Analyzing Mobile App Design's Impact on Instagram User Experience and Satisfaction

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Abstract
This study investigates the impact of User-Centered Design (UCD), responsiveness, and microinteractions on user experience (UX) within Instagram's mobile application, with user satisfaction acting as a mediating variable. Instagram, being a significant social media platform, demands a seamless user experience to maintain user engagement and loyalty. Utilizing a quantitative approach, data was gathered through online surveys and analyzed using Smart PLS-SEM. The results indicate that UCD enhances user experience by creating intuitive and user-friendly interfaces, responsiveness contributes to smoother interactions by reducing delays, and microinteractions improve emotional engagement through subtle visual cues. Furthermore, user experience significantly mediates the relationship between these factors and user satisfaction, proving that a cohesive design approach leads to a more satisfying user experience. These findings emphasize the importance of focusing on user needs, fast interaction responses, and effective microinteractions to improve both the functionality and emotional appeal of Instagram, ultimately fostering greater user satisfaction and loyalty.

Keywords: User-Centered Design; Responsiveness; Microinteractions; User Experience; User Satisfaction; Instagram Mobile App

1. Introduction

Mobile applications have become an integral part of daily life. Applications like Instagram are not just platforms for sharing photos and videos but also essential tools for communication, business, and digital marketing. With over one billion monthly active users worldwide, Instagram has transformed into more than just social media. According to Digital Indonesia (2024), Instagram is the second most widely used social media platform in Indonesia, with 85.3% of internet users aged 16 to 64 years. This places it just below WhatsApp, which leads with 90.9% of users. Instagram's popularity as one of the primary platforms highlights the critical importance of User Experience (UX) in its application development. However, the success of applications like Instagram does not rely solely on their popularity but also on the quality of the User Experience (UX) they provide. UX is a key factor that can enhance user engagement, satisfaction, and loyalty to an application. Good UX is not only defined by an attractive interface design but also by various elements such as User-Centered Design (UCD), application responsiveness, and the effective use of microinteractions.

UCD is a design approach that places users at the center of the application design process. User-centered design ensures that users' needs, goals, and preferences are always a top priority in every aspect of application development. Norman (2013), in his book *The Design of Everyday Things*, stated that "good design should serve human needs, not just focus on technology. All design elements must be arranged with consideration for humans as the primary users." On Instagram, UCD can be applied to create an interface that is easy to use, visually appealing, and functional, thereby enhancing user comfort and engagement.

Previous studies show that applications designed with UCD principles are more likely to increase User Satisfaction because these designs align with user expectations and are more intuitive to use (Gonzales et al., 2021). By prioritizing user needs, Instagram can ensure that every feature offered truly benefits its users. In addition to good design, application responsiveness or the speed at which the application responds to user commands is another important UX element. Responsive applications allow users to navigate with ease, without interruptions or delays. Slow response times can cause user frustration and potentially reduce their loyalty to the application. Conversely, fast and efficient application responses improve overall User Experience and encourage users to continue using the application (Yu et al., 2020).

Responsiveness is crucial for interactive and real-time applications like Instagram. Instagram users expect the application to load content, send messages, or upload photos instantly. If the application fails to respond quickly, it negatively impacts User Experience and is likely to drive users away from the platform.

Microinteractions are small elements within an application that provide immediate feedback to users, such as notifications, animations, or subtle visual changes. Although small, microinteractions play a significant role in creating a more intuitive and emotional User Experience. For example, when a user likes a photo on Instagram and sees the "heart" icon briefly enlarged, this is a microinteraction that provides quick and pleasant visual feedback.

Well-designed microinteractions can enhance User Satisfaction by fostering more personal and intuitive interactions between users and the application (Helfenstein et al., 2021). On Instagram, microinteractions are used in various aspects, from the display of Stories to likes or comments, all designed to provide smoother and more enjoyable interactive experiences.

User Satisfaction is a crucial indicator in evaluating the success of mobile applications. Applications with good UCD, high responsiveness, and effective microinteractions tend to deliver a satisfying experience to users, ultimately increasing user loyalty. User Satisfaction can also mediate the relationship between these elements and users' intention to continue using the application.

Previous research has demonstrated that User Satisfaction is a key variable linking application design and User Experience to users' long-term engagement with the application

(Li & Shin, 2022). When Instagram users are happy with their experience, they are more inclined to keep using the app and even tell others about it. Although much research has highlighted individual UX elements such as UCD, responsiveness, and microinteractions, few studies examine how these three elements work together to influence UX and User Satisfaction on the Instagram platform. Therefore, this study aims to address this gap by analyzing the impact of UCD, responsiveness, and microinteractions on UX, with User Satisfaction as an intervening variable.

2. Literature Review

2.1 User-Centered Design (UCD)

User-Centered Design (UCD) is an approach that focuses the entire application development process on the needs and preferences of users. This approach actively involves users at every stage, from planning to product evaluation. Several theories support UCD, including the Pragmatic Design Theory, which emphasizes rapid adaptability to user needs by integrating design thinking and agility (Chouki et al., 2021). Additionally, Peirce's Pragmatic Semiotics highlights the importance of representing user habits and interpreting digital objects, which is crucial in building connections between users and their needs (Chouki et al., 2021). The Usability Theory focuses on enhancing application ease of use through intuitive interface design and responsiveness to user input (Sukamto et al., 2020). The Engagement Theory demonstrates that good design can boost user engagement and satisfaction by enabling them to feel in control of the application (Soltani-Nejad et al., 2020). Lastly, the Theory of User Satisfaction in Digital Platforms underscores that UCD directly enhances loyalty and user satisfaction to the application (Alderei & Sidek, 2023).

2.2 Responsiveness

Responsiveness in the context of applications refers to the system's ability to respond to user inputs quickly and efficiently. This significantly impacts User Satisfaction, as faster response times are often associated with better User Experience. Subjective Time Theory highlights that shorter response times positively influence users' perceptions of the application (Willermark et al., 2021). Additionally, Demand Responsiveness Theory links the speed of an application's responses to the optimization of User Satisfaction (Guo et al., 2021). In social media, Algorithm Responsiveness plays a role in enhancing user engagement through quick responses to user interactions (Taylor & Choi, 2022). Behavioral Responsiveness emphasizes that applications responsive to user behavior can improve User Satisfaction (Hong & Lee, 2019). A responsive system's overall quality has a significant impact on how users perceive an application's usability and level of pleasure (Soltani-Nejad et al., 2020).

2.3 Microinteractions

Microinteractions are small interaction details within an application, such as notifications and animations, that provide users with immediate feedback. According to Microinteraction Design Theory, these elements enhance user comfort by creating a more enjoyable application experience (Saffer, 2019). Interaction Criticism highlights that microinteractions can redefine interface design standards, influencing users' trust in the application (Sosa-Tzec, 2019). The Feedback and Affordance Theory asserts that quick feedback from microinteractions, whether visual or haptic, improves user understanding and engagement (Gonzales et al., 2021). In the context of social media, the Social Influence of Microinteractions explains that these small interaction elements can boost user engagement

with content (Mazzarolo et al., 2021). Additionally, User Perception Theory indicates that well-designed microinteractions enhance users' emotional satisfaction and provide a sense of personalization in their application experience (Alsalem, 2019).

2.4 User Experience (UX)

User Experience encompasses how users perceive their interactions with the application, including design, speed, and ease of use. Content, accuracy, format, usability, and timeliness are the five main criteria that the End-User Computing Satisfaction (EUCS) Model uses to assess this experience (Prastyo et al., 2021). Additionally, the User-Centered Interaction Design Theory emphasizes the importance of providing responsive feedback to users to create a satisfying application experience (Palos-Sánchez et al., 2020). The Cognitive-Affective Model explains that User Experience involves not only cognitive but also emotional aspects, which can influence user loyalty and satisfaction (Molinillo et al., 2020). The Technology Acceptance Model (TAM) identifies users' perceptions ease of use (PEU) and the application's usefulness as key factors in its acceptance (Ngubelanga & Duffett, 2021). Time perception also plays a critical role, as unexpected delays can diminish the quality of the User Experience (Willermark et al., 2021).

2.5 User Satisfaction

User Satisfaction is a subjective evaluation based on users' interactions with an application. The Expectation Confirmation Theory (ECT) states that User Satisfaction depends on the alignment between initial expectations and the perceived performance of the application (Wang et al., 2019). Similarly, Disconfirmation Theory measures the extent to which an application meets or exceeds user expectations, directly impacting satisfaction levels (Baker-Eveleth & Stone, 2020). The Service Quality Model highlights that reliability and consistent performance are key factors in determining User Satisfaction (Luna-Perejón et al., 2019). The EUCS Model evaluates User Satisfaction by considering content and ease of use (Dewi et al., 2023).

3. Material and Method

3.1 Design Study

This study looks into five variables. Microinteractions (X3), responsiveness (X2), and user-centered design (UCD) (X1) are the independent factors. The dependent variable is User Satisfaction (Y), while the mediating variable is User Experience (UX) (M). This study's main goal is to examine how User Experience functions as a mediator between User-Centered Design, Responsiveness, and Microinteractions and User Satisfaction in the context of Instagram.

The population for this study includes Instagram users, particularly students at Universitas Negeri Jakarta. The inclusion criteria required respondents to be active Instagram users for at least one year. To guarantee data relevance, this study used a survey methodology in conjunction with a purposive sampling technique.

An online survey disseminated using Google Forms and reposted on social media was used to collect primary data. In order to provide responses, respondents were given a 5-point Likert scale that went from "strongly disagree" to "strongly agree." Through literature studies,

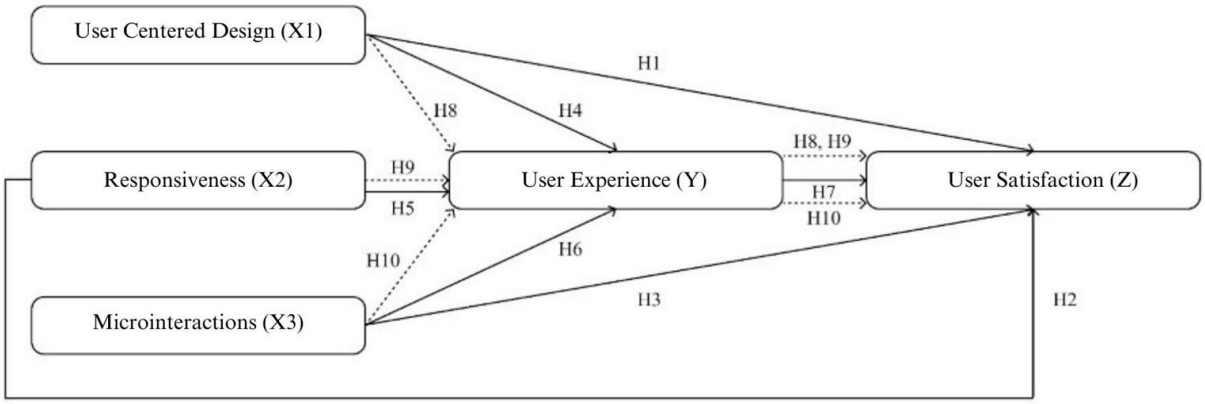
which included scholarly books, journal articles, and reliable internet sources pertinent to the research issue, the secondary data that was used to enhance the analysis was gathered.

3.2 Data Analysis

SmartPLS 4 software and Microsoft Excel were used for the data analysis procedure. With User Experience serving as a mediating factor, this study examines the connections between the variables of User-Centered Design, Responsiveness, and Microinteractions and their effects on User Satisfaction.

The analysis includes examining direct and indirect effects between these variables to understand the role of User Experience in strengthening the relationships. To verify the assumptions and confirm the suggested model, statistical techniques were used, guaranteeing that the results offer precise and significant insights.

Figure 1. Research Model



Source: *Data Processing 2024*

4. Result

In order to verify the validity of the hypotheses put forth, this study had 107 respondents. Three elements made up the questionnaire utilized in this study: demographics of the respondents, their Instagram usage patterns, and their views on User-Centered Design (UCD), responsiveness, microinteractions, user experience (UX), and user satisfaction.

In order to fill out the questionnaire, respondents were required to choose one answer for each statement. Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1) were the response levels on the 5-point Likert scale used in the questionnaire. In the context of Instagram, the gathered data was examined to look at the correlations between the variables and evaluate how User Experience mediates the impact of User-Centered Design, Responsiveness, and Microinteractions on User Satisfaction.

4.1 Respondents' Experience and Characteristics

The characteristics of the respondents are described in the following statistics.

Tabel 4.1 Characteristic of the Respondents

Characteristic	Frequency	Precentage

Gender	Male	58	54.7%
	Female	48	45.3%
Age	<18 years	4	3.8
	18-25 years	101	95.3
	26-35 years	1	0.9
	>35 years	0	0
Faculty	Language and Arts	10	9.3%
	Economics	35	32.7%
	Sports Science	10	9.3%
	Educatuion Science	15	14%
	Social Science	10	9.3%
	Mathematics and Science	5	4.7%
	Psychology Education	10	9.3%
	Engineering	12	11.2%
Frequency of Use	Every day	86	81.1%
	Several times a week	16	15.1%
	Several time a month	4	3.8%
	Less than once a month	0	0%

Sources: *Processing of Primary Data, 2024*

According to table 4.1, the study's respondents' characteristics indicate that the majority are female, comprising 54.7% of the sample, while males account for 45.3%. The findings also reveal that 95.3% The age range of the responders of 18–25 years, indicating that the majority are young adults. Additionally, the largest group of respondents, 32.7%, comes from the Faculty of Economics, followed by the Faculty of Education with 14%.

Additionally, the experiences of the respondents in this study are described in the data that follows.

Table 4.2 Respondent's Experiences

Experiences		**Frequency**	**Precentage**
Frequency of Use	Every day	86	81.1%
	Several times a week	16	15.1%
	Several time a month	4	3.8%
	Less than once a month	0	0%

Sources: *Processing of Primary Data, 2024*

Table 4.2's data shows that 81.1% of respondents use Instagram every day, indicating a high level of platform engagement. This suggests that most of the participants are youthful, frequent Instagram users, which is consistent with the study's goal of comprehending Generation Z and millennials' user experience and contentment.

4.2 Test of the Measurement Model (Outer Model)

1. Analysis of Internal Consistency

Assessing the coherence between statements or questions in a tool intended to measure a certain construct is the goal of internal consistency analysis. By analyzing the Cronbach alpha (CA) and Composite Reliability (CR) values which are regarded as indicating strong reliability if they surpass 0.7 the internal consistency of this study was ascertained.

Table 4.3: Composite Reliability (CR) and Cronbach Alpha (CA) Results

	Cronbach's alpha	**Composite reliability**	**Criteria**
X1	0.798	0.861	Significant
X2	0.837	0.867	Significant
X3	0.840	0.887	Significant
Y	0.823	0.876	Significant
M	0.850	0.894	Significant

Sources: *Processing of Primary Data, 2024*

Table 4.3 indicates that this study is good and dependable because its Cronbach alpha (CA) value is more than 0.7.

2. Assessment of Construct Validity

Convergent validity and discriminant validity are used to assess construct validity. A part of instrument validity called convergent validity looks at how well an instrument collects

data that is consistent with data from other instruments that measure the same construct. By examining the connection or correlation between the score items/components and the construct score or outer loadings, the convergent validity value is determined. Convergent validity is measured using the outer loading/loading factor as shown below.

Table 4.3 Result of Outer Loading

Construct	Indicator	Outer Loading Value	Description
User Centered Design (X1)	X1.1	0,748	Valid
	X1.2	0,783	Valid
	X1.3	0,752	Valid
	X1.4	0,742	Valid
	X1.5	0,691	Invalid
Responsiviness (X2)	X2.1	0,860	Valid
	X2.2	0,712	Valid
	X2.3	0,687	Invalid
	X2.4	0,879	Valid
	X2.5	0,603	Invalid
Microinteractions (X3)	X3.1	0,808	Valid
	X3.2	0,859	Valid
	X3.3	0,800	Valid
	X3.4	0,703	Valid
	X3.5	0,732	Valid
User Experience (Y)	Y1	0,789	Valid

	Y2	0,734	Valid
	Y3	0,741	Valid
	Y4	0,786	Valid
	Y5	0,776	Valid
User Satisfaction (Z)	Z1	0,731	Valid
	Z2	0,883	Valid
	Z3	0,763	Valid
	Z4	0,859	Valid
	Z5	0,715	Valid

Sources: *Processing of Primary Data, 2024*

Table 4.3's computations lead to the conclusion that the results of convergent validity with loading factors show that nearly all indicators related to User-Centered Design, Responsiveness, Microinteractions, User Experience, and User Satisfaction are valid, as they meet the criteria with loading factors greater than 0.7. Therefore, the indicators in this questionnaire are considered appropriate measurement tools. However, three indicators X1.5, X2.3, and X2.5 do not meet the criteria, as their loading factors fall short of the expected values. These invalid indicators are excluded from further calculations. Below is the Path Diagram for each indicator.

The next step is to use Average Variance Extracted (AVE) to measure convergent validity.

Table 4.4 Average Variance Extracted (AVE) Outcomes

Variabel	**AVE**	**Criteria**	**Result**
User-Centered Design	0,612	0,50	Valid
Responsiveness	0,517	0,50	Valid
Microinteractions	0,586	0,50	Valid
User Experience	0,629	0,50	Valid
User Satisfaction	0,553	0,50	Valid

Sources: *Processing of Primary Data, 2024*

Every variable has a good value, namely above 0.5, as Table 4.4 demonstrates. This indicates that the construct being measured is significantly influenced by these indicators.

4.3 Testing Hypotheses

By looking at the statistical T value and P-value in the analysis results table, one can perform hypothesis testing. The P-value shows the significance of the test results, whereas the T value shows the distance between the sample value and the population value.

Table 4.5 Hypothesis Evaluation

Hypothesis	Path	T statistics (|O/STDEV|)	P Values	Description
H1	X1 > Y	2.450	0.014	Accepted
H2	X2 > Y	0.168	0.867	Rejected
H3	X3 > Y	5.103	0.000	Accepted
H4	X1 > M	0.326	0.745	Rejected
H5	X2 > M	0.243	0.808	Rejected
H6	X3 > M	3.711	0.000	Accepted
H7	Y > M	2.399	0.016	Accepted
H8	X1 > Y > M	1.764	0.078	Rejected
H9	X2 > Y > M	0.151	0.880	Rejected
H10	X3 > Y > M	2.214	0.027	Accepted

Sources: *Processing of Primary Data, 2024*

In table 4.5. illustrates the outcomes of hypothesis testing, including the following:

1. User Satisfaction (Y) is not significantly impacted by User-Centered Design (X1). This is demonstrated by a P-value of 0.745, which is higher than 0.05, and a T-statistic value of 0.326, which is smaller than 1.96.
2. User Satisfaction (Y) is not significantly impacted by responsiveness (X2). The P-value is 0.808, which is higher than 0.05, and the T-statistic value is 0.243, which is smaller than 1.96.
3. User satisfaction (Y) is directly impacted by microinteractions (X3). The P-value is 0.000, which is less than 0.05, and the T-statistic value is 3.711, which is higher than 1.96.
4. User Satisfaction (Y) is significantly impacted by User Experience (M). The P-value is less than 0.05 and the T-statistic value is 2.399, which is more than 1.96.

5. User-Centered Design (X1) does not immediately have a major influence on User Experience (M). The P-value is 0.014, which is less than 0.05, and the T-statistic value is 2.450, which is higher than 1.96.
6. User Experience (M) is not significantly impacted by responsiveness (X2). The P-value is 0.867, which is higher than 0.05, and the T-statistic value is 0.168, which is smaller than 1.96.
7. User Experience (M) is directly impacted by microinteractions (X3). The P-value is 0.000, which is less than 0.05, and the T-statistic value is 5.103, which is higher than 1.96.
8. User Satisfaction (Y) is significantly impacted by User-Centered Design (X1) via the mediating variable User Experience (M). The P-value is 0.014, which is less than 0.05, and the T-statistic value is 2.450, which is higher than 1.96.
9. User Satisfaction (Y) is not impacted by responsiveness (X2) through the mediating variable of user experience (M). The P-value is 0.808, which is higher than 0.05, and the T-statistic value is 0.243, which is smaller than 1.96.
10. User Satisfaction (Y) is significantly impacted by microinteractions (X3) through the mediating variable User Experience (M). The P-value is 0.000, which is less than 0.05, and the T-statistic value is 3.711, which is higher than 1.96.

5. Discussion

5.1. Direct Impact on User Contentment

The results reveal that User-Centered Design (X1) and Responsiveness (X2) do not have a substantial direct influence on User Satisfaction (Y). Since Instagram users already anticipate a flawless experience as a default, user-centered design and responsiveness could not have a major direct impact on user satisfaction. While a good design and fast response times are important, they may be considered expected features rather than unique factors that drive satisfaction. Instagram users are increasingly focused on the emotional aspects of their interaction with the app, which may explain why Microinteractions (X3) has a stronger direct influence on satisfaction.

5.2. Direct Influence on User Experience

The findings indicate that User Experience (M) is significantly impacted directly by Microinteractions (X3). Microinteractions play a critical role in enhancing User Experience because they provide immediate feedback and enrich interactions with the app. These small design details, such as animations or transitions, make the app feel more responsive and personalized, thus improving the overall user experience. Instagram effectively uses microinteractions to keep users engaged and provide an intuitive, enjoyable interface, which contributes to a positive experience.

5.3. Direct Impact of User Experience on User Satisfaction

The findings demonstrate that, via the mediating variable User Experience (M), User-Centered Design (X1), has a substantial influence on User Satisfaction (Y). User-Centered Design, when combined with a well-designed User Experience, plays a crucial role in determining User Satisfaction. By focusing on the needs and preferences of users, Instagram creates an interface that is intuitive and accessible, improving both usability and emotional engagement. This emphasizes the importance of applying a User-Centered Design approach to

create a satisfying user experience, which in turn drives satisfaction.

On the other hand, Responsiveness (X2) and Microinteractions (X3), through the mediating variable User Experience (M), have a major effect on Y, or user satisfaction. Microinteractions are critical for emotional engagement and satisfaction, while responsiveness ensures the smooth functioning of the app. Together, these factors contribute to the overall experience, fostering higher levels of satisfaction among Instagram users.

6. Conclusion, Implication, and Recommendation

This study highlights the significant impact of User-Centered Design and Microinteractions on User Satisfaction through their influence on User Experience in the context of Instagram. Although responsiveness doesn't directly affect customer pleasure, it does contribute to improving the user experience as a whole. These findings suggest that Instagram's design choices and interactive elements significantly contribute to user engagement and satisfaction. The implication for Instagram is clear: focusing on intuitive design and effective microinteractions will strengthen user satisfaction. To further improve, Instagram should continue refining its design based on user feedback and prioritize features that foster emotional engagement. It is recommended that Instagram invests in enhancing microinteractions and consistently applying User-Centered Design principles to ensure a better and more satisfying user experience.

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