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USER EXPERIENCE EVALUATION ON MUSIC STREAMING APPLICATIONS WITH UEQ METHOD

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Abstract: Along with the development of information technology, the way people listen to music also changed with the emergence of many music streaming applications. The user experience of an application plays an important role in attracting and retaining application users. Therefore, this study has goal to compare the music steaming applications' user experience of the Joox and Spotify by using User Experience Questionnaire (UEQ) method. There are 6 scales assessed by UEQ, including attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty. Data was collected by distributing online questionnaires and obtained as many as 104 responses that could be processed. The results show that both applications have positive impressions which are indicated by the average value of each scale greater than 0.8. This indicates that these two applications are considered quite fun, effective, easy to understand, and innovative. However, the comparison' results show that between Spotify and Joox is not significantly different, with Spotify scores slightly better than Joox.

Keywords: music streaming application; user experience; user experience questionnaire

Abstrak: Seiring dengan perkembangan teknologi informasi, cara masyarakat mendengarkan musik juga mengalami perubahan dengan munculnya banyak aplikasi *streaming* musik. *User experience* suatu aplikasi berperan penting untuk menarik dan mempertahankan pengguna aplikasi. Oleh karena itu, penelitian ini memiliki tujuan untuk membandingkan *user experience* dari aplikasi *streaming* musik Joox dan Spotify dengan metode *User Experience Questionnaire* (UEQ). Terdapat 6 skala yang dinilai oleh UEQ yaitu daya tarik, kejelasan, efisiensi, ketepatan, stimulasi, dan kebaruan. Data dikumpulkan melalui penyebaran kuesioner secara daring dan diperoleh sebanyak 104 jawaban yang bisa diolah. Hasil penelitian menunjukkan bahwa kedua aplikasi memiliki impresi positif yang ditandai dengan nilai rata-rata setiap skala lebih besar dari 0.8. Artinya kedua aplikasi ini dinilai cukup menyenangkan, efektif, mudah dipahami, dan inovatif. Meskipun demikian, hasil perbandingan menunjukkan bahwa perbedaan antara Spotify dan Joox tidak terlalu signifikan, dengan nilai Spotify sedikit lebih unggul daripada Joox.

Kata kunci: aplikasi *streaming* musik; pengalaman pengguna; *user experience questionnaire*

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INTRODUCTION

In previous era, people could listen to music through radio, television, or watch their idol's concert live on stage. However, by the technology development, the way people listen to music has undergone significant changes. Through the emergence of many music streaming applications, society and specifically the younger generation are now able to easily download and enjoy the music whenever and wherever they want. This application-based music streaming service is increasingly in demand among the number of smartphone users in Indonesia because it offers unlimited access to a large music catalog [1]. This statement supported by the 2021 digital report issued by We Are Social which shows that 84% of internet users aged 16-64 years listen to music via streaming services and users spend an average of 1 hour 30 minutes every day listening to music streaming services [2].

There are several music streaming apps available for free as well as paid. Based on a survey conducted by DailySocial, Joox and Spotify are the most used music streaming applications in Indonesia [3]. Spotify as a music streaming service, was first launched in Sweden in 2008. In Indonesia, Spotify was officially launched in 2016. The Spotify's service is free, however users may subscribe to premium services to enjoy music without ads [4], [5]. Meanwhile, there are also Joox as a music streaming service from China which was released in early 2015, and in the same year, Joox was also present in Indonesia. Just like Spotify, Joox also applies premium services. However, Joox users can only listen to a part of the song collection if they are not subscribed, unlike Spotify where users can enjoy the entire song collection [6].

For an application to be used by users, the application should have a good user experience. User experience includes not only for the design of systems, websites, or applications but entire user interactions with the company aspects, its services and products. A good user experience design may also increase user satisfaction when using a product or service. The chances of product to success when entering the market will also be increasing [7], [8]. Thus, the user experience aspects should not be ignored because it can be a success or failure determinant of a product.

User experience plays an important role to emphasize the advantages of the application. User experience may helps the application to attract more users and also increases satisfaction so that users may continue to use the application. Therefore, it is necessary to measure and compare user experience between Joox and Spotify applications. There are several methods to measure user experience, including the heuristic evaluation method, the McCall method, the Simple Additive Weighting (SAW) method, and the User Experience Questionnaire (UEQ). Of all these methods, the User Experience Questionnaire (UEQ) method will be implemented in this study.

Laugwitz, Held, & Schrepp revealed that the User Experience Questionnaire (UEQ) is a research instrument used to process the survey data related to user experience with the aim to assess the subjective quality [9]. UEQ (User Experience Questionnaire) provides data processing instrument that is easy to apply, reliable and valid, and can complement other subjective quality assessment methods as the advantages. UEQ also allows researchers to assess the experience of using interactive products

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quickly. The scales of the questionnaire is designed in such a way as to capture the impression of the overall user experience. The questionnaire is structured in a format that supports respondents to express attitudes, impressions, and feelings that arise when using a product. Respondents also felt more positive when user experience was measured using a questionnaire than interviews, where there was a slightly different impression when looking at the details of the measurement [10].

The use of the UEQ method in assessing user experience is not something new. There are already several platforms that have been assessed by using the UEQ method, such as in the implementation of electronic learning [11], web-based academic information system [12], healthcare application [13], virtual event application [14], transportation service application [15], delivery service application [16], and e-wallet [17], [18]. Comparison of user experience on music streaming applications has also been done using a different method, namely the UX Curve method [19]. Thus, this research will compare the user experience between two music streaming applications, namely Joox and Spotify. Both applications were selected based on the highest number of subscribers in Indonesia.

METHOD

Initially, an observation was made on the Joox and Spotify applications to get idea about features provided by the two applications. Then the activity was continued by looking for a literature review of previous studies related to user experience assessment using the UEQ method. After that, the population and sample of users of the two applications were determined. Data collection was carried out by distributing questionnaires regarding the Spotify and Joox music streaming applications online. User experience testing on these two applications by using the UEQ method. There are 6 scales to be assessed, including: attractiveness (general impression of users on the product, whether they like the product or not), efficiency (products can be used quickly and efficiently, with an organized user interface), perspicuity (ease of use and getting used to the product), dependability (users' feelings in interacting, is it safe, controllable and predictable), stimulation (feeling interesting and enjoyable, and motivated to use the product), and novelty (the product is innovative and creative, and attracts users' attention) [20].

Figure 1 is the whole step carried out in this research:

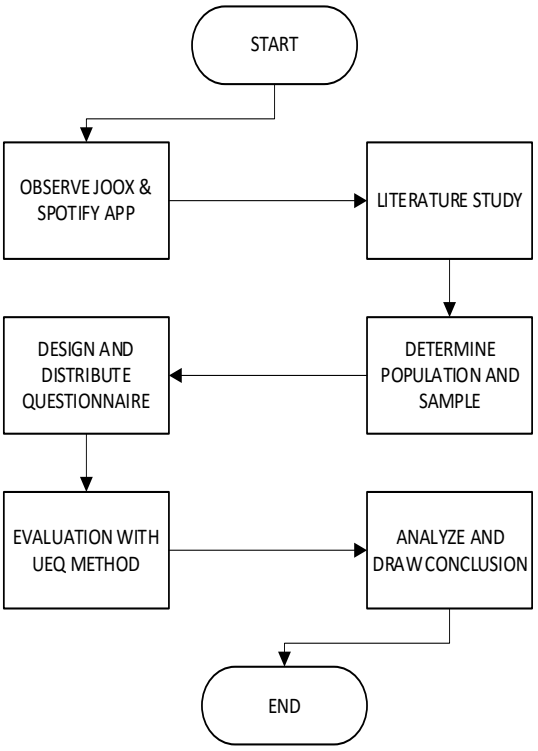

Figure 1. Research Steps

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UEQ also measures technical and non-technical aspects related to the user's emotions or perceptions of pleasure. The UEQ structure to measure user experience consists of pragmatic quality and hedonic quality, which build product attractiveness. Efficiency, perspicuity, and dependability are part of pragmatic quality. Meanwhile, stimulation and novelty are part of hedonic quality. The scale is not assumed to be independent. In fact, the user's general impression is captured by the attractiveness scale, which should be influenced by scores on the other 5 scales as show in Figure 2 [20].

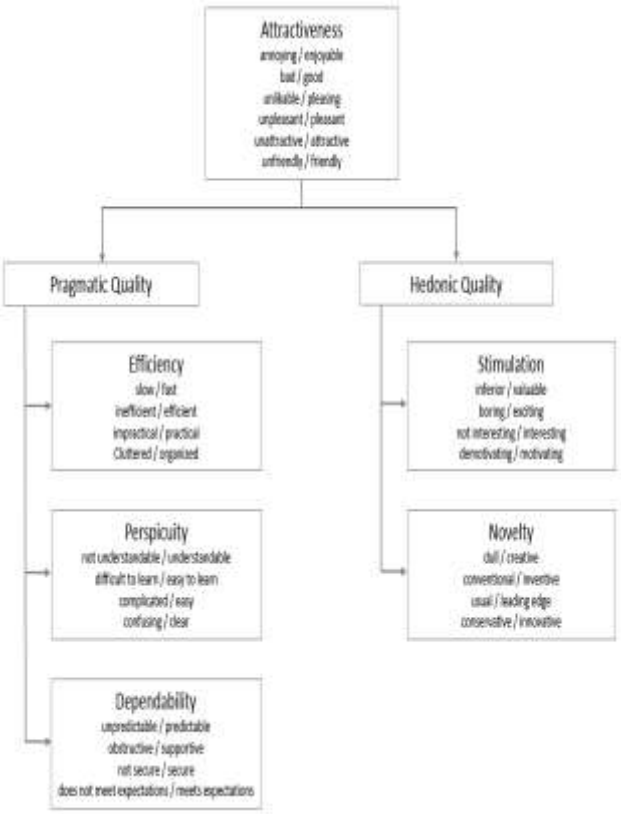

Figure 2. UEQ Scale Structure

There are 26 questionnaire questions taken from the UEQ method, and their contents can be seen in Figure 3.

	1	2	3	4	5	6	7	
menyusahkan	O	O	O	O	O	O	O	menyenangkan
tak dapat dipahami	O	O	O	O	O	O	O	dapat dipahami
kreatif	O	O	O	O	O	O	O	monoton
mudah dipelajari	O	O	O	O	O	O	O	sulit dipelajari
bermanfaat	O	O	O	O	O	O	O	kurang bermanfaat
membosankan	O	O	O	O	O	O	O	mengasyikkan
tidak menarik	O	O	O	O	O	O	O	menarik
tak dapat diprediksi	O	O	O	O	O	O	O	dapat diprediksi
cepat	O	O	O	O	O	O	O	lambat
berdaya cipta	O	O	O	O	O	O	O	konvensional
menghalangi	O	O	O	O	O	O	O	mendukung
baik	O	O	O	O	O	O	O	buruk
rumit	O	O	O	O	O	O	O	sederhana
tidak disukai	O	O	O	O	O	O	O	menggembirakan
lazim	O	O	O	O	O	O	O	terdepan
tidak nyaman	O	O	O	O	O	O	O	nyaman
aman	O	O	O	O	O	O	O	tidak aman
memotivasi	O	O	O	O	O	O	O	tidak memotivasi
memenuhi ekspektasi	O	O	O	O	O	O	O	tidak memenuhi ekspektasi
tidak efisien	O	O	O	O	O	O	O	efisien
jelas	O	O	O	O	O	O	O	membingungkan
tidak praktis	O	O	O	O	O	O	O	praktis
terorganisasi	O	O	O	O	O	O	O	berantakan
atraktif	O	O	O	O	O	O	O	tidak atraktif
ramah pengguna	O	O	O	O	O	O	O	tidak ramah pengguna
konservatif	O	O	O	O	O	O	O	inovatif

Figure 3. UEQ Questionnaire

The response will be converted according to this rule. If the left side of the questionnaire consists of positive statement, then convert the answer value using the following formula: 4 – answer. For example, if the respondent chooses 5, then the converted data will be 4 – 5 = -1. However, if the left side of the questionnaire consists of negative statement, then convert the answer value using the following formula: answer – 4. So, if the responden chooses 7, then the converted data will be 7 – 4 = 3.

The data collected from respondents then being processed by using the 9th version of the Data Analysis Tools in excel form provided by UEQ. The data

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processing results then being interpreted to assess user experience of the application. After that, the testing results of the two applications will be compared by using the 4th version of Excel Compare Products which is also provided by UEQ, thus conclusions can be drawn from this research.

RESULT AND DISCUSSION

After questionnaires were distributed online, there were 124 respondents collected. However, from 124 respondents, there were 20 respondents whose answers were inconsistent when giving the assessment for 26 items of questionnaire questions, thus the data that being processed only came from 104 respondents.

Table 1 contains the results of the average value of all questions grouped according to UEQ scale on Joox application.

Table 1. Mean of UEQ Scale of Joox

Scale	Mean	Variance
Attractiveness	1.337	0.94
Perspicuity	1.433	1.05
Efficiency	1.317	1.14
Dependability	1.101	1.06
Stimulation	1.262	1.13
Novelty	0.913	1.07

The average value of impressions that is between -0.8 and 0.8 indicates a normal evaluation value (right arrow in yellow), an average value > 0.8 means a positive evaluation (up arrow in green).), and the value < -0.8 means negative evaluation (down arrow in red). Thus, it can be concluded that the Joox application creates positive impressions from all UEQ scales, namely attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty.

Table 2. Mean of UEQ Aspect of Joox

Aspect	Mean
Attractiveness	1.34
Pragmatic Quality	1.28
Hedonic Quality	1.09

The results are then classified based on three aspects, namely attractiveness which is a pure valence dimension, pragmatic quality which describes the quality of interaction between the tasks performed and goals to be achieved by user, and hedonic quality, describes aspects of user's pleasure when using the product. Table 2 shows UEQ evaluation's result on Joox application for the attractiveness aspect with a value of 1.34, for pragmatic quality with a value of 1.28, and a value of 1.09 for hedonic quality. Of these three qualities, the attractiveness aspect has the highest value (1.34) which is a good category, followed by pragmatic quality (1.28) and hedonic quality (1.09). In terms of attractiveness, Joox application is considered to be quite fun, good, comfortable, fun, attractive and user-friendly. As for pragmatic quality aspect, Joox application is considered clear enough and users feel the security and accuracy in controlling the application. Futhermore, for hedonic quality aspect, the results show that users can easily understand the application and the innovation of application is quite good.

In addition, UEQ has also provided a benchmark dataset as a benchmark to compare how well a product is, compared to other products. The dataset provided by Data Analysis Tools version 9 is derived from 21175 respondents from 468 studies related to various products (business software, web pages, web-based stores, social networks, etc.). The products will be categorized into excel-

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lent, good, above average, below average, and bad. Excellent means that the measured product is in the 10% of the best results in the benchmark. Good means that there are 10% better results in the benchmark than the product being measured and 75% worse results. Above average means that 25% of the results in the benchmark are better than the product being measured and 50% are worse off. Below Average means that 50% of the results in the benchmark are better and 25% worse than the product being measured. Lastly, bad means that the measured product is among the worst 25% of results.

Table 3. Benchmarking Result of Joox

Scale	Benchmark Comparison
Attractiveness	Above average
Perspicuity	Above average
Efficiency	Above average
Dependability	Below average
Stimulation	Above average
Novelty	Above average

In Table 3, it can be seen that for the entire scale, only the dependability scale is in below average category with the interpretation value of 50% of the results in benchmark dataset being better than evaluated product, and 25% worse results in benchmark dataset. While other scales such as attractiveness, perspicuity, efficiency, stimulation, and novelty are included in above average group. This represent that 25% of results in benchmark dataset are better than the evaluated product, and 50% of results in benchmark dataset are worse. Thus, it can be concluded that the user experience of the Joox music streaming application can still be categorized as above average.

Furthermore, Table 4 contains the measurement of average value of all questions grouped according to the UEQ scale on the Spotify application.

Table 4. Mean of UEQ Scale of Spotify

Scale	Mean	Variance
Attractiveness	1.357	1.04
Perspicuity	1.262	1.14
Efficiency	1.322	1.17
Dependability	1.214	1.12
Stimulation	1.327	1.11
Novelty	0.986	1.11

The average value on each UEQ scale of Spotify application shows results above 0.8 and there is an up arrow in green, which means Spotify application also gets a positive impression from all scales, namely attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty.

Table 5. Mean of UEQ Aspect of Spotify

Aspect	Mean
Attractiveness	1.36
Pragmatic Quality	1.27
Hedonic Quality	1.16

The measurement results of each scale are then calculated again based on its aspects. Of the three aspects, attractiveness has the highest value, which is around 1.36 which is good category. Then followed by hedonic and pragmatic qualities with values of 1.27 and 1.16 respectively. Just like Joox application, from aspect of attractiveness, Spotify application is considered quite pleasant, good, comfortable, uplifting, attractive, and user-friendly. In terms of pragmatic quality, the Spotify application is considered self-explanatory by users, and easy to understand and learn by users. Spotify application can also provide responses quickly and efficiently, and quickly complete the tasks given by its users. Then, from hedonic quality aspect, users can

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feel the security and accuracy in controlling Spotify, and innovation of application is quite good.

Table 6. Benchmarking Result of Spotify

Scale	Benchmark Comparison
Attractiveness	Above average
Perspicuity	Above average
Efficiency	Above average
Dependability	Above average
Stimulation	Above average
Novelty	Above average

Benchmarking results on all UEQ scales show that Spotify application is in above average category, which means that there are 25% of results in benchmark dataset that are better than product being measured, and 50% of results in benchmark dataset that are worse than product being measured. This means that overall user experience of Spotify application is still above the average value.

Next, the user experience measurement results for these two applications are entered in Compare Products version 4 in an excel form that provided by UEQ. These tools also able to show whether there is a statistical difference between comparisons of these two products. The results these two applications comparsion are shown in Figure 4.

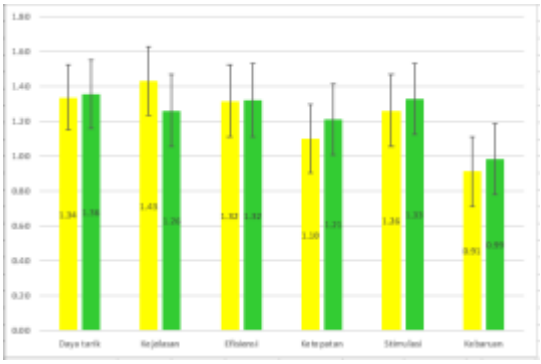

Figure 4. Comparison Result of Joox and Spotify

Figure 4 shows the UEQ Scale-comparison between Joox and Spotify applications, where the Joox application are marked in yellow, while Spotify application are marked in green. In the figure, it shows that Spotify application dominates by getting a higher average score than Joox on the attractiveness scale (1.36> 1.34), accuracy (1.21> 1.10), stimulation (1.33>1.26), and novelty (0.99>0.91). Both applications get same score on efficiency scale (1.32=1.32). Meanwhile, on clarity scale, Joox is superior to Spotify (1.43>1.26). From these results, it can be concluded that the Spotify application is superior and preferred by respondents for its user experience perspective compared to the Joox application.

Within the same tools T-test for both applications is also available. The T test was used to find out whether there was a statistical difference between comparisons of these two products. The results of the test can be seen in Figure 5.

Alpha level:	0.05	
Daya tarik	0.8799	No Significant Difference
Kejelasan	0.2412	No Significant Difference
Efisiensi	0.9743	No Significant Difference
Ketepatan	0.4360	No Significant Difference
Stimulasi	0.6591	No Significant Difference
Kebaruan	0.6189	No Significant Difference

Figure 5. T-test Result

Figure 5 shows the difference in average value between 2 music streaming applications tested on 6 scales with an alpha value of 0.05. The six scales shows that attractiveness scale (0.8799> 0.05), perspicuity scale (0.2412> 0.05), efficiency scale (0.9743> 0.05), dependability scale (0 .4360>0.05), stimulation scale (0.6591>0.05), and novelty scale (0.6189>0.05). Overall, the scores on all

six scales are greater than the alpha scores, which indicates that these two tested applications have no significant difference.

CONCLUSION

The user experience measurement activity for Joox and Spotify music streaming applications has been carried out by using UEQ method involving answers from 104 respondents. Both Joox and Spotify applications have a positive impression with a fairly good average score of 6 scales, namely attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty, each of which reaches an average value greater than 0. 8. Likewise, the value of pragmatic quality and hedonic quality are quite good, which means that in terms of user experience, these two applications are considered quite pleasant, efficient, easy to understand, and innovative. It can also be concluded that the average value of these two applications is not significantly different. Although the average value of Spotify music streaming application is slightly superior to Joox application, in general, in terms of user experience, both applications have positive impressions for users.

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