Virtual skin: Assessing Player Experience of Attractiveness with the User Experience Questionnaire (UEQ)

Noraziah Mohd Razali*
Faculty of Art and Design, Universiti Teknologi MARA, Cawangan Sarawak
Email: noraziahmohdrazali@uitm.edu.my

Azahar Harun*
Faculty of Art and Design, Universiti Teknologi MARA, Cawangan Melaka
Corresponding author
Email: azahar581@uitm.edu.my

Ruslan Abdul Rahim*
Faculty of Art and Design, Universiti Teknologi MARA, Shah Alam
Email: ruslan@uitm.edu.my

*These authors contributed equally to this study

ABSTRACT

There are numerous subfields within visual communication, one of which is new media, alongside conventional practices such as advertising, photography, the web, animation, and signage. Blogs, social media, video games, email and the pervasiveness of smartphones have all resulted in the emergence of new media that are inextricably linked to the internet and the online environment. since the first mobile game, "Tetris", in 1994 and "Snakes" in 1997, the visual element in mobile games has evolved significantly, culminating in the modern-day mobile gaming world. These changes have involved progress from the black and white images of the early games to the variety of colours used in game visuals today and the creation of virtual goods in-app games. A skin is one of these virtual goods or items and is synonymous with a virtual appearance, outfit or cosmetic item that can be used to modify and enhance the appearance of a player's avatar. This is a cosmetic item and purely aesthetic in nature, serving no functional purpose. Among players, the desire for a skin is undeniable. Apart from the "beauty factor," another hidden value is inherent in players' perceptions of their interactions with purely aesthetic items. To determine the attractiveness of the skin in mobile games, preliminary research on skin evaluation was conducted to ascertain players' perceptions of recent virtual skins they had used in-game. The purpose of the study was to identify players' perceptions of the attractiveness of the skin they used. To conduct the research, the Standard User Experience Questionnaire (UEQ) was used to determine the attractiveness of the skin as a virtual product. The UEQ is composed of six scales and twenty-six items that assess attractiveness on a hedonic and pragmatic level. Thirty respondents were chosen, and data analysis was performed using UEQ Data Analysis Tools. The product's benchmark was divided into five UX quality categories: excellent, good, above average, below average, and bad. The results indicate that stimulation is an excellent proxy for the UX quality of skin and efficiency is above average; meanwhile, attractiveness, perspicuity, dependability, and novelty were below average.

Keywords: *Virtual Skin, Assessment, Player Experience, Attractiveness, UEQ.*

INTRODUCTION

A skin is a virtual in-game item with a monetary value in the real world, so it can be purchased with real money. It can be gained in-game by completing missions or by being given as a seasonal gift to players. It can also be purchased directly or through loot boxes or from different marketplaces, or by trading with other players (Macey, J.& Hamari, 2019; Grove, 2016; Martinelli, 2017) This skin is completely aesthetic and has no direct influence on gameplay, existing mostly as a decorative item (Macey, J.& Hamari, 2019; Martinelli, 2017).

Martinelli (2017) and Grove (2016) added that skins are virtual items created by video game companies that allow players to customise the appearance of their in-game avatars, weapons, and other equipment in a game world. A gun or knife with a brightly coloured design or camouflage finish would be similar to having a brightly coloured gun or knife in the real world. Although skins are purely aesthetically pleasing and have no direct impact on gameplay, they have arguably become a status symbol and are extremely valuable to the gaming community(Martinelli, 2017).The above-mentioned researchers were all referring to the skins in the game Counterstrike: Global Offensive (CS:GO), which can be played on a Steam account and cross-platforms such as Windows, Linux, Playstation3 and Xbox360.CS:GO is not the only game with skins; mobile games such as PlayerUnknown's Battleground and Mobile Legend include the skin concept. A meta-analysis study by Hamari and Keronen (2016) regarding player behaviour towards buying virtual goods or items found that this behaviour is based on experiences related to the use of the core service, the attractiveness of the item and the desire for self-representation in the game world. According to the meta- analysis study, an item's attractiveness is one factor that might explain why players buy virtual goods. Thus, the goal was to determine what attractiveness was, from the player's perception, and how it was affected by pragmatic and hedonic qualities upon viewing virtual skins. It is beneficial to identify the quality of attractiveness in specific virtual goods such as skins. Therefore, a study was conducted to find an assessment tool for this virtual product and to determine how the tool could be efficiently used to assess a player's experience.

In games, many tools and approaches can be used in assessing or evaluating player experience. Player experience is complex and varied; while some currently available scales focus on the aspect of an individual player's experience, others assess different aspects in combination. Some scales that can be used to evaluate games include the Game User Experience Satisfaction Scale (GUESS), the System Usability Scale (SUS), the immersive experience questionnaire (IEQ), the game engagement questionnaire (GEQ) and the player experience of need satisfaction (PENS).These, and other assessment tools, are utilised to measure different qualities and player experiences (Shelstad et al., 2019).Due to the variety of scales, these tools sometimes overlap but they are intended to measure different player experiences(Shelstad et al., 2019;Denisova et al., 2016).

According to Nordin et al. (2014), researchers face difficulties when determining the most appropriate questionnaire. It was recognised that among these are the ability to persuade participants to take the questionnaires seriously and the scale to which they respond. Additionally, it is critical to consider the wording of questions to ensure that the questionnaires retain their face validity. No specific study uses the Standard User Experience Questionnaire (UEQ) in measuring player experience in games because this approach was not developed for game evaluation. However, because the EQ can measure attractiveness in terms of hedonic and pragmatic quality, the researchers believe that it can be used in assessing skins in terms of players' experience because it was developed as a comprehensive user experience attribute (Shelstad et al., 2019; Laugwitz et al., 2008).

This analysis was restricted to players' experiences of skins they had recently used in-game. The challenging aspect of this study was that every respondent evaluated different skins base on their own skin preferences, regardless of the game they played. The objective is to identify how the UEQ can be used to measure player experience towards in-game visuals, specifically skins. Analysis will be performed on the five UX quality categories that are product benchmarks in the UEQ: excellent, good, above average, below average, and bad.

LITERATURE REVIEW

Skins: an in-depth description

The history of costume design in film dates to 1915, when Clare West, one of the industry's first studio designers, established the first costume office. By the 1920s, costume design had become established as a critical component of film production, with an expanding department and sizable budgets. However, in games, one of the earliest video game human characters with clearly designed clothing was Jumpman, later known as Super Mario. He appeared in the game Donkey Kong, developed by Shigeru Miyamoto in 1981(Salomaa, 2018). It is perhaps not widely known that Jump man became the far more famous Super Mario and, intime, Super Mario has evolved since first being displayed using pixel graphics and a limited colour palette. Recent advancements in technology have enabled realistic depictions of game clothing, generating a need for knowledge of material- and cloth-behaviour, as well as the ability to create visual support for characters' personalities.

Costume design is a type of visual storytelling in which the character's past, age, social standing, and personality can all be identified with a single glance. A study by Salomaa (2018) explained the history and timeline of costume design from film to game, and how both professional character designers and costume designers must cooperate. Furthermore, character artists need some knowledge of costume design when focusing on producing realistic games. With the demand of modern gaming players for character customisation, this study was intended to meet the needs of creating and crafting creative outfits to support the contemporary requirements of players.

A skin is considered a virtual appearance for players in-game. Most modern mobile games are widely recognised as incorporating skins, such as Mobile Legends, Call of Duty, Fortnite, PUBG and Garena Free Fire. A recent study on skins used in Fortnite examined self-presentation and how it related to purchasing behaviour. In Avatar-based games, self-presentation is significant for player experience since players naturally pay more attention to their own "self" (Li et al., 2020). Li et al. (2020) also mentioned that self- presentation, in theory, encompasses both how one's identity is portrayed based on one's awareness of oneself and how one expects others to see him or her. This may require an appropriation and personalisation of the "self," resulting in more self-serving purchases. In practice, avatar design is a key priority in game development and the industry since associating with an avatar boosts a player's intrinsic drive and the players benefit from an increased attachment to avatars and engagement (Li et al., 2020). Though skins in Fortnite do not inherently offer a player an advantage in gameplay, they might give players a more attractive aesthetic experience (Li et al., 2020). Colour, uniqueness, and fashion sense comprise part of the criteria that players use when purchasing a skin. Furthermore, a skin may be an indicator of an experienced player because its use shows that the player has already played the game fora long time. Clearly, skin can display one's experience in gameplay though it has no direct function at all; however, the experience might differ between games, as skins themselves vary depending on the game developers.
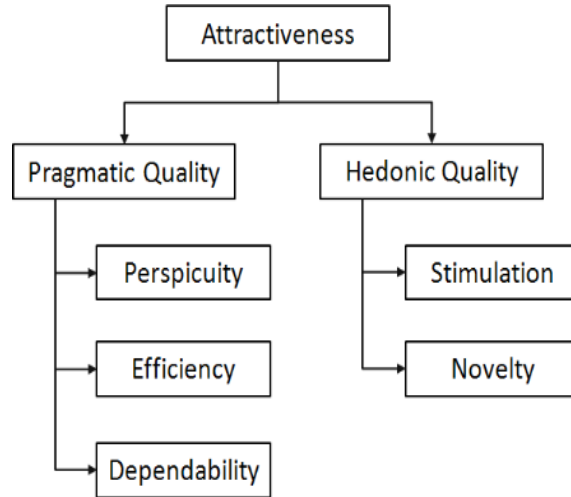
The UEQ as a Tool

The User Experience Questionnaire (UEQ) is a tool for assessing the subjective experiences that users have with interactive products. Data analysis is based on an instrument developed by the UEQ creators, the UEQData Analysis Tool, while the questionnaire is assumed to be applicable to various products (Kadastik et al., 2018). A study by Kadastik et al. (2018) showed that the UEQ should be applicable in assessing different products. A skin is a digital or intangible product, but it can also be considered an interactive product, as the visual itself communicates with players in a unique way. Many assessment tools are available to investigate users' in-game experiences; however, to measure the level of attractiveness of a skin, the UEQ was found to be the most suitable tool for use in this study. A study of user experience assessment tools undertaken by Shelstad et al. (2019) found that the UEQ-S (the short version of the UEQ)consisted of hedonic and pragmatic qualities with which to measure

attractiveness, suggesting that it could be used for assessing game experience. However, this study only examined a specific in-game product, the skin. The UEQ-S was proven to contain the concept of in-game fun and enjoyment. Though this study used the UEQ with 26 scales, the subscales maintained the same hedonic and pragmatic qualities. Thus, it is beneficial to identify which quality was affected when assessing in-game visuals for user experience.

The six scales UEQ contain 26 items as follows (Schrepp et al., 2017):

- *Attractiveness: General impression of the product. Is it liked or disliked by users? Do they perceive it as attractive, enjoyable or pleasing? 6 items: annoying / enjoyable, good / bad, unlikable / pleasing, unpleasant / pleasant, attractive / unattractive, friendly / unfriendly.*

- *Perspicuity: How easy is it to get to know the product? Can it be easily learnt and understood? Is it clear? 4 items: not understandable / understandable, easy to learn / difficult to learn, complicated / easy, clear / confusing.*

- *Efficiency: Do users have to make an effort to solve their tasks? How efficient and fast is the interaction? How immediate is the product's response to user input? 4 items: fast / slow, inefficient / efficient, impractical / practical, organized / cluttered.*

- *Dependability: Does the interaction allow the user to feel in control? Can the system's behaviour be predicted? Does working with the product make the user feel safe? 4 items: unpredictable / predictable, obstructive / supportive, secure / not secure, meets expectations / does not meet expectations.*

- *Stimulation: How exciting and motivating is it to use the product? Does the user have fun? 4 items: valuable / inferior, boring / exciting, not interesting / interesting, motivating / demotivating.*

- *Novelty: Is the product innovative and creative? Is the users' attention captured? 4 items: creative / dull, inventive / conventional, usual / leading- edge, conservative / innovative.*

According to Schrepp et al., 2017a, *Attractiveness* is the main variable and measuring emotional responses to the scale's pure acceptance or rejection. *Perspicuity, Efficiency, and Dependability* are goal- directed and represent pragmatic quality, *Stimulation* and *Novelty* are hedonic qualities and not goal-directed (Kadastik et al., 2018). The assumed scale for determining attractiveness is depicted in (Figure 1) below. It is based on the impressions of these five scales, perceived *Perspicuity, Efficiency, Dependability, Stimulation,* and *Novelty,* that contributed to the evaluation of attractiveness in user experience. The 26 items on the UEQ are graded on a -3 to +3 scale, with +3 indicating complete agreement with the negative term, which is -3. Following the random order, half of the items begin with a positive term and the other half with a negative term.

Figure 1: Assumed scale structure of the UEQ (Schrepp et al., 2017)

Figure 2: The English version of the UEQ Figure (Schrepp et al.,2017)

Applying the UEQ is simple, typically, it takes three to five minutes for a participant to read the instructions and complete the questionnaire. The UEQ can be completed on paper as part of a traditional usability test which, Schrepp et al. (2017b) mentioned, remains the most common application. However, in this study, the form attributes were set up using Google Forms online. The 26 items of the UEQ are listed in the above image (Figure 2). Each UEQ item comprises two terms with opposing meanings.

RESEARCH METHODOLOGY

The preliminary survey was conducted randomly among respondents who regularly engage in gaming activities. The questionnaires were distributed online via a Google Forms sheet to respondents (N=30). In the remote research area, an optimal number is enough to start a research based on population size (Hinton, P.R., et al., 2014). According to Sekaran, 2003, for most studies, sample sizes of greater than 30 but less than 500 are applicable for most research. Prior to completing the online questionnaire, respondents were briefed on the purpose of the survey and prompted to provide feedback on it. The questionnaire did not include a picture; instead, the evaluation was based on the players' experiences of selecting a virtual skin outfit. The UEQ was used to assess players' subjective perceptions of their recent use of a virtual skin. This questionnaire was intended to allow the user to express their immediate feelings and impressions about the product (Kadastik et al., 2018).

Respondents

The respondents were purposefully chosen from among individuals who play games and are familiar with the concept of a skin, regardless of the type of game they play. As mentioned previously, skin can be functional or purely aesthetic. This is the fundamental concept of skin that all respondents who responded to the questionnaire should understand. Those gamers who are unfamiliar with the concept of skin or who are unaware of its existence are ineligible to respond to the questionnaire. As a result, this study purposefully chose gamers who were aware of the skin. The goal of this research was to examine how the UEQ might be used to evaluate the attractiveness of a skin. As a result, this questionnaire could be utilised in the future to measure visual gaming experiences.

Thirty respondents were chosen using social media snowballing strategies and Google Forms was used to complete the questionnaire. According to Waters 2015, the researcher's ability to assemble a diverse snowball sample is almost entirely dependent on previous personal or professional contacts. Thus, this procedure starts with the personal contact of the researcher who is actively playing games and familiar with the skin in-game. The Exponential Non-Discriminative Snowball Sampling technique was used, in which the initial respondent was purposefully chosen to be someone who regularly plays games and is familiar with skin, and subsequent respondents were referred via the initial referral. However, not every gamer is familiar with the term "skin." The initial respondents provided contact information for other gamers they knew who were aware of skin, and the process was repeated until the sample size was reached. These strategies are effective because they targeted gamers who are already familiar with skins in-game.

First, Google Forms provided instructions on how players should assess their skin. Second, respondents were asked to rate the skin based on their recent in-game experience with it. This evaluation should be quick and not require extensive thought, as the initial thought is the purest response. As a result of their experience and skin selection, thirty respondents might have analysed various skin varieties. The current study, on the other hand, focuses solely on deploying the UEQ to analyse the overall perceptions of skin design among in-game skin users. Finally, respondents were asked whether they completely understood the items on the UEQ or whether they did not understand them at all.

Data Collection

This study utilised the English-language version of the UEQ, which was downloaded from https://www.ueq-online.org/. The data was analysed using the UEQ Data Analysis Tool Version 5. This collection of questionnaires and tools is available as a free download from the UEQ website and is available in 30 languages. Data was collected from respondents via Google Forms and then entered on a data worksheet. The UEQ tools automatically transformed the data and calculated the statistics required to create the UEQ diagram (Kadastik et al., 2018).

FINDING

All participants completed the UEQ in this study and no data errors were discovered. However, given that the English version was used, the responses might be misleading in terms of respondents' comprehension of the scales. The data in the Google Form was measured on a seven-point scale, so the closest number increased the value of the scale selection. For example, if the scale had been set to annoying to enjoyable, a higher point seven would indicate that the skin is more enjoyable than annoying. This data was then transferred to the UEQ Data Analysis Tools system, where the scale was transformed so that -3 indicated a negative response, 0 indicated a neutral response and +3 indicated the most positive response (Schrepp, 2019). No errors were found in the transferred data, indicating that all the respondents took the questions seriously.

Cronbach's Alpha coefficient

The Cronbach's Alpha values for attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty were0.52, 0.66, 0.65, 0.60, 0.75, and 0.17, respectively. Only one category, novelty, had a lower consistency value than the other five. This was linked to the decreasing value of the property in terms of skin users' experiences, as well as the possibility of item interpretation issues on the scale (Santoso et al., 2016; Kadastik et al., 2018). However, Santoso et al. (2016) and Kadastik et al. (2018) mentioned the lower value on the dependability scale and that the products evaluated where learning platforms and learning tools. On the other hand, this study is the first assessment to use the UEQ in evaluating interactive skin for games, which is a significant difference from the scopes of both these studies. Although, as both studies agreed, the scale value decreased, either this was unimportant in evaluating user experience for skins or may relate to the respondents' ability to comprehend the scales item. This could be a topic for future research.

The Benchmark

To create a benchmark for the UEQ, data from all available UEQ evaluations was compiled. This data was provided by researchers who shared their UEQ evaluations from previous years. This was only possible because of the large number of contributors who generously shared their UEQ evaluation studies. Most of the data was gathered through industry projects that incorporated the UEQ. These products span many different applications. The benchmark contains 100 complex business applications, development tools, web shops, social networks, mobile applications, household appliances and several other products. The benchmark contains 9,905 responses, with samples sizes ranging from extremely small to huge (1,390 respondents). On average, there were 40 respondents per study (Schrepp et al., 2017b).

Due to the restricted amount of evaluation findings in the benchmark dataset, it was decided to limit the feedback per scale to five categories:

- *Excellent: The evaluated product is among the best 10% of results.*

- *Good: 10% of the results in the benchmark are better than the evaluated product; 75% of the results*

are worse.

•   *Above average: 25% of the results in the benchmark are better than the evaluated product; 50% of the results are worse.*

•   *Below average: 50% of the results in the benchmark are better than the evaluated product; 25% of the results are worse.*

•   *Bad: The evaluated product is among the worst 25% of results.*

(Schrepp et al., 2017b; Kadastik et al., 2018)

Figure 3 (below) explains the evaluation results for the virtual skins. The scale shows values above 0 to represent a positive evaluation of the aspect measure and below 0 to represent a negative evaluation. All six aspects in the UEQ received positive evaluations. The highest-ranked aspect was stimulation, followed by efficiency, attractiveness, perspicuity, dependability, and novelty. To evaluate the result as good or bad is almost impossible because virtual skins were evaluated for the first time by using the UEQ. However, these findings indicate that it is important to identify and compare the use of other skins in different games. This would enable more meaningful comparisons and establish other scores for different skins. This result, however, shows that the aspects measured received positive feedback from the respondents. (See Table 1 below for the UEQ scales and variance for the aspect measure.) The low evaluation result for dependability and novelty was based on the item subscale of the aspect measure. The lower evaluation affected subscale items for dependability (*unpredictable to predictable*, and *secure to not secure*) while for novelty the affected subscale items were *inventive to conventional* and *usual to leading edge.*
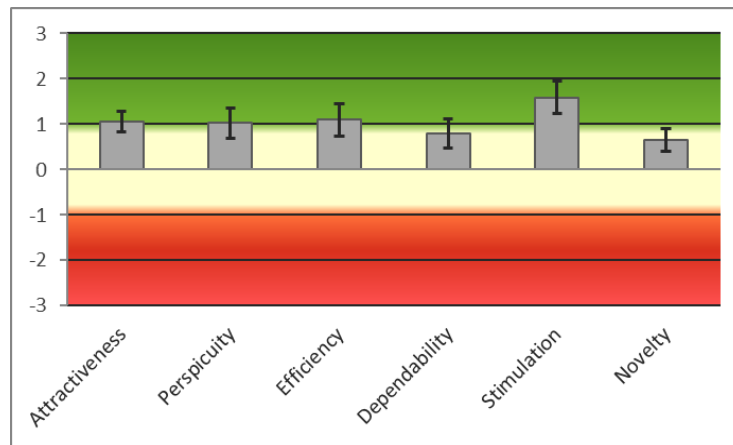
Figure 3: Evaluation of results showing scales, values and error bars of virtual

Table 1. UEQ Scales (means and variance)

| Scales	Means	Variance
Attractiveness	**1.06**	**0.43**
Perspicuity	**1.03**	**0.86**
Efficiency	**1.10**	**0.99**
Dependability	**0.79**	**0.78**
Stimulation	**1.59**	**0.94**
Novelty	**0.65**	**0.52**

In Table 2, the UEQ scales are classified according to their pragmatic and hedonic qualities. This table demonstrates that respondents reacted more strongly to hedonic than to pragmatic qualities. Pragmaticqualities comprise Perspicuity, Efficiency and Dependability, while hedonic qualities are composed of Stimulation and Novelty. Novelty or originality displayed the lowest item scale value in this study, suggesting that the term "novelty" may have been interpreted incorrectly by respondents. The findings indicate that in terms of evaluating skins, respondents are more concerned with the hedonic aspect than withthe pragmatic.

Table 2. UEQ Scales (Pragmatic and Hedonic Quality)

Scales	Means
Attractiveness	1.06
Pragmatic Quality	0.97
Hedonic Quality	1.12

Figure 3 (below) illustrates the benchmark of virtual skins. The development of the benchmark for the User Experience Questionnaire (UEQ) facilitates the interpretation of user experience (UX) evaluations of products (Schrepp et al., 2017b). Thus, this evaluation would interpret the players' experiences of virtual skins.
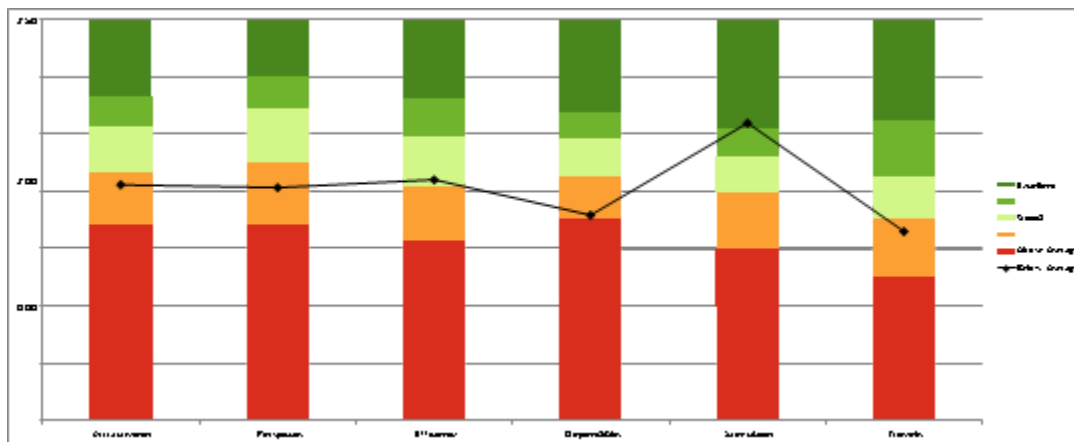
Figure 3: Visualisation of the benchmark of virtual skins

From the UEQ Excel data analysis sheet, the benchmark can be visualised, and the results of the evaluated product are represented by the line. The coloured bars indicate the ranges of the mean values of the scales. The primary goal of the UEQ questionnaire is to provide quick and direct results for user experiences (UX). Since the majority of the data in the benchmark came from business applications or websites, according to Schrepp et al. (2017b), applying it to specialised applications or products such as games, social networks or home appliances might be challenging. The benchmark, on the other hand, is useful when a product is evaluated using the UEQ for the first time, that is, when no previous evaluation results have been obtained (Schrepp et al., 2017b).

The benchmark interpretation of the evaluated skins is shown in Table 3. The benchmark may appear to have a negative value because the four scales are below average. This might be explained by established products being incompatible with games products. For these types of products, the quality expectations may simply differ greatly from those expressed in the benchmark. Furthermore, since the benchmark incorporates data from measurements of existing items but does not include games products, this might explain the lower benchmark quality of the evaluated product in this study.

The mean value for the UEQ benchmark dataset shows that the stimulation set an excellent benchmark for the evaluated product, the skins, though it mentioned that repeating this for products such as games would be challenging, based on the dataset in the benchmark. However, this study might be useful as the UEQ developers recognised the future necessity of developing distinct benchmarks for distinct product categories (Schrepp et al., 2017b).

Table 3. Scale and means comparison to benchmark

Scales	Means	Comparison	Interpretation benchmark
Attractiveness	1.06	Below average	50% of the results in the benchmark are better than the evaluated product; 25% of the results are worse.
Perspicuity	1.03	Below average	50% of the results in the benchmark are better than the evaluated product; 25% of the results are worse.
Efficiency	1.10	Above average	25% of the results in the benchmark are better than the evaluated product; 50% of the results are worse.
Dependability	0.79	Below average	50% of the results in the benchmark are better than the evaluated product; 25% of the results are worse.
Stimulation	1.59	Excellent	The evaluated product is among the best 10% of results.
Novelty	0.65	Below average	50% of the results in the benchmark are better than the evaluated product; 25% of the results are worse.

CONCLUSION

The goal of this research was to examine how the UEQ may be used to assess the use of skins by gamers. The outcome was positive, with the attractiveness of the skin being more essential in terms of hedonic than pragmatic quality. Stimulation was identified as the most important factor in the hedonic quality scale, while efficiency was the most important factor in terms of pragmatic quality. The results of the study show that the UEQ may be used to assess a player's experience of using skins in-game.

Apart from the benchmark, this research might be used as a future case study, given that the benchmark does not include data on products such as games. Only business applications or websites are used in the current benchmark. As a result, the quality expectation for skin examination may differ significantly from this benchmark.

The researchers aim to discover more about in-game user experiences of skins, utilising the UEQ with different categories of games in future research. This might provide completely new meanings of the various product categories in the UEQ data collection benchmark.

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