Revealing the Charm of UI and UX: Malaysian Engagement in Mobile Games

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Abstract
This research identifies User Interface (UI) and User Experience (UX) as key factors influencing Malaysian participation in mobile video games. It aims to determine which aspects of UX motivate Malaysians to play and how various UI features affect their engagement. A quantitative approach is used to collect primary data. The findings reveal that clear navigation, character design, colour theme, and background music are significant UI elements that encourage player participation. For UX, loading time, responsive layout, and streamlined interface are crucial. The study highlights the equal importance of UI and UX in enhancing engagement among Malaysian gamers, providing valuable insights for game developers and designers to improve the gaming experience.
Keywords: Mobile Game, UI, UX, Influencing Factors, Malaysian Gamer

Introduction
Throughout history, games have always presented and engaged players in an intentionally separate and immersive experience outside the realm of real life (Huizinga, 2014). With a staggering 3 billion video game users worldwide in 2022 and anticipated continued growth in the coming years, the global gaming industry is experiencing rapid expansion (Statista, 2022). Mobile phones, particularly smartphones, have become an indispensable part of modern life, due to their diverse functionalities such as gaming, communication, news consumption, and multimedia. Consequently, mobile video games have become increasingly integrated into individuals' daily routines, providing a convenient and accessible means of seeking leisure and alleviating stress (Ji et al., 2018). In this context, the development of an appealing and user-friendly User Interface (UI) that enhances the User Experience (UX) becomes crucial for attracting and engaging a wider user base (Indeed, 2020). Therefore, this study aims to examine the factors that contribute to the attractiveness of mobile video games in terms of UX and UI from the players' perspective, providing valuable insights for game developers and designers to enhance user satisfaction and foster increased involvement in this ever-expanding market.

Ergonomics

Ergonomics, as defined by the International Ergonomics Association (IEA), studies human interactions within systems, playing a crucial role in UX and UI design. It integrates assumptions, values, and methods to ensure human well-being and efficient system operations. Ergonomics focuses on aspects such as safety (e.g., user-friendly elements like readable fonts), comfort (e.g., streamlined interfaces), ease of use (e.g., consistent UI components), performance (e.g., task efficiency), and aesthetics (e.g., visually appealing designs) to enhance user experience and system functionality.

The significance of UX lies in enhancing user satisfaction by improving usability, accessibility, and engagement. The success of an interface depends on how users interact with, understand, and enjoy it, highlighting the importance of UX design in driving higher application adoption.

User Interface (UI)

User Interface (UI) acts as a bridge between people and technology, simplifying interactions with devices like computers and mobile phones (Marcus, 2002). It includes both physical and verbal elements, facilitating user input and information exchange.

Creating an immersive UI requires considering users' emotions during interactions with computers and virtual environments (Bowman et al., 2017). Emotional states can be linked to gameplay through physiological responses, voice analysis, and text interpretation.

Designers utilize visual elements—such as signs, images, and symbols—to convey ideas, while music and voice enhance immersion (Jung et al., 2019). Attractive game characters influence user engagement, as perceived beauty affects social acceptability (Downs & Smith, 2010). Effective mobile UI design incorporates components like navigation, layout, and colour, improving interaction and enhancing engagement in mobile gaming (Sarsam & Al-Samarraie, 2018).

User Experience (UX)

User experience (UX) refers to the emotional responses users have when interacting with products. According to iso 9421-210, it encompasses how a product is designed for use and how users engage with it, including their perceptions, emotions, and psychological aspects throughout the interaction.

Ux goes beyond usability to include various disciplines, such as user interface design and information architecture. It emphasizes both functionality and the emotional impact of user interactions. With advancements in computer technology, the focus in human-computer interaction (HCI) has shifted toward a broader understanding of UX. Effective UX design aims to create satisfying experiences that encourage user engagement. It ensures the product is useful and meets market needs, allows users to achieve their goals efficiently, and makes it easy to find information, especially in digital environments with extensive content.

Usability, Fun and Emotional Appeal

Incorporating elements of fun into technology, like mobile games, leads users to perceive it as easy to use (Labrecque, 2020). Effective technology should minimize cognitive demands to

facilitate quick task completion. For online shoppers, Augmented Reality (AR) offers 3D imagery that enhances decision-making and product assessment (Petit et al., 2019). Users find AR entertaining and appreciate its functionality on mobile devices (Delage, 2018). Although AR may cause some visual projection delays, its integration into mobile apps reduces the overall purchasing time and aligns with users' needs.

Advancements in communication technology have made gaming experiences more enjoyable and accessible across devices such as mobile phones, tablets, and laptops (Uuskoski, 2011). Vividness theory (Steuer, 1992) posits that rich and vibrant information enhances comprehension. Immersive technologies like virtual reality provide a sensory-rich communication medium, while multimedia interfaces can evoke emotional responses and boost engagement in social activities (Kandaurova & Lee, 2019). The richness of media content accessed through smartphone apps varies by functionality; for example, video calls offer a more immersive experience than audio alone. Thus, UI/UX design significantly impacts users' psychological, emotional, and visual experiences.

Mobile Games
Mobile games encompass a broad spectrum of electronic games playable on various platforms, including personal computers, mobile devices, and consoles like the Xbox or Nintendo 3DS. Developing these games presents challenges due to the diverse features of different phone models and mobile carrier services. Games may come pre-installed or be downloaded using mobile data, whereas portable video games are typically sold through retail. Developers of handheld games often maintain closer relationships with console manufacturers than those creating mobile games.

Exergames are gaining popularity for their positive effects on physical health, requiring users to engage physically to control on-screen characters. Played on consoles with motion sensors like the Nintendo Switch, Wii, or Xbox Kinect, exergames improve balance, cardiovascular fitness, flexibility, and muscle strength.

The dynamic nature of mobile exergames can lead to high adherence rates, with patients diagnosed with multiple sclerosis more likely to stick with exergame interventions than traditional exercise programs (Kramer et al., 2014). The engaging and evolving elements of exergames offer an enjoyable alternative to standard exercise routines. However, further research is needed to assess long-term adherence and whether exergames are more sustainable than regular exercise. Additionally, exergames have shown potential in alleviating psychological symptoms like depression.

Hypothesis
H1: UI has positive significant effect on the people engagement of mobile video game.
H2: UX has positive significant effect on the people engagement of mobile video game.

The hypotheses had come up with the realization of the importance of UI and UX in engaging people of mobile video game. Studying the role of User Interface (UI) and User Experience (UX) in shaping Malaysian gamers' engagement provides valuable insights into the factors that captivate users, enhance satisfaction, and sustain interest in mobile games.

This research is necessary to understand how design elements like navigation, aesthetics, responsiveness, and loading times impact user engagement. As gaming increasingly transcends recreation to influence social and psychological aspects, understanding UI/UX dynamics becomes critical for game developers aiming to create immersive and inclusive experiences. Additionally, this study addresses a growing demand for culturally relevant designs that cater to diverse user groups, fostering innovation and competitiveness in the gaming industry.

Research Methodology

This study uses a quantitative approach to explore the factors influencing engagement in mobile video games, employing statistical analysis to assess user experience (Apuke, 2017). Data were collected through questionnaires distributed via Google Forms, an efficient method for gathering responses.

Participants identified the mobile device they last used for gaming and answered questions about their UI and UX experiences using a Likert-type scale from 1 ("strongly disagree") to 5 ("strongly agree"). The survey included items from Hsu and Lu (2004) to measure perceived utility, ease of use, and perceived control. Additionally, four items from Wu and Liu (2007) assessed perceived pleasure, while five elements from Yalcin and Demir (2009) and Park (2009) evaluated control over the game or product.

Target Population

The target population of this research is the public Malaysian. This study targets all Malaysians regardless of race, religion, or educational background. Questionnaires will be delivered on social media and ICT, such as WhatsApp and Telegram.

Sample Size & Sampling Method

According to Cohen et al. (2002), causal-comparative and experimental studies require a sample size of more than 50, so this study adopted a sample size of 60. Experimental studies focus on causation and are similar to "cause and effect" models used in explanatory research. Probability sampling was employed in this study, and a stratified sampling approach was used to minimize bias and ensure fairness among all survey respondents in this quantitative research.

Ethical Issues and Accessibility

Data was collected using a Google Form, distributed via ICTs such as Facebook Messenger and WhatsApp. Since responses may come from individuals outside the target demographic, participants were asked to provide their employer's email address for verification purposes. This information was solely used by the researcher to validate the responses and will not be disclosed in the research or shared with third parties.

Data Analysis Plan

The Google Form used for data collection in this study employed a 5-point Likert scale. Participants answered 18 questions, with 5 questions dedicated to each variable: user interface and user experience. The collected data will be analyzed using IBM SPSS Amos (Analysis of Moment Structures), a statistical software. Amos will be used for path analysis,

confirmatory factor analysis (CFA), and structural equation modeling (SEM), which are types of covariance structure models.

Table 1
Questionnaire Questions

Variable	Questions statement	Citation
UI	I prefer a video game that uses the right colour theme.	Yalcin and Demir (2009)
UI	I prefer a video game that has a clear and understandable navigation on the control or buttons.	Yalcin and Demir (2009)
UI	I prefer a video game that has well designed characters.	Hsu and Lu (2004)
UI	I prefer a video game that has suitable and enjoyable background music (BGM).	Wu and Liu (2007)
UI	I prefer a video game that has less controls.	Hsu and Lu (2004)
UI	I prefer a video game that easy to play.	Hsu and Lu (2004)
UI	I prefer a video game that enables me to satisfy the purpose of playing game easier.	Hsu and Lu (2004)
UX	I prefer a video game that has shorten loading time.	Yalcin and Demir (2009)
UX	I prefer a video game with a streamlined and comfortable interface.	Yalcin and Demir (2009)
UX	I prefer a video game that is responsive and able to fit different ratio of devices.	Park (2009)
UX	I prefer a video game that has voice interaction.	Wu and Liu (2007)
UX	I prefer a video game that easy for me to become skillful at playing.	Ahn, Ryu, and Han (2007)
UX	I prefer a video game that enables me to accomplish the purpose of playing game more quickly.	Ahn, Ryu, and Han (2007),
UX	I prefer a video game that enables me to fulfil the purpose of playing game effectively.	Ahn, Ryu, and Han (2007),
UX	I prefer a video game that better gaming flow.	Wu and Liu (2007)
UX	I prefer a video game that gives me a lot of pleasure.	Wu and Liu (2007)

Results & Discussions

This empirical study examines the impact of UX and UI on consumer engagement with mobile video games in Malaysia. The sample included 60 volunteers, with 55% male, 41.7% female,

and the rest opting for anonymity. The largest age group was 26-35 years old (66.7%), followed by 46 and above (6.7%), and 36-45 years old (15%).

Most respondents (88.3%) used mobile devices or tablets to play video games, while 48.3% also used computers or laptops. The majority (65%) spent 20 or fewer hours per week gaming, and 11.7% spent 21-34 hours gaming weekly. These findings form the basis for accepting or rejecting the study's hypothesis.

Measurement Model for User Interface
Table 2
Measurement Model for User Interface

	N	Min	Max	Mean	Std. Deviation
H1a	60	1	5	4.08	0.926
H1b	60	1	5	4.40	0.867
H1c	60	1	5	4.30	0.962
H1d	60	1	5	4.08	1.078
H1e	60	1	5	3.67	1.130
H1f	60	1	5	3.75	1.230
H1g	60	1	5	4.00	1.074

The questionnaire results for the measurement model are detailed in Table 2, indicating that User Interface questions had a standard deviation ranging from 0.867 to 1.230. For hypothesis H1a ("I prefer a video game that has clear and understandable navigation on the control or buttons"), the mean value was 4.40, while H1b ("I prefer a video game that has well-designed characters") had a mean of 3.40. H1a reflects a positive perception among Malaysian respondents regarding clear navigation, suggesting that games like Candy Crush, which feature vibrant themes, can enhance engagement.

H1c ("I prefer a video game that uses the right colour theme") and H1d ("I prefer a video game that has suitable and enjoyable background music (BGM)") both received a mean value of 4.08. H1c indicates that well-designed characters positively impact Malaysian gamers' engagement, while H1d suggests that suitable BGM significantly improves gaming engagement.

Respondents showed less agreement with H1e ("I prefer a video game that has fewer controls"), scoring a mean of 3.67, followed by H1f ("I prefer a video game that is easy to play") with a mean of 3.75. H1e indicates a slight preference among Malaysian gamers for simpler games like Candy Crush and Pokémon Go. H1f demonstrates a positive perception of easy-to-play games, indicating a mild preference for idle games like Ragnarök Idle and Arcade Idle.

Lastly, H1g ("I prefer a video game that enables me to satisfy the purpose of playing games easier") reported a mean value of 4.00, reflecting a positive perception of games that fulfill

players' objectives, such as those on the Shopee platform, which reward users with points or vouchers for achievements in the game.

Measurement Model for User Experience
The questionnaire included an instruction page that opened a second window displaying the components to be evaluated. Respondents were asked to name the mobile device they most recently used for playing a video game and then answer questions based on their personal experiences with the UI and UX components. They responded using a Likert-type scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree").

According to Cohen et al. (2002), causal-comparative and experimental studies require a sample size of more than 50, so this study adopted a sample size of 60. Experimental studies focus on causation and are similar to "cause and effect" models used in explanatory research. Probability sampling was employed in this study, and a stratified sampling approach was used to minimize bias and ensure fairness among all survey respondents in this quantitative research.

Table 3
Measurement Model for User Experience

	N	Min	Max	Mean	Std. Deviation
H2a	60	1	5	4.40	1.061
H2b	60	1	5	4.27	0.989
H2c	60	1	5	4.32	0.930
H2d	60	1	5	3.60	1.138
H2e	60	1	5	3.85	0.988
H2f	60	1	5	3.85	1.022
H2g	60	1	5	4.05	0.872
H2h	60	1	5	4.17	1.011
H2i	60	1	5	3.90	1.298

The questionnaire results, detailed in Table 3, indicate varied perceptions of User Experience among respondents. The strongest agreement was for H2a ("I prefer a video game that has shortened loading time") with a mean of 4.40, followed by H2c ("I prefer a video game that is responsive across different devices") at 4.32, and H2b ("I prefer a video game with a streamlined interface") at 4.27. These findings suggest that Malaysian gamers prioritize quick loading times, responsive designs, and user-friendly interfaces.

Conversely, H2d ("I prefer a video game that has voice interaction") had the lowest agreement at 3.60, indicating only moderate interest in voice features. Mean scores for H2e ("easy to become skilled") and H2f ("achieve goals quickly") were 3.85, highlighting a desire for skill development and guidance.

H2g ("fulfill goals effectively") and H2h ("better gaming flow") scored 4.05 and 4.17, respectively, showing positive perceptions of effective goal fulfillment and gaming flow. The lowest mean score was 3.90 for H2i ("gives me a lot of pleasure"), still reflecting a positive sentiment toward enjoyment in gaming. Detailed analysis is provided in Table 3.

Conclusion
This study highlights the importance of UI and UX in engaging Malaysian mobile gamers. Clear navigation, character design, colour themes, and background music were identified as key UI elements that enhance immersion, while UX factors such as loading speed, responsive layouts, and streamlined interfaces significantly impact user satisfaction. These findings provide actionable insights for developers and industry stakeholders to improve mobile gaming experiences.

Ultimately, the research underscores the value of user-centric design principles in creating functional and emotionally engaging games. By prioritizing these elements, developers can foster long-term player loyalty and succeed in the competitive gaming industry.

Research Limitation
This study yielded valuable insights into UI and UX outcomes but has several limitations. The sample was drawn exclusively from Malaysia, limiting the generalizability of the findings. Data collection at a single point in time complicates causal conclusions and allows for the possibility of reverse causality.

Moreover, relying on gamers' self-reports may introduce self-serving bias. Future research should consider including independent peer evaluations. While self-report measures were appropriate for capturing participants' perspectives, they could also introduce variability in the results.

Recommendation
This study provides valuable insights into the importance of UI and UX elements in shaping the gaming experience of Malaysian mobile gamers. However, several areas warrant further exploration to expand on these findings and enhance their generalizability and practical applications.

Future studies should broaden the participant base to include gamers from diverse cultural and geographic backgrounds. Expanding the scope to include players from different regions would enable comparative analyses of cultural preferences in game design. Additionally, demographic factors such as age, gender, income levels, education, and job categories should be explored. For instance, younger players might prioritize vibrant aesthetics and fast-paced gameplay, while older users may prefer simplicity and intuitive designs.

Further exploration of performance-based evaluations is recommended to assess how UI and UX influence broader aspects such as branding, social interactions, and emotional engagement. Investigating the psychological impact of game design—such as how specific features evoke immersion, satisfaction, or frustration—could optimize player experiences.

The integration of advanced technologies into future studies is another promising avenue. With the rise of artificial intelligence, virtual reality (VR), and augmented reality (AR), researchers could examine how these technologies shape UI/UX design and user engagement. For example, AI-driven personalization might adapt UI elements to player preferences, enhancing satisfaction. Similarly, studying UI/UX in VR and AR games could provide insights into creating immersive and intuitive experiences. Extending these principles to non-gaming applications, such as educational or healthcare apps, could showcase the versatility of effective UI/UX design.

Lastly, future research should address emerging trends in gaming. For example, exploring the impact of UI/UX on monetization strategies, such as in-app purchases or ad tolerance, could benefit freemium game developers. Investigating accessibility features in UI/UX design could enhance inclusivity for players with disabilities. Furthermore, incorporating sustainability into game design—such as eco-conscious practices—might align with players' growing environmental awareness and increase market appeal.

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