User Experience Analysis on Websites Using the User Experience Questionnaire (UEQ) Framework: A Case Study on the HalalHub.id Website

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Abstract. HalalHub.id is a digital application is a synergistic ecosystem to accelerate the development of local superior halal-oriented products towards the global market. This synergism was built to realize East Java as the largest owner of halal products in Indonesia. The HalalHub.id service can be found on the website and application version (android). The prepared design is still under development both from the appearance and the content provided. The purpose of making this application is to drive the people's economy through the sale of halal products and a forum for MSME actors to share information about halal certification, consolidate business supply chain processes, opportunities, consultations, and strategies. From User experience (UX) a website plays an important role in determining user satisfaction and engagement. In this study, we analyzed the user experience of Halalhub.id website using the User Experience Questionnaire (UEQ) framework. Through comprehensive case studies, we investigate different aspects of user interaction, usability, and overall satisfaction. Our findings provide valuable insights for website designers and developers to improve Halalhub.id platform, ensuring a seamless and enjoyable experience for users.

Keywords: Halal Value Chain, User Experience Analysis, User Experience Questionnaire

1   Introduction

The development of the halal industry requires an inclusive approach by utilizing the potential of Micro, Small and Medium Enterprises (MSMEs). Currently, there are around 64.2 million MSME business units in Indonesia. The use of digital technology in empowering halal MSMEs has a significant impact on the national economy and community welfare. Indonesia has a large Muslim population, reaching 87% of the total population or around 236.53 million people. Therefore, halal products with certification are a major need for Muslims. Although Indonesia has the potential to become the largest producer of halal products and services in the world, most needs are still met through imports because domestic producers have not fully met applicable halal standards.

On the other hand, the digital economy in Indonesia has great potential and is expected to become the largest in Southeast Asia by 2025. However, currently the number of MSMEs connected in the digital ecosystem and halal certified is still relatively low compared to the number of MSMEs as a whole. To accelerate halal, go-digital MSMEs, the Coordinating Ministry for Economic Affairs encourages program synergy between Ministries/Institutions, the Government, and digital platforms. One example is the Halal Product Marketing and Management Digitalization Training Program for 1000 MSMEs in West Sumatra Province. The program is a joint effort between the Ministry of Cooperatives and SMEs, BPJPH Ministry of Religious Affairs, and the West Sumatra Provincial Government. It is backed by digital platforms like Tokopedia, Blibli, Bukalapak, and LinkAja Syariah.

With digital platforms such as HalalHub ID, it is hoped that MSMEs in East Java can strengthen the halal value chain and more easily meet the needs of Muslim consumers. Hopefully this step can support economic growth and community welfare in a sustainable manner.

2   Literature Review

2.1   User Experience

User Experience (UX) is a term that refers to the level of ease and comfort of using a website or digital product. According to the ISO 9241-210 definition, UX measures a user's level of comfort and satisfaction with a product, system, or service based on aspects of the interface's appearance, accessibility, and performance. UX measurement can be done through the Usability Testing and User Experience Questionnaire (UEQ) methods [1]. This method helps in understanding and improving the quality of user experience in interaction with digital products.

2.2   Usability

John Brooke created the system usability scale (SUS) in 1986. SUS consists of ten questions that have five answer scales. Questions that have odd numbers (1, 3, 5, 7, 9) have a positive value. Conversely, questions with even numbers (2, 4, 6, 8, 10) have negative values [1]. According to the ISO 9241-11 (1998) standard, usability is a characteristic used to measure how effective, efficient, and satisfying a product is when used by users. Three measures are used to measure usability:
1. Effectiveness: how effectively users accomplish tasks when using the product.
2. Efficiency: How easy it is for the user to perform tasks after understanding the product, including accurate and detailed measurements for each task the user performs.
3. Satisfaction: How comfortable the product is to use.

This method aims to provide quantitative and qualitative information to find problems with product usability. Scenario testing is an effective method for gathering information about the quality of a product when used by users. Scenario testing involves users performing tasks based on task scenarios and using the product to achieve specific goals. Four parameters are used in scenario testing to measure usability, including: Task Completed, Time per Completed Task, Error Rate, and Number of Clicks [1].

2.3   User Experience Questionnaire (UEQ)

One way to measure user experience is a user experience survey (UEQ) [1]. UEQ can show the usability aspects of user experience. The concept is to combine effectiveness and efficiency with aesthetics, comfort of use, and attractiveness. Effectiveness and efficiency are often referred to as pragmatic aspects, while aesthetics, comfort of use, and attractiveness are referred to as hedonic aspects. UEQ can quickly measure a user's experience with a product [2]. To implement a UEQ, it usually takes 3 to 5 minutes to read and fill out the survey [3]. Data analysis can also be done effectively using the Excel sheet provided. The advantage of using UEQ is also that it is free and available in Indonesian. [1]

The User Experience Questionnaire (UEQ) consists of six scales with a total of 26 items. Each of these scales are:

1. Attractiveness: The general impression one has of the product. Is the customer happy or not with this product? This scale serves as a measure of pure valence. Annoying/pleasant, good/bad, disliked/liked, interesting/not interesting, friendly/unfriendly are the categories.
2. Efficiency: Can the product be used quickly and efficiently? Does the interface look systematic? Can it be fast or slow? Efficient or inefficient? Organized or cluttered?
3. Perspicuity: Is it easy for users to use this product? Can users quickly become familiar with using this product? Is it easy to understand or difficult? Is it easy to learn or difficult? Is access to use complicated or easy? Is the product clear or confusing?
4. Dependability: Does the customer feel like they have control over how to interact with this product? Is it safe and predictable to interact with this product? This also includes things like unpredictable or predictable, hindering or supporting, safe or unsafe, and meeting or not meeting expectations.
5. Stimulation: Is using this product interesting and entertaining? Do users want to continue using this product? Is it valuable or not valuable to spend time using this product? Boring or exciting? Interesting or uninteresting? Motivating or not?
6. Novelty: Is the design of this product creative and innovative? Is this product attractive? Creative or boring? Innovative or conventional? Ordinary or up to date? Conservative or innovative?

3   Method

3.1   Developing UEQ KPIs

In this study, the method used was based on the use of User Experience Questionnaire (UEQ). Expanding the questionnaire can explain how to obtain Key Performance Indicators (KPIs). Improving UEQ is aimed at measuring pragmatic and hedonic qualities. UEQ can provide a quick and complete assessment of the desired user experience. This allows users to simply and directly express the feelings, impressions, and attitudes that arise when interacting with the product under study. According to [3]. UEQ consists of twenty-six items, which are divided into six scales: Attractiveness, Agility, Efficiency, Dependability, Stimulation, and Novelty [3]. Each scale represents a different aspect of the quality of the user experience. Many metrics and KPIs are available.

According to a study by [4], only 18% of the respondents use KPIs related to user experience (UX) or usability. The study also found that other methods and tools such as questionnaires (34%), cognitive tests (40%), interviews (58%), and observation (63%) are more commonly used than KPIs. A KPI is a metric, but not all metrics can be considered KPIs. This suggests that there are many metrics that claim to provide KPIs. Metrics are tools that help in facilitating the decision-making process and improving organizational performance. Any metric can be a KPI, but it's important for organizations to understand and use those metrics well.

According to [5], UX questionnaires are a widely used quantitative measurement method to evaluate user experience. These questionnaires are used to measure the subjective attitude of users towards the object being tested. Respondents assess the statements (items) in the questionnaire, for example by selecting the appropriate category from the range of values on the rating scale. There are different types of UX questionnaires available, each with different scales to measure different aspects of UX. Some questionnaires, such as the System Usability Scale (SUS) [6] and the Software Usability Measurement Inventory (SUMI) [7], focus on measuring aspects of pure usability. Meanwhile, there are also broader questionnaires, such as the Visual Aesthetics of Websites Inventory (VisAWI) [8], the User Experience Questionnaire (UEQ) [3], and the Standardized User Experience Percentile Rank Questionnaire (SUPR-Q) [9], UX questionnaires that measure various aspects of user experience more comprehensively can be grouped into two categories based on their total scores. The first category includes questionnaires that give only one overall result. The second category includes questionnaires that calculate the overall results as the average of a sub-scale. Some questionnaires give one overall score because it consists of only one item, so the answer to that item is the overall result. Examples of such questionnaires include:

- *A questionnaire called System Usability Scale (SUS), which consists of ten items, was created by John Brooke in 1986 to evaluate the usability of a wide range of products and services, including hardware, software, mobile devices, websites, and applications* [6]
- *After Scenario Questionnaire (ASQ) is a three-item questionnaire developed by Lewis in 2011 to measure the usability of a product or service after a user has completed a task* [10]
- *Net Promoter Score (NPS) is a one-item questionnaire developed by Reichheld in 2003 to measure customer loyalty and satisfaction with a product or service.* [11]
- *Single Ease Question (SEQ) is a one-item questionnaire developed by Sauro and Dumas in 2009 to measure the ease of use of a product or service.* [12]
- *Subjective Mental Effort Questionnaire (SMEQ) is a one-item questionnaire developed by Sauro and Dumas in 2009 to measure the mental effort required to complete a task* [12]

There are also questionnaires that are designed to provide results for sub-scales as well as overall results. The overall result is usually calculated by taking the arithmetic-mean from the sub-scale's scores. Examples of such questionnaires include:

- *Post-Study System Usability Questionnaire (PSSUQ): This questionnaire consists of 19 items and three sub-scales. It was developed by Lewis in 2011 to measure the usability of a product or service after a user has completed a task.* [10]

- *Visual Aesthetics of Websites Inventory (VisAWI): This questionnaire consists of 18 items and four sub-scales. It was developed by Moshagen and Thielsch in 2010 to measure the visual aesthetics of websites* [8]

The overall results and the results of these subscales can generally be used as Key Performance Indicators (KPIs) because they are valid metrics. Another method used by [13] was to use four different scores (task achievement, number of errors, task time, and satisfaction score) to create a uniform and standardized usability metric [13]. This metric is calculated by considering individual scores as well as weighted coefficients from principal component analysis. This resulting metric provides more detailed information than just the average value of the individual sources.

To effectively use UX KPIs, it is important to consider different meanings and criteria in the context of different scenarios and user groups. This results in values that can be properly interpreted. For instance, the importance of individual quality characteristics may vary between different products and user groups. For example, efficient operation will be more important for a product that is used repeatedly in a day compared to a web service that is only used once a year. Conversely, intuitive operation can be a more central factor in the assessment of the user experience of such web services, but not so relevant for applications that are used daily.

4   Discussion

4.1   UEQ Scale

The scales in the UEQ can be grouped into pragmatic qualities (Agility, Efficiency, Dependability) and hedonic qualities (Stimulation, Novelty). Pragmatic qualities describe aspects of quality related to the task to be accomplished, whereas hedonic qualities describe aspects of quality unrelated to the task.
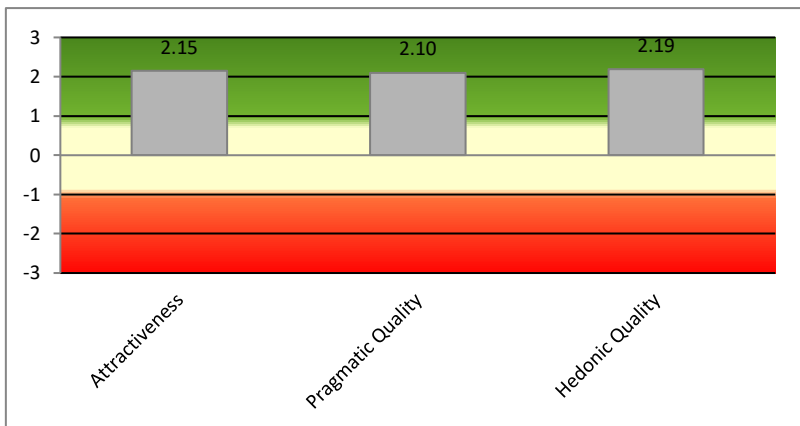

Fig. 1. Pragmatic and Hedonic Quality

The results of the UEQ presented show the assessment of the pragmatic and hedonic quality of the Halalhub website. In this context, the scales measured are "Attractiveness", "Pragmatic Quality", and "Hedonic Quality".

1. Attractiveness has a value of 2.15. This indicates that users give a positive assessment of the general impression or attractiveness of the Halalhub web.
2. Pragmatic Quality has a value of 2.10. This reflects an assessment of the quality aspects related to the task and functionality of the product. This value indicates that there are some areas that may require improvement in terms of the effectiveness and efficiency of the Halalhub web.
3. Hedonic Quality has a value of 2.19. This includes a positive assessment of aspects of quality related to the emotional experience, aesthetics, and visual or sensory appeal of the product or system. The results show that users are satisfied or pleased with the non-task related aspects of the Halalhub web usage experience.

Overall, the results of this UEQ illustrate that users have a positive perception of hedonic aspects, although there is still room for improvement in terms of pragmatic quality. Improvements to the effectiveness and efficiency of using the Halalhub web can improve the overall user experience.

4.2. Benchmark UEQ

According to the benchmark of the UEQ [14], the results obtained are in the good to excellent range. The scales in the UEQ can be grouped into pragmatic quality (Agility, Efficiency, Dependability) and hedonic quality (Stimulation, Novelty). The mean scores of the pragmatic quality aspects and the hedonic quality aspects are calculated. Overall, hedonic quality was rated higher (2.19) than pragmatic quality (2.10). This indicates that Halalhub web meets expectations and generates a positive experience for users.

The overall results of the Halalhub UEQ scale are depicted in Table 1, Figures 2, and 3. The scores of each UEQ item can be seen in Table 1, where the average on the Attractiveness scale is 2.146; Agility 1.977; Efficiency 2.141; Dependability 2.188; Stimulation 2.336; and Novelty 2.039.

Table 1. HalalHub overall UEQ scale results

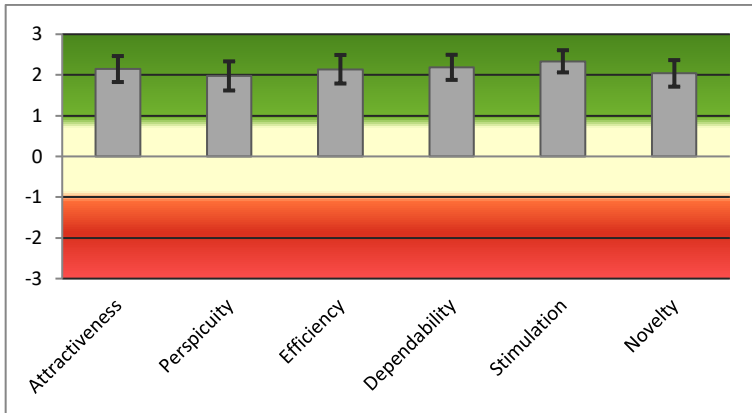| UEQ Scales	Mean
Attractiveness	2.146
Perspicuity	1.977
Efficiency	2.141
Dependability	2.188
Stimulation	2.336
Novelty	2.039

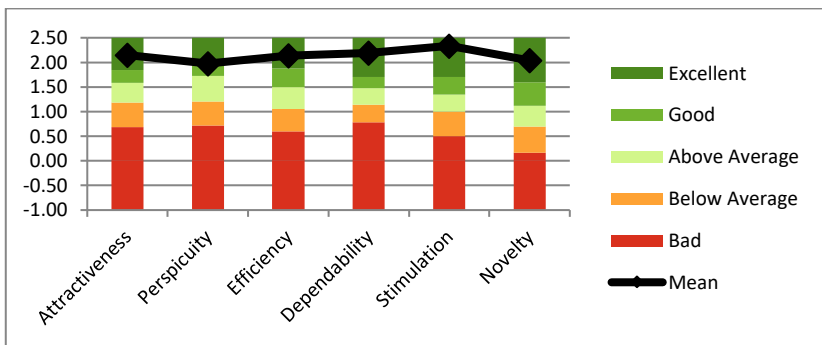**Fig. 2.** Graph of HalalHub overall UEQ scale results

Fig. 3. Results of questionnaire responses to the HalalHub application

Figure 3 shows the results of the questionnaire responses to the Halalhub web, which all indicate a positive user experience (according to the guideline, a score is considered positive if it is >0.8). This section will be evaluated for sections that will increase the user experience value in the next design improvement. Based on the UEQ benchmark results, the Halalhub website falls into the category of "good to excellent." This benchmark contains data from 21,175 people in 468 product study evaluations with UEQ. A score falls into the Good category if it falls into the best 25% of results from this benchmark data set. Meanwhile, the Excellent category corresponds to the best 10% of results.

Based on the data presented, a comprehensive analysis is provided for each scale of the User Experience Questionnaire (UEQ), along with prospective areas that may need to be considered.

1. The attractiveness variable was measured, with an average score of 2.146.
   The level of attractiveness is given a very good rating, indicating that customers perceive the Halalhub web to have high attractiveness. To increase the attractiveness of a product or service, it is recommended to allocate resources to incorporate design elements, improve visual aesthetics, and improve the user interface. These

measures will provide a more visually appealing and immersive experience for users.

2. The concept of agility, with an average score of 1.977.

   The agility score is below 2, indicating that consumers may face some challenges in understanding or navigating the Halalhub web. To improve clarity, it is recommended to simplify the user interface, provide explicit guidance, and improve general usability to create a more user-friendly and intuitive experience.

3. System efficiency, with an average score of 2.141.

   The efficiency score indicates an excellent level of performance, indicating that consumers believe that Halalhub web is relatively effective in achieving their goals. To improve efficiency, it is recommended to simplify the process, eliminate redundant stages, and optimize task flow to provide smoother and faster interactions.

4. Dependability attribute, with an average score of 2.188.

   The dependability attribute is positively rated, indicating that users view Halalhub web as reliable and trustworthy. Although the product or service has shown excellent performance, it is important to improve the dependability attribute. This will ensure the product or service remains stable and consistent over a long period of time.

5. The concept of stimulation, with an average score of 2.336.

   The highest rating was given to stimulation, indicating that consumers find the Halalhub web very interesting. Although the current aspect shows excellent performance, it is important to maintain and improve the user experience by introducing new and interesting features or content to keep users engaged.

6. Novelty, with an average score of 2.039.

   The evaluation of novelty has a very good assessment, indicating that users see some level of originality or innovation in Halalhub web. To improve novelty, it is recommended to include more innovative materials to maintain consumer enthusiasm and engagement over a long period of time.

4.2   KPI (Key Performance Indicator)

The UEQ KPI is a measure of the quality of user experience. It is calculated by combining two values for each UEQ factor: the UEQ factor value and the perceived importance per UEQ factor. One way to calculate the range of possible values is to include a UEQ benchmark. Benchmarks already exist for UEQ, which set practical value ranges for UEQ factors. The average values of the benchmark categories can be used to calculate the possible value ranges of the UEQ KPIs with practical data. All possible combinations of all benchmark categories and for each factor the perceived importance (1-7 per UEQ factor) is calculated. The result is a possible value range for the UEQ KPIs.

Table 2. Calculation results of Confidence Interval on Halalhub UEQ

Scales	Mean	Std. Dev.	N	Confidence	Confidence Interval
Attractiveness	5.64	1.21	255	0.15	5.79
Perspicuity	6.15	1.02	255	0.13	6.27
Efficiency	6.44	0.79	255	0.10	6.54
Dependability	6.22	0.94	255	0.12	6.34
Stimulation	5.09	1.43	255	0.17	5.26

Novelty	5.32	1.24	255	0.15	5.47

KPI (Key Performance Indicator) confidence intervals are statistical measures that provide information about the precision and reliability of average values for different scales or metrics. In this dataset, confidence intervals are provided for six different scales: Attractiveness, Agility, Efficiency, Dependability, Stimulation, and Novelty. Each of these scales represents a specific aspect of user experience or product evaluation. In summary, the confidence intervals provided for each scale provide insight into the precision of the mean scores. Narrower intervals indicate greater confidence in the estimates, while wider intervals indicate more variation in user perceptions. These intervals help assess the reliability of the data and guide decision-making based on user experience metrics.

5   Conclusion

This research shows that UEQ can be extended to understand the importance of the different scales present in the questionnaire. This approach can basically be used to develop other questionnaires that have several different scales clearly in the content. Despite the expansion of the UEQ by adding 6 additional questions, the UEQ still remained intact and did not lose information on any of the scales. In other words, information about users' perceptions of individual aspects is still available and can be assessed. Currently, a larger benchmark has been developed for the UEQ scales [14], which is helpful in interpreting the results obtained from this questionnaire. However, for UEQ KPIs, a similar benchmark needs to be developed. The process of developing such benchmarks is more time-consuming as it requires the collection of a large amount of evaluation data to be used as the basis for the benchmarks.

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