.3
7	The website provides detailed information about the product	3.7	3.7	3.1
8	The website content is up-to-date	6.7	6.3	5.6
9	The order charges, such as taxes and shipping costs, are specified as soon as possible in the purchasing process	6.7	6.8	6.3
10	Information about the delivery dates is clearly presented	6.6	6.3	5.8
11	The website recommends products related to (or complementing) the selected product	6.3	6.4	3.9
12	The download of the website's pages is quick	6.6	4.2	3.8
13	The website has a shopping cart which is accessible from all the pages	6.8	6.7	6.2
14	If registration is required, the process is short and simple and requires only essential information	6.9	6.2	5.9
15	The website provides alternative methods for the delivery of the order	3.6	3.3	3.0
16	The website provides alternative methods for payment	6.5	6.8	6.4
17	The website's interface is consistent	6.4	5.9	5.7
18	The website provides an easy-to-order process	6.5	6.4	6.1
19	The website is easy to learn	6.6	6.5	5.7
20	The website is efficient	6.6	5.9	5.4
21	If personal information is required, the Privacy Policy is available on the website	6.6	6.3	5.7
22	The website presents the shipping, return, or exchange policy and other shopping rules	6.0	6.2	5.5
23	The website has visible contact information	6.1	6.0	5.7
24	The website has a Frequently Asked Questions (FAQ) section that covers common customer questions	6.5	6.6	5.6
25	If an error has occurred while interacting with the website, the website displays simple and clear error messages and suggests a solution to get out of the error	4.7	4.3	4.1
26	The website is secure; for example, it shows security logos in the checkout such as FedEx, UPS, Visa, PayPal, SSL, etc	6.5	6.5	6.1
27	The website provides foreign language and currency support	5.4	5.7	5.6
	Hedonic quality			
28	My experience with the website is enjoyable	6.5	5.7	4.2
29	I was pleased to interact with the website	6.6	5.9	3.6
30	The website is visually attractive	5.9	5.2	4.4
31	The website meets my expectations	6.4	5.5	4.3
32	The website is exciting	5.7	5.2	4.3
33	The website is interesting	6.4	5.6	4.9
34	The website is motivating	5.7	5.2	4.0
35	The website is creative	6.2	5.6	5.0
36	The website is inventive	6.5	5.3	5.0
37	The website has innovative features	6.3	5.3	4.5
38	The website has desirable design elements that evoke emotion and gratitude	6.4	4.9	4.3
39	The website has novel functionality that is new or unusual in an interesting way	6.3	5.4	4.2
40	The website allows users to engage in their tasks	6.3	5.8	4.6

W1: Website 1; W2: Website 2; W3: Website 3

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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