User Experience Evaluation of Botani Mobile Application using User Experience Questionnaire

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Info Artikel	ABSTRAK
  ✉ Corresponding Author **Nurizal Dwi Priandani,** Teknik Informatika, Fakultas Sains dan Teknologi - UIN Maulana Malik Ibrahim Malang, Tel. +62 85259673388 nd.priandani@uin-malang.ac.id	Saat ini, akses untuk berkonsultasi dengan para ahli pertanian bukanlah hak istimewa yang dimiliki oleh petani. Kombinasi antara teknologi dan pertanian perlu dikembangkan agar memudahkan petani dalam melakukan konsultasi. Botani *Mobile Apps* merupakan aplikasi berbasis Android yang telah dikembangkan oleh Fakultas Pertanian UB. Tujuan dari aplikasi ini adalah untuk mempermudah budidaya pertanian para petani. Evaluasi pengalaman pengguna perlu dilakukan untuk mengukur keberhasilan desain produk dan mendapatkan umpan balik pengguna untuk perbaikan lebih lanjut. Metode User Experience Questionnaire (UEQ) digunakan untuk mengevaluasi pengalaman pengguna aplikasi BOTANI. Berdasarkan hasil UEQ yang telah dilakukan, 26 pertanyaan yang diajukan memiliki nilai rata-rata lebih dari 1. Setelah mengelompokkan pertanyaan dalam 6 skala UEQ, hasil rata-rata perhitungan menunjukkan bahwa semua skala berada dalam area hijau. Berdasarkan karakteristik UEQ, skor tertinggi adalah untuk kualitas Daya Tarik, Pragmatis, dan Hedonik secara berurutan. Semua hasil dari nilai karakteristik memiliki nilai lebih dari 1. Berdasarkan perhitungan Benchmark, menunjukkan bahwa skala Daya Tarik, Efisiensi, Keandalan, dan Kebaruan memiliki hasil skala yang baik, sementara skala Keterbacaan dan Kebaruan mendapatkan hasil skala di atas rata-rata. Berdasarkan semua hasil evaluasi UEQ, dapat disimpulkan bahwa pengalaman pengguna pada aplikasi BOTANI baik.

INTRODUCTION

Agriculture is an important sector in Indonesia because most of the population's livelihoods are as farmers [1]. In the agricultural sector, the use of technology is necessary. It aims to help farmers with cultivation problems that exist in the field. In current conditions, farmers experience difficulties in conducting consultations with agricultural experts. The difficulties that are often experienced are related to problems with the plants. The combination of technology and agriculture needs to be developed to make it easier for farmers to consult. Botani Mobile Apps is an Android-based application developed by the Faculty of Agriculture Brawijaya University. The purpose of this application is to make it easier for farmers to cultivate crops. In this application, various menus can be accessed easily and at no cost.

User experience is how a person feels when using a product, system, or service [2]. User

experience covers all aspects of the user's experience with the system including graphic design, interfaces, physical interaction, and manuals. User experience is a benchmark in user satisfaction when using the product. Good product quality is influenced by good user experience as well. With a good user experience, users feel safe and comfortable using the product.

User experience evaluation needs to be done to measure the success of a product design and to get user feedback for further improvements. The evaluation of Mobile Learning applications using UX Honeycomb was discussed in study [3], and the approach had been found to be successful in assessing the required features in an application. However, honeycomb UX implementation is not simple, this approach relies on weighting. In addition, this weighting is done in several stages. Based on this, this study proposes a user experience evaluation method UEQ (User Experience Questionnaire). This approach has proven successful in several previous studies and is simpler.

The UEQ evaluation method is an evaluation method that is free and provides a thorough assessment quickly [4]. UEQ provides speed in processing the results of user experience measurements. This method can perform data processing only with the number of participants as many as 20-40 participants [11]. Research [5], [6], and [7] have discussed the use of the UEQ method in evaluating user experience. In particular, the evaluation of user experience using UEQ on mobile device applications also been discussed in several previous studies. Research conducted by [8] discusses the evaluation of the user experience of the Smart Grid mobile application. In research by [9] the UEQ method was used to evaluate the Patik Bali mobile device application. The UEQ method was also used in the evaluation study of the Grab Online mobile transportation application conducted by [10].

Based on the explanation above, this study discusses the evaluation of the user experience of the Botany mobile application. The results of this study are the presentation of the evaluation results of the BOTANI Mobile application with the UEQ method. These results can be the basis for application improvements to improve a better user experience. Improving a better user experience is expected to increase user interest and enthusiasm in using the application and achieve application development goals for users.

BOTANI Application Review

The BOTANI application is an Android-based mobile device application that contains cultivation technology and agricultural issues. The purpose of the BOTANI application is to help agricultural sector actors including farmers and entrepreneurs in the agricultural sector, especially plant cultivation. The BOTANI application has been published and distributed on the Google Play Store. Figure 1 is a screenshot of the BOTANI application.
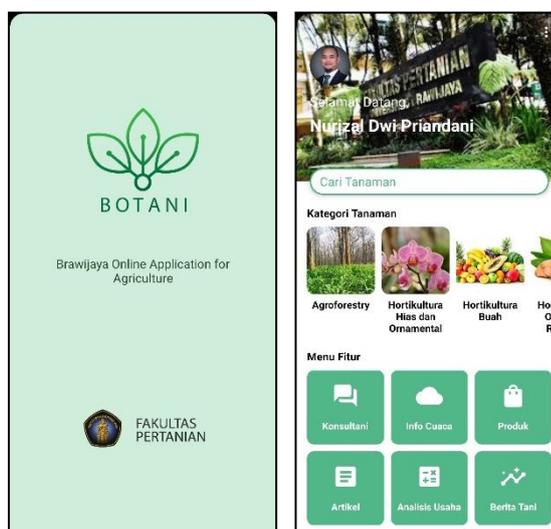
Figure 1. Botani App

The BOTANI application has several main features including:

1. Plant Cultivation Information

   This feature contains information about plants separated according to plant categories, namely Food Crops, Industrial, Fruit Horticulture, Vegetable Horticulture, Ornamental, Ornamental Horticulture, and Medicinal Horticulture and Spices. In the plant category, there are several menus, namely a brief description of plants, plant cultivation from land preparation to harvesting, as well as information on plant pests and diseases and how to control them.

2. Agricultural Consulting (Consultant)

   This feature serves to connect directly between end users and agricultural experts. The step is to fill in the questions in the column provided, then the Agriculture Expert will answer them.

3. Weather Info

   This feature contains the latest weather forecast at the farmer's location. The location is obtained through the GPS sensor on the user's device.

4. Product info for sale

   This feature displays products sold by Business Entities of Universitas Brawijaya.

5. Agricultural Articles

   This feature contains scientific and non-scientific writings that can be used as a reference for readers. Apart from that, in the agricultural articles, there is also reading about plant cultivation and about the latest things in the world of agriculture, such as writing about hydroponics, refugia, and so on.

6. Business Analysis

   This feature is a feature for calculating or calculating the profit and loss of crop cultivation carried out by farmers.

7. Agricultural News

   This feature contains the latest activities and news at the Faculty of Agriculture, University of Brawijaya.

User Experience Questionnaire

The User Experience Questionnaire (UEQ) is a method used to measure the user experience of a system or application. Measurements are made through a questionnaire given to system users. UEQ provides speed in processing the results of user experience measurements. This method can perform data processing only with the number of participants as many as 20-40 participants [11]. The UEQ method consists of 6 rating scales which include:

1. Attractiveness

   The user's impression when using the product for the first time.

2. Dependability

   How a system can provide interactions that are following what is expected by the user.

3. Efficiency

   How users can efficiently complete tasks with the system.

4. Novelty

   How can a system give a sense of fun when used by its users.

5. Perspicuity

   How easy to use a system can be given to its users.

6. Stimulation

   How the system differs is unique from the user's perspective.

UEQ has 3 main characteristics namely Attractiveness, Pragmatic, and Hedonic. Figure 2 displays the mapping of the rating scale for the three main characteristics.
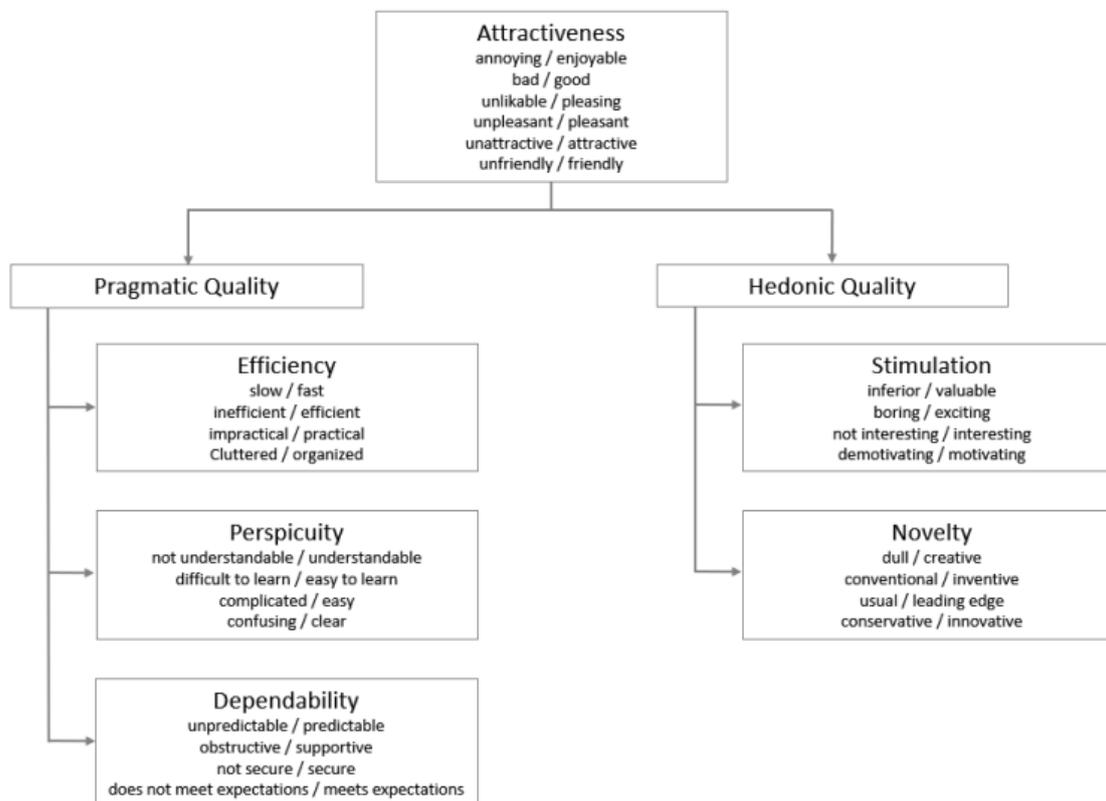
Figure 2. Rating Scale Map of Main Characteristics

METODE

This research was conducted by giving a questionnaire to the end user of the application. Users get commands to perform pre-built application scenarios. Users are guided to fill out the questionnaire that has been given after doing this. This guidance is intended so that users understand the intent of each question point. After the user enters the value of each question from the questionnaire, the data is entered into the UEQ measurement tool to obtain the calculation and analysis results.

Research Instruments

This study used the UEQ questionnaire which was adopted into Indonesian. The UEQ questionnaire uses a 7-point Likert scale for 26 questions. Calculation of UEQ results uses a tool called Data Analysis Tools provided by UEQ to make it easier to calculate the data that has been collected. Data analysis tools are scatterplot files in which there are calculation functions to analyze UEQ. By using Data Analysis Tools, UEQ calculation and analysis becomes easier.

Questionnaire

The form of the questionnaire is paper-based or printed out of 26 UEQ question points. Each user gets 1 questionnaire printout file. The list of UEQ questions given to application users in this study can be accessed on the UEQ Online page (https://www.ueq-online.org/Material/UEQ_All_Languages.zip).

Respondent

The UEQ evaluation of the Botany application was conducted on 25 respondents. The number of respondents in this study met the UEQ respondent requirements to obtain fairly stable results[11]. Respondents are end-users of Botany applications who work as farmers, agricultural extension workers, and agricultural entrepreneurs.

RESULTS AND DISCUSSION

The initial step after the questionnaire has been answered by the respondents is to enter values that are still in the form of a Likert scale into the Data Analysis tools. The tool will then

transform the data from a Likert Scale of 1 to 7 to -3 to 3 as shown in Table 1. The results of the data transformation are used for calculations at each stage to obtain the results of the UEQ analysis.

Table 1. Results of Data Transformation

Initial Value	Transformation Value
1	-3
2	-2
3	-1
4	0
5	1
6	2
7	3

The transformed data are then calculated for the mean, variance, and standard deviation. Each question item is also grouped into 6 scales, namely attractiveness, dependability, efficiency, novelty, perspicuity, and stimulation. Table 2 displays the results of grouping each question item against the 6 UEQ scales and calculating the mean, variance, and standard deviation.

Table 2. Calculation results of the mean, variance, and standard deviation

Item	Mean	Variance	Std. Dev.	Left	Right	Scale
1	2,1	0,4	0,6	annoying	enjoyable	Attractiveness
2	1,8	0,7	0,8	not understandable	understandable	Perspicuity
3	1,2	0,6	0,8	creative	dull	Novelty
4	1,7	0,8	0,9	easy to learn	difficult to learn	Perspicuity
5	1,7	0,6	0,8	valuable	inferior	Stimulation
6	1,0	0,6	0,8	boring	exciting	Stimulation
7	1,4	0,5	0,7	not interesting	interesting	Stimulation
8	1,0	0,5	0,7	unpredictable	predictable	Dependability
9	1,6	0,8	0,9	fast	slow	Efficiency
10	1,4	0,9	1,0	inventive	conventional	Novelty
11	1,2	0,5	0,7	obstructive	supportive	Dependability
12	2,0	0,5	0,7	good	bad	Attractiveness
13	1,2	0,9	1,0	complicated	easy	Perspicuity
14	1,5	0,6	0,8	unlikable	pleasing	Attractiveness
15	1,3	1,0	1,0	usual	leading edge	Novelty
16	1,6	0,6	0,8	unpleasant	pleasant	Attractiveness
17	1,8	0,5	0,7	secure	not secure	Dependability
18	1,0	0,7	0,8	motivating	demotivating	Stimulation
19	2,0	0,6	0,8	meets expectations	does not meet expectations	Dependability
20	1,9	0,7	0,8	inefficient	efficient	Efficiency
21	1,6	0,9	1,0	clear	confusing	Perspicuity
22	1,9	0,5	0,7	impractical	practical	Efficiency
23	1,3	0,7	0,9	organized	cluttered	Efficiency
24	1,1	0,9	0,9	attractive	unattractive	Attractiveness
25	1,4	0,9	1,0	friendly	unfriendly	Attractiveness
26	1,4	0,8	0,9	conservative	innovative	Novelty

Table 2 shows that the value of each question item is more than 1. This means that all questions have a good result value. Based on the calculation results in Table 2, each question is

grouped according to its scale, which is then calculated for the average on each scale. Figure 3 shows a diagram of the average values of the 6 UEQ scales.
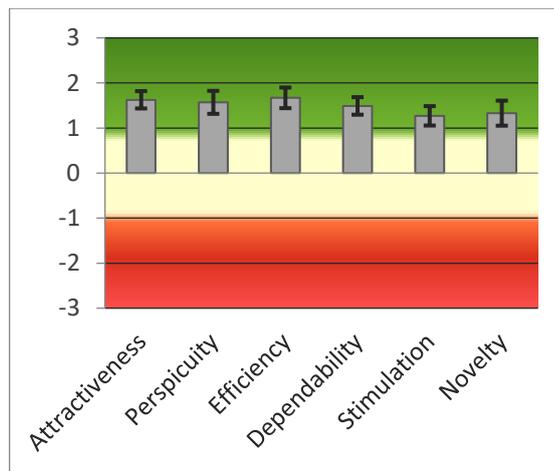
Figure 3. Average values on 6 scales

Figure 3 shows that all scales are in the green area. It shows that all scales are at a good value. The best ratings in a row are Efficiency, Attractiveness, Perspicuity, Dependability, Novelty, and Stimulation.

The UEQ scale is grouped into two characteristic qualities, namely Pragmatic and Hedonic. Pragmatic quality consists of the Perspicuity, Efficiency, and Dependability scales. The Hedonic Quality consists of the Stimulation and Novelty scales. The Attractiveness Scale stands alone. Attractiveness, Pragmatic and Hedonic ratings are shown in Table 3 and depicted in Figure 4.

Table 3. Results of Attractiveness, Pragmatic and Hedonic Values

Characteristics	Average Value
Attractiveness	1.63
Pragmatic Quality	1.58
Hedonic Quality	1.30
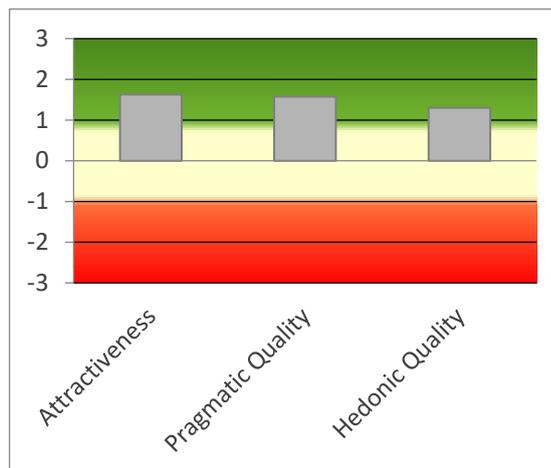
Figure 4. Attractiveness Value Diagram, Pragmatic and Hedonic Quality

Based on Table 3, the highest score is found in Attractiveness followed by Pragmatic and Hedonic Quality where all of these values are more than 1. If depicted on a graph, as in Figure 4, the peaks of all diagrams are in the green area. This shows that all aspects have good value.

The last stage of calculation analysis is Benchmark calculation. This calculation compares the means obtained on each scale in this study with studies that have been reported on the UEQ

online. The BOTANI mobile application assessment benchmarks are shown in Table 4 and depicted in the diagram in Figure 5.

Table 4. Benchmark Score Results

Scale	Average Value	Benchmark comparison
Attractiveness	1.63	Good
Perspicuity	1.57	Above Average
Efficiency	1.67	Good
Dependability	1.49	Good
Stimulation	1.27	Above Average
Novelty	1.33	Good
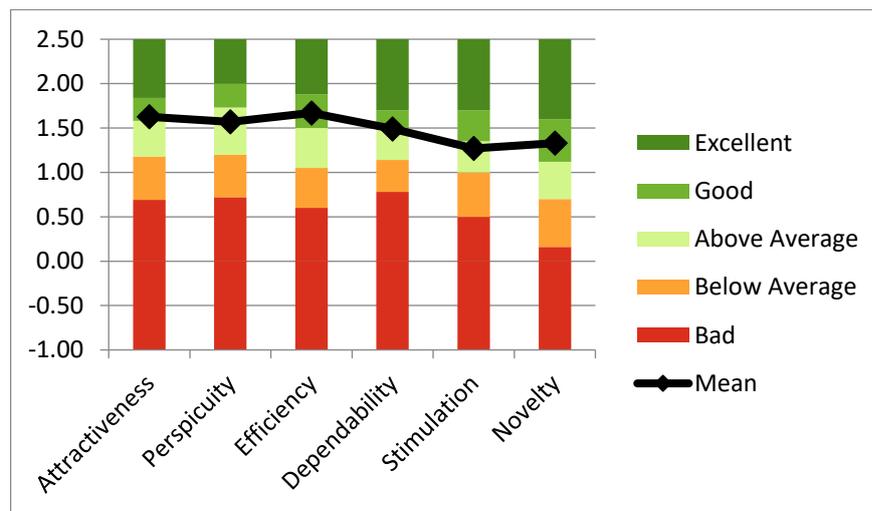
Figure 5. Benchmark Value Chart

Table 4 shows that the Attractiveness, Efficiency, Dependability, and Novelty scales have good ratings when compared to benchmarks. It is also shown that these scales have a peak in the green area in the benchmark diagram Figure 5. The Perspicuity and Novelty scales have values above the average when compared to the benchmark. In the benchmark diagram, the two scales are in the light green area. Based on all these results, it can be concluded that the user experience of the BOTANI application is good when compared to benchmarks.

CONCLUSION

Based on the results of the UEQ calculations that have been carried out, the 26-item questions posed obtained an average value of more than 1. This shows a good score for all statements. The results of the average calculation where after grouping the questions on the 6 UEQ scales show that all scales are in the green area. This shows that all scales are of good value. When viewed based on the UEQ characteristics, Attractiveness has the highest value and is followed by Pragmatic and Hedonic qualities. All of these characteristic values are more than 1 and are in the green area, indicating that this is of good value. Based on Benchmark calculations, it was found that the Attractiveness, Efficiency, Dependability, and Novelty scales had good ratings and the Perspicuity and Novelty scales had scores above average. Based on all the UEQ evaluation results above, it can be concluded that the user experience of the BOTANI application is good.

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