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Improving User Interface Design and Efficiency Using Graphic Design and Animation Techniques

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Abstract

User interface (UI) design has undergone a significant evolution, integrating graphic design and animation techniques that have redefined digital experiences. This evolution, driven by technological advancements and a deeper understanding of user behaviour, has emphasized the fusion of aesthetics and functionality as a cornerstone in modern UI design. This research explores the integration of graphic design and animation techniques to enhance user interface (UI) design and user experience (UX) within digital environments. The study includes a detailed analysis of user perception regarding functional enhancements, impact on accessibility, and efficiency of task completion through data collected from respondents. A prototype of car booking and rental App was designed using Figma as the primary design tool which facilitated collaborative design processes, leading to the creation of engaging user experiences such as Landing Page Animation and Circular Navigation Animation. The research approach employed in this study involves a combination of survey and direct observation. The findings reveal a positive reception among users regarding functional enhancements, with a majority strongly agreeing (63.20%) and a minority expressing dissent (5.01%). Similarly, the impact on accessibility garnered high satisfaction levels, with approximately 60.7% strongly agreeing and minimal dissent (3.66%). Efficiency in task completion also received positive feedback, with 55.46% strongly agreeing and dissent at 2.94%. The design and data analysis journey highlight the significance of integrating visually appealing and interactive elements in UIs. This research work underscores the importance of design innovation and data-driven decision-making in optimizing UI design for enhanced user experiences and satisfaction.

1.0. Introduction

User interface (UI) design has undergone a significant evolution, integrating graphic design and animation techniques that have redefined digital experiences. This evolution, driven by technological advancements and a deeper understanding of user behavior, has emphasized the fusion of aesthetics and functionality as a cornerstone in modern UI design. The historical transition from basic command-line interfaces to visually rich GUIs, pioneered in the 1970s and refined by industry leaders like Apple and Microsoft, underscored the importance of user-friendly design [1][2][3]. These milestones paved the way for the integration of advanced graphic design and animation technologies, enhancing both the visual appeal and usability of digital systems.

Contemporary UI design relies on technologies such as HTML5, CSS3, and animation frameworks to create immersive experiences [4][5]**.** Research in cognitive psychology, notably Cognitive Load

Theory [6] and the Cognitive Theory of Multimedia Learning [7]**,** has provided theoretical support for leveraging animations to enhance user comprehension and reduce cognitive load in UIs. Although, several studies have emphasized the significant positive impacts of incorporating graphic design and animation into user interfaces, there are, however, several specific areas within this domain that require further exploration and optimization. These include understanding the nuanced effects of different animation types, exploring emotional responses to animations, addressing accessibility considerations, and ensuring inclusivity for diverse user groups. Despite advancements in integrating graphic design and animation in user interfaces (UIs), there remains a lack of comprehensive understanding regarding the specific impacts of different animation types, the integration of graphics with animations, their emotional effects, accessibility considerations, and the long-term effects of animations on user engagement. This gap hinders the development of optimized UI designs that balance functionality with visual and interactive richness, catering to diverse user needs and preferences.

This research work seeks to delve into these critical areas through empirical research focused on enhancing user interface (UI) design by investigating the specific impacts of the integration of graphics design with animations, analyzing their emotional effects, addressing accessibility considerations, and evaluating the effects of animations on user engagement. The ultimate objective is to develop interfaces that excel in functionality, exhibit compelling visual appeal, and foster enhanced user engagement. This approach underscores the importance of creating inclusive and accessible digital environments while leveraging the power of graphic design and animation to deliver exceptional user experiences.

2.0. Review of Relevant Literature

The integration of graphic design and animation into user interfaces has been a focal point of recent research, aiming to understand its effects on user comprehension, engagement, and efficiency. Numerous studies have demonstrated that these elements can significantly enhance the interactive experience by improving navigation, increasing satisfaction, and facilitating faster comprehension.

[8] explored the impact of motion design on user navigation in mobile applications. Their study found that animated transitions help users understand the relationship between UI elements better, leading to quicker navigation and reduced cognitive load. The use of subtle animations indicated the flow of tasks, which users reported made the interface more intuitive

[9] conducted a survey on user satisfaction in animated versus static user interfaces, revealing that users felt more engaged and satisfied with interfaces that included well-designed animations. This increased satisfaction also correlated with higher retention rates, as users were more likely to return to an interface that they found visually appealing and easy to interact with

[10] examined the emotional responses elicited by animated interfaces, finding that users often experience a positive emotional response when animations are used to confirm successful actions, such as a completed download or a sent message. This positive reinforcement through animation enhances overall user satisfaction

[11] in their experimental study on educational platforms demonstrated that animations can help users understand complex processes faster than static images. Their findings suggest that animations provide a sequential, dynamic representation that mirrors the way processes occur in real life, thereby improving comprehension and recall.

3.0 Methodology

This section describes the Research Design, Population and sampling, Research Instrument, and method of data collection and analysis.

3.1 Research Design

The research design used is the Descriptive survey study approach. This approach is chosen to gather detailed insights into user satisfaction levels, engagement patterns, efficiency in completing tasks, considerations for accessibility, and perceptions of functional enhancements facilitated by graphic and animation integration. Data collection will involve administering surveys to participants who interact with interfaces designed with varying degrees of graphic and animation integration. The surveys will encompass questions tailored to assess user experiences across the specified metrics, providing rich data for analysis. The research method adopted in this study is the combination of survey and direct observation.

3.2. Study Area

This research was conducted at the University of Benin, Benin City and Environs and among students, employees, and entrepreneurs offering different services, all within the vicinity of the University.

3.3. Population, Sample and Sampling Technique

The population of the study consists of students, employed individuals, and entrepreneurs within the vicinity of the University of Benin. A purposive sampling technique was used. A purposive sample is a non-probability sample that is selected based on the characteristics of a population and the objective of the study. A purposive sampling technique was used so as to get accurate and consistent results. The goal of this sampling approach was to ensure that participants had a certain level of familiarity and experience with digital interfaces, particularly in educational and local business contexts.

The sample size for this study is fifty (50) respondents which is sufficient and adequate for this research as determined using the Krejcie and Morgan Table at a confidence level of 95% and a margin error of 1% [12]. This sample size was to ensure that the population of the study was adequately represented an to allow for a detailed analysis of the collected data while balancing practical considerations such as time constraints for conducting surveys and collecting feedback from respondents within the study area.

3.4. Research Instrument

The research instrument for this study is structured into four main areas: user satisfaction and engagement, efficiency of task completion, impact on accessibility, and user perception of functional enhancements. Each area consists of three questions, making a total of twelve questions in the questionnaire. Additionally, the questionnaire includes demographic questions to gather information about participants' age and gender. The questions in each section are designed to capture participants' experiences, perceptions, and feedback regarding the integration of graphic design and animation techniques in user interface design and efficiency.

The questionnaire uses a four-point Likert scale for responses: Strongly Disagree, Disagree, Agree, and Strongly Agree. These responses are coded as 1, 2, 3, and 4, respectively. The use of a Likert scale provides a structured approach for analyzing participant feedback and allows for nuanced responses to the questionnaire items. The questionnaire was administered on paper by the researcher to ensure consistency and accuracy in data collection.

3.5. Validity and Reliability of the Instrument

The research instrument was accessed by experts to determine its appropriateness. The instrument was subjected to face validity and Content validity. Face validity was conducted to evaluate the appearance of the questionnaire in terms of feasibility, readability, consistency of style and formatting, and clarity of language used. Content validity involves detailed and concise examination of the test contents (items in the questionnaire) to determine if they give a good coverage of the domain to be measured. To ensure the reliability of the instrument, the questionnaire was pilot tested with three (3) participants randomly selected from the sample. They provided clarity and understanding on some items. Their responses were used to refine the instrument before administering to the rest of the sample.

3.6 Method of Data Collection

The method of data collection for this study involved leveraging participants' previous experiences with car booking apps and other digital interfaces to gather insights into the impact of graphic design and animation techniques on user interface (UI) design. A structured questionnaire was designed that encompassed questions related to user satisfaction, engagement, task efficiency, accessibility considerations, and perceptions of functional enhancements within UI designs. The questionnaire was administered virtually using Google Forms to facilitate easy and efficient data collection. Participants were selected based on their familiarity and experience with car booking apps and other digital platforms. The purposive sampling technique was employed to ensure that participants possessed average knowledge and intermediate experience with at least one e-commerce or service-oriented app. This approach aimed to gather responses from individuals who could provide meaningful insights into the usability and effectiveness of UI designs enhanced by graphic design and animation techniques.

The questionnaire utilized a four-point Likert scale to capture participants' responses, ranging from "Strongly Disagree" to "Strongly Agree," with corresponding coded values. This scale allowed participants to express their opinions and perceptions in a nuanced manner, providing rich data for analysis. Participants were briefed on the purpose of the study and the questionnaire before responding. They were encouraged to provide detailed feedback based on their actual experiences and interactions with UI designs incorporating graphic design and animation elements.

3.7. Method of Data Analysis

The data obtained in this study was analyzed and interpreted using simple tables, charts, frequency, and percentages. These statistical tools were used because they are suitable means of breaking down, clarifying, and easily comprehending generated data. Participants' questionnaire outcomes were statistically examined and presented as percentages to derive meaningful insights into user perceptions and experiences related to graphic design and animation techniques in UI/UX design.

To assess the efficiency and effectiveness of the UI designs enhanced by graphic design and animation techniques, specific formulas and calculations were utilized. These formulas, which have been recommended and proven in usability testing contexts, were applied to measure key metrics related to task completion times, error rates, and user interaction patterns. Mean calculations were also employed to determine overall user satisfaction rates based on the responses gathered. The combination of statistical analysis, visual representations, and formula-based evaluations ensured a rigorous and comprehensive approach to the data analysis. By leveraging these methods, the study aimed to provide valuable insights into the effectiveness and impact of graphic design and animation techniques on user interface design within the context of digital environments.

3.8 Creation of a web based UI and UX design

The research work is aimed at enhancing user interface design and efficiency through the integration of graphic design and animation. The primary design tool selected for this project was Figma, chosen for its collaborative features, versatility, and robust capabilities in creating interactive and visually appealing designs. The project's methodology focused on leveraging Figma's tools and features to create a seamless, user-friendly interface that enhances user engagement and satisfaction.

3.8.1 Design Process

i. Structuring the Interface

The design process began by structuring the interface using frames within Figma, delineating different sections such as the landing page, headers, menus, search bars, and content areas. This structural foundation allowed for the effective organization of design components and visualization of the overall layout.

ii. Applying Graphic Design Principles

A cohesive and aesthetically pleasing design was achieved by harmonizing color schemes, selecting appropriate typography, and maintaining consistent branding elements throughout the interface. These elements were chosen to align with the project's objectives and create an engaging visual experience.

iii. Designing Headers and Menus

Headers and menus were designed with clarity and functionality in mind. Fonts, font sizes, and color palettes were carefully selected to ensure readability and ease of navigation. Search bars were designed intuitively, featuring clear input fields and recognizable search icons to enhance user-friendliness.

iv. Structuring Content Sections

Content sections were structured to present information effectively and engagingly. A variety of design elements such as text boxes, images, icons, and white space were utilized strategically to improve readability and create a balanced visual hierarchy.

v. Iterative Refinement

Throughout the design process, UI elements were iterated upon to refine their usability. Prototyping interactive designs helped simulate user interactions and workflows, allowing for the identification of areas for improvement and fine-tuning the UI for an optimal user experience.

vi. Responsive Design

Responsive design principles were incorporated to ensure that the UI elements adapted seamlessly across different screen sizes and devices. This approach is crucial for delivering a consistent and user-friendly experience regardless of the user's device.

3.8.2 Landing Page Animation

The goal was to create a smooth and intuitive carousel-like experience for users, allowing seamless exploration of different car types.

Execution:

- **Trigger Mechanism:**

Event listeners were implemented to detect user actions such as clicks or drags on designated elements. These actions initiated the animation sequences, ensuring an interactive user experience.

- **Animation Sequences:**

CSS animations and JavaScript libraries were utilized to create flip and slide effects during transitions between car types. These animations provided a fluid and engaging visual experience, making the interface more dynamic.

- **Dynamic Content Loading:**

Dynamic content loading was integrated to ensure that only relevant information, such as specific car details, was displayed during the animation. This approach optimized performance by minimizing unnecessary data load and enhancing user experience by presenting only pertinent information.

3.8.3 Circular Navigation Animation

The goal was to enhance user navigation and provide a visually engaging experience on the landing page.

Execution:

- **Interaction Method:**
  Users could interact by clicking or dragging, which rotated a circular element to reveal the next car type. This interaction method provided an intuitive and engaging way for users to explore different options.
- **Animation Technique:**
  Smooth rotation and transitions between car types added interactivity and visual appeal. The circular motion was chosen for its novelty and ease of use, making the navigation process both fun and efficient.

Benefits:

- **Efficient Navigation:**
  Users could navigate between car types effortlessly, thanks to the intuitive circular navigation system. This method reduced the cognitive load on users, making it easier to find and compare different car options.
- **User Satisfaction:**
  The novel and creative animation method contributed to a positive user experience. Users appreciated the innovative design, which enhanced their overall interaction with the interface and left a lasting impression.

3.8.4 Navigation Map Animation

This was created to enhance user experience by providing real-time visualization of car movement and direction.

Execution

- **Real-Time Visualization:**
  Displayed the car's movement on the map in real-time with directional indicators and progress details. This feature allowed users to track their booked cars accurately and stay informed about their journey.
- **Interactive Visualization:**
  Animated the car's movement to convey essential information engagingly. The animations provided visual cues about the car’s direction and progress, making the navigation information easy to understand at a glance.

4.0 Implementation, Data Analysis and Presentation

This section is in two phases. The first phase presents the implementation of the prototype application using Figma while the second phase is the data analysis and presentation of the results on the Figma app.

4.1 Design and Implementation of a Car Booking and Rental App

The research focused on enhancing user interface design and efficiency through graphic design and animation integration, Figma was selected as the primary design tool. Figma stands out as an

industry-leading platform due to its collaborative features, versatility, and robust capabilities in creating interactive and visually appealing designs. Unlike traditional design software, Figma offers real-time collaboration, which was crucial for the project involving multiple iterations and feedback from stakeholders. Moreover, Figma's cloud-based nature allows seamless access and sharing of design files, facilitating teamwork and version control. Another key reason for choosing Figma is its comprehensive toolkit tailored specifically for UI/UX designers. From creating wireframes and prototypes to intricate animations and interactive components, Figma provides a unified environment that streamlines the entire design process. Its intuitive interface and easy-to-use tools make it accessible to both beginners and experienced designers, ensuring a smooth workflow and efficient design iteration cycles. Furthermore, Figma's support for animations and transitions within designs was instrumental in visualizing the impact of graphic design and animation techniques on user engagement and interface efficiency. The ability to prototype complex interactions and animations directly in Figma allowed the practical implementation of design concepts and evaluation of their effectiveness in enhancing user experiences. The user interface of the system is shown in Figure 1

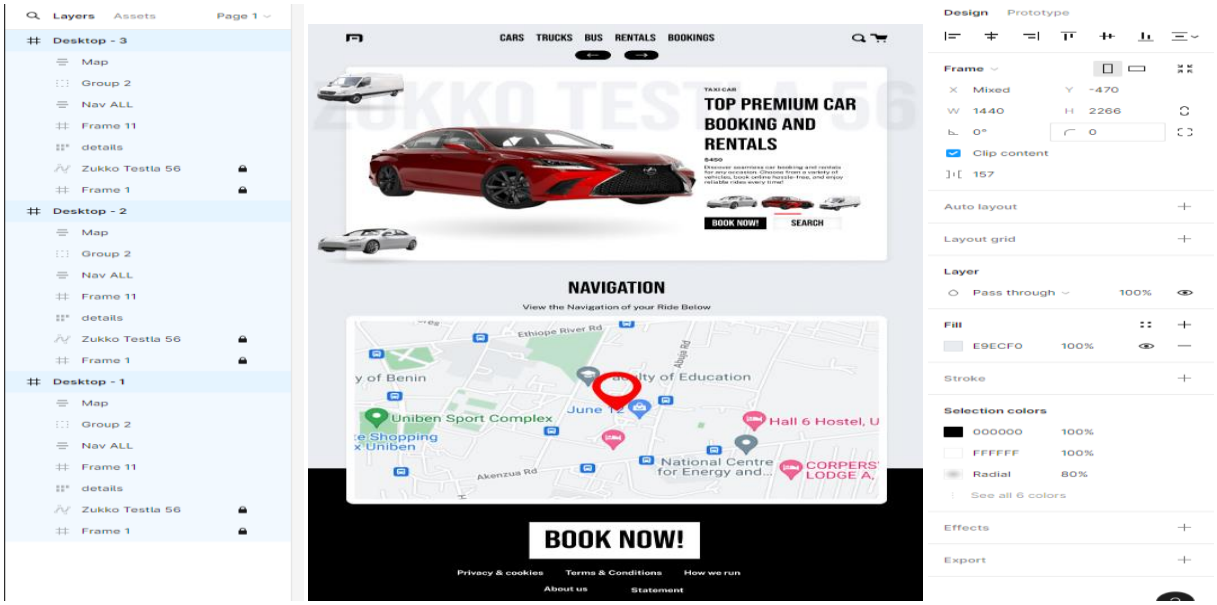

Figure 1: Figma interface and the website design

4.1.1. Landing Page Animation Details

The primary goal of implementing the landing page animation as shown in Figure 2 was to showcase a smooth and intuitive carousel-like experience for users, allowing them to explore different car types seamlessly.

Execution:

The animation was designed to activate upon user interaction, either through a click or drag action. When triggered, the animation revealed various car types using a combination of flip and slide animations. This approach ensured that users could navigate through different car options without cluttering the interface or overwhelming them with excessive information.

Technical Implementation:

i. **Trigger Mechanism**: Implemented event listeners to detect user actions such as clicks or drags on designated elements.

ii. Animation Sequences: Utilized CSS animations or JavaScript libraries to create the flip and slide effects when transitioning between car types.

iii. Dynamic Content Loading: Incorporated dynamic content loading to ensure that only relevant information (such as car details) was displayed during the animation, optimizing performance and user experience.

The landing page animation successfully achieved its objective of showcasing different car types while maintaining a clean and user-friendly interface. It exemplified how thoughtful animation techniques can contribute to a more engaging and efficient user experience, aligning with the broader goal of enhancing user interface design and efficiency through graphic design and animation integration.

Creating Details in Figma

In crafting the details within Figma for the research, a meticulous and thoughtful process was followed to create a visually appealing and user-friendly interface. Here's a detailed account of this approach:

The process began by structuring the interface using frames within Figma, delineating different sections such as the landing page, headers, menus, search bars, and content areas. This structural foundation allowed for the effective organization of design components and the visualization of the overall layout of the interface. Applying graphic design principles was paramount in this process. A cohesive and aesthetically pleasing design was created by harmonizing color schemes, selecting appropriate typography, and maintaining consistent branding elements throughout the interface. These elements were chosen to align with the research objectives and create an engaging visual experience.

Headers and menus were designed with clarity and functionality in mind. Fonts, font sizes, and color palettes were carefully selected to ensure readability and ease of navigation. Search bars were designed intuitively, featuring clear input fields and recognizable search icons to enhance user-friendliness. Content sections were structured to present information effectively and engagingly. A variety of design elements such as text boxes, images, icons, and white space were utilized strategically to improve readability and create a balanced visual hierarchy. Throughout the design process, UI elements were iterated upon to refine their usability. Prototyping interactive designs helped simulate user interactions and workflows, allowing for the identification of areas for improvement and fine-tuning the UI for an optimal user experience.Figma's collaborative features allowed progress to be shared with mentors or peers for feedback and review. This feedback loop was instrumental in refining the design based on constructive input and ensuring that the final UI design met the research objectives effectively. Furthermore, responsive design principles were incorporated to ensure that the UI elements adapted seamlessly across different screen sizes and devices. This approach is crucial for delivering a consistent and user-friendly experience regardless of the user's device. The Figma animation loop between pages is shown in Figure 2.

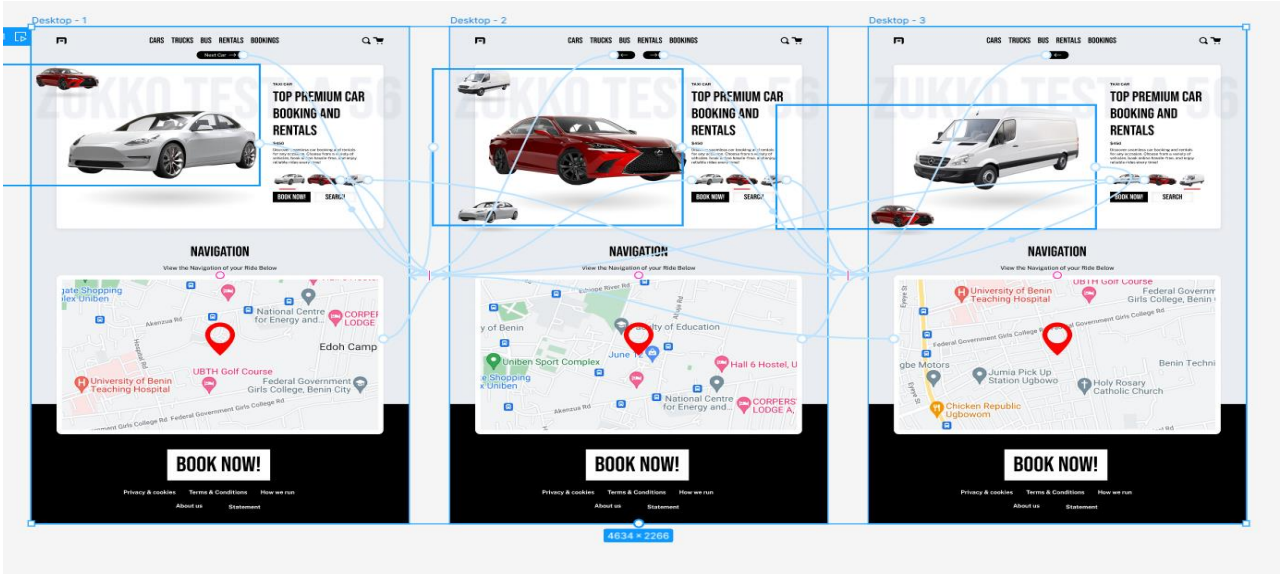

Figure 2: The Figma animation Loop between webpages

4.1.2 Landing Page Animation

The Landing Page Animation component was designed to enhance user engagement and streamline navigation within the interface. The main goal was to create a dynamic and visually appealing method to showcase different car types while maintaining a clean and organized layout. To achieve this objective, a smooth carousel-like animation was implemented, allowing users to interact with it through simple actions like clicking or dragging. This interaction triggered a series of animations that seamlessly revealed different car options. The animations were carefully designed with a flip and slide effect, ensuring a fluid transition between car types without overwhelming the user with excessive details or clutter, this is shown in Figure 3**.**

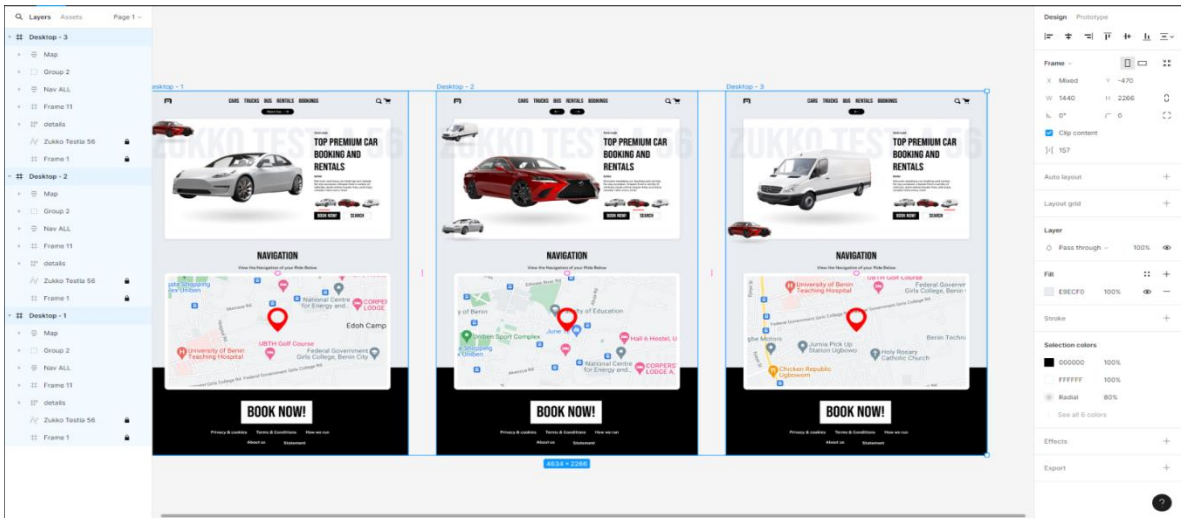

Figure 3: The Figma animation setup of the 3 integrations of webpages

One of the primary benefits of this approach was the reduction of space clutter. Instead of displaying numerous static images or lengthy lists of cars, the animation effectively utilized space and presented the information in an engaging manner. This not only made the interface visually appealing but also helped users focus on the essential details without distractions. Moreover, the interactive nature of the animation enhanced intuitiveness. Users could explore different car options without the need for complex navigation menus or extensive browsing. This simplified user

experience contributed to a more user-friendly interface, where users could quickly grasp the available options and make informed decisions.

The Landing Page Animation also played a significant role in encouraging user engagement. The dynamic nature of animations tends to capture users' attention and keep them engaged with the content. By providing an interactive and visually stimulating experience, the animation encouraged users to explore further and spend more time interacting with the interface. From a navigation perspective, the animation acted as both a showcase and a navigation tool. Users could seamlessly navigate between different car types due to the intuitive animations. This streamlined navigation eliminated potential frustrations related to complex menu structures or tedious browsing processes, making it easier for users to find relevant information and proceed with their tasks efficiently. The Landing Page Animation successfully combined aesthetics with functionality to create an engaging, clutter-free, and intuitive user interface for showcasing car types and enhancing the overall user experience.

4.1.3 The Circular Navigation Animation component was designed with the primary purpose of enhancing user navigation and providing a visually engaging experience on the landing page. This animation technique was specifically crafted to facilitate easy exploration of different car types while maintaining a seamless and efficient user interface. The primary purpose of this animation was to allow users to navigate between different car types effortlessly. By implementing a circular navigation system, users could interact with the interface by clicking or dragging, which in turn rotated a circular element to reveal the next car type smoothly. This intuitive interaction method aimed to reduce friction in exploring different options, making the navigation process more fluid and engaging.

The animation technique utilized in the circular navigation system was crucial to achieving the desired impact. The smooth rotation and transition between car types added a layer of interactivity and visual appeal to the user experience. Instead of traditional linear navigation methods, the circular animation introduced an element of novelty and creativity, making the interface more memorable and enjoyable for users. The impact of the Circular Navigation Animation was significant in terms of enhancing user experience. By providing a visually appealing and efficient way to explore different car options, the animation contributed to a more engaging user interface. Users were not only able to navigate between car types seamlessly but also experienced a sense of delight and satisfaction through the interactive animation. From a usability standpoint, the circular navigation animation streamlined the navigation process, making it easier for users to find and compare different car types. This efficiency in navigation ultimately contributed to a positive user experience, as users could quickly locate the information they needed without unnecessary delays or confusion.

4.1.4 The Navigation Map

The Navigation Map Animation component played a crucial role in enhancing user experience by providing real-time visualization of car movement and direction. This feature was designed to offer users a clear understanding of their booked cars' progress and navigation details, ensuring they remained informed and engaged throughout their journey. The primary functionality of the Navigation Map Animation was to implement a navigation map feature that visualized the movement of cars. This animation effect brought the navigation experience to life by displaying the car's movement on the map in real-time, complete with directional indicators and progress details. Users could track their booked cars, understand their movement trajectory, and ascertain whether they were on the correct route. The animation effect was pivotal in conveying essential information to users in an engaging manner. By animating the car's movement on the map, users could quickly grasp the progress of their journey and make informed decisions based on real-time data. This

interactive visualization not only added a layer of excitement to the user experience but also served a practical purpose by enhancing situational awareness.

One of the key benefits of the Navigation Map Animation was its ability to empower users with valuable insights into their car's navigation. Users could track their car's position, monitor its movement in relation to the intended route, and ensure they were heading in the right direction. This feature not only instilled confidence in users but also contributed to a safer and more efficient navigation experience. From a usability perspective, the Navigation Map Animation contributed to a more engaging and user-centric interface. It leveraged animation to convey complex navigation information in a simple and intuitive manner, making it easier for users to interact with the system and stay informed about their journey progress. The Navigation Map Animation component is depicted in Figure 4**.**

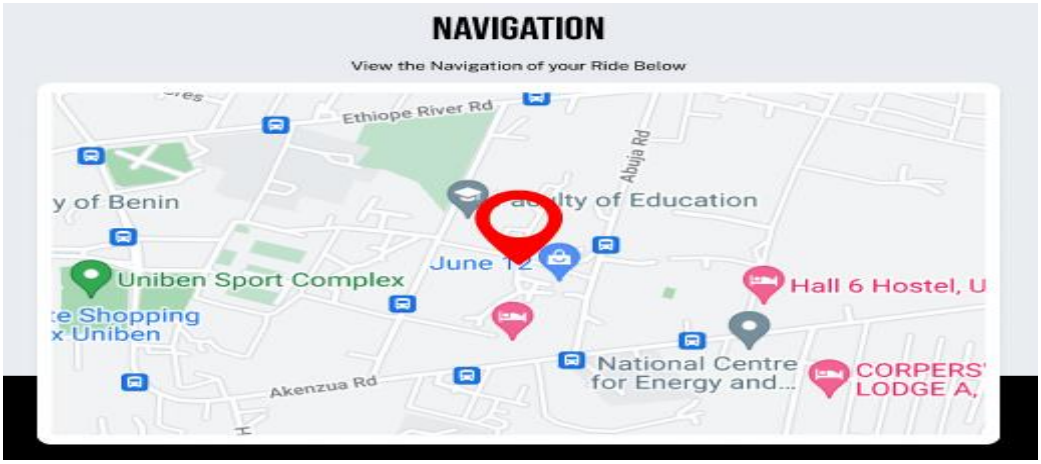

Figure 4: The Figma animation Loop between webpages

4.2 Data Presentation and Analysis

This section presents the findings and analysis of data collected from the quantitative studies conducted as part of this research. It discusses how graphic design and animation impact user interface (UI) efficiency and satisfaction. Insights drawn from the data are synthesized to highlight significant trends and practical implications for UI/UX design.

Fifty (50) students from the University of Benin, Benin-City participated in the study, each receiving a questionnaire. In total, fifty (50) questionnaires were distributed among the participants, with one questionnaire given to each student.

4.2.1 Participants Characteristics and Classification

The demographic breakdown of participants in the study reflects a diverse group in terms of gender and age. Among the participants, 46% were male (23 participants) and 54% were female (27 participants). In terms of age distribution, 20% fell in the 16-20 age range (10 participants), 62% were in the 21-25 age range (31 participants), and 18% were 26 years old and above (9 participants). These demographic statistics as shown in Table 1 provide a comprehensive view of the participant profile, offering valuable insights into the representation across different gender and age categories within the study. Table 2, however, depicts the summary of responses obtained from the questionnaire.

Table 1: Personal information of participants

S/N	Variables	Category	Frequency	Percentage%
1	Gender	Male Female	23 27	46 54
2	Age	16-20 21-25 26 and Above	10 31 9	20 62 18

Table 2: Summary of responses obtained from Questionnaire

Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
User Satisfaction and Engagement				
How satisfied are you with the overall user interface design of mobile applications, including visual elements and animations?	24	24	2	
Would you describe the animations used in apps, such as dynamic transitions or interactive elements, as engaging and enjoyable?	27	18	5	
Do you feel that animations in apps make the user experience more immersive and interactive, such as the GPS animation in car booking apps?	28	20	2	
Efficiency of Task Completion				
Have animations in apps, such as loading animations or progress indicators, helped you understand processes better?	18	30	2	
Do you think animations in apps contribute to making tasks quicker and more streamlined?	27	23		
Have animations, like button animations or visual cues, helped you navigate apps more easily?	21	23	5	
Impact on Accessibility				
Do you feel that the design of apps, including animations, caters well to users with varying levels of tech-savviness?	26	21	3	
Have animations in apps, such as visual cues or simplified animations, improved accessibility for you?	24	23	3	
Would you describe the animations used in apps as inclusive and helpful for users with different backgrounds and abilities?	25	21	4	
User Perception of Functional Enhancements				
Do you perceive animations and visual elements in apps as modern and innovative?	32	15	3	
How much do animations and visual elements influence your perception of the app's brand or service?	26	19	5	
Would you say that interactive elements, like animated buttons or transitions, positively affect your decision to continue using an app?	24	21	5	
Total	**302**	**258**	**39**	

4.2.2 User Satisfaction and Engagement

The analysis of data collected on user satisfaction and engagement involves categorizing responses into four parameters viz: strongly agree, agree, disagree, and strongly disagree. From the data, there was a total of nine responses indicating disagreement across three questions. This translates to 9

respondents who disagreed with the statements. Moving to the "agree" category, there were 62 respondents who agreed, constituting 62% of the total responses. As for "strongly agree," there were 79 responses, which need to be multiplied by 4 since strongly agree carries a score of 4. Similarly, the 62 "agree" responses are multiplied by 3, and the 9 "disagree" responses by 2 to account for their respective scores. After these calculations, the values were summed up to obtain a comprehensive view of the participants' sentiments across the survey questions. The weighted scores was calculated based on the given data and the Likert scale with values ranging from 1 to 4 (strongly disagree = 1, disagree = 2, agree = 3, strongly agree = 4).

1. Disagreement responses:

Number of respondents who disagreed = 9

Weighted score for disagreement = 9 (number of respondents) × 2 (score for disagreement) = 18

Disagreement responses = $\frac{18}{520}$x 100 **=3.46%**

2. Agreement responses:

Number of respondents who agreed = 62

Weighted score for agreement = 62 (number of respondents) × 3 (score for agreement) = 186

Agreement responses = $\frac{186}{520}$x 100 **=35.77%**

3. Strong agreement responses:

Number of respondents who strongly agreed = 79

Weighted score for strong agreement = 79 (number of respondents) × 4 (score for strong agreement) = 316

Strong agreement responses = $\frac{316}{520}$x 100 **=60.77%**

Figure 5 is a bar chart showing the User Satisfaction and Engagement (in percentages)

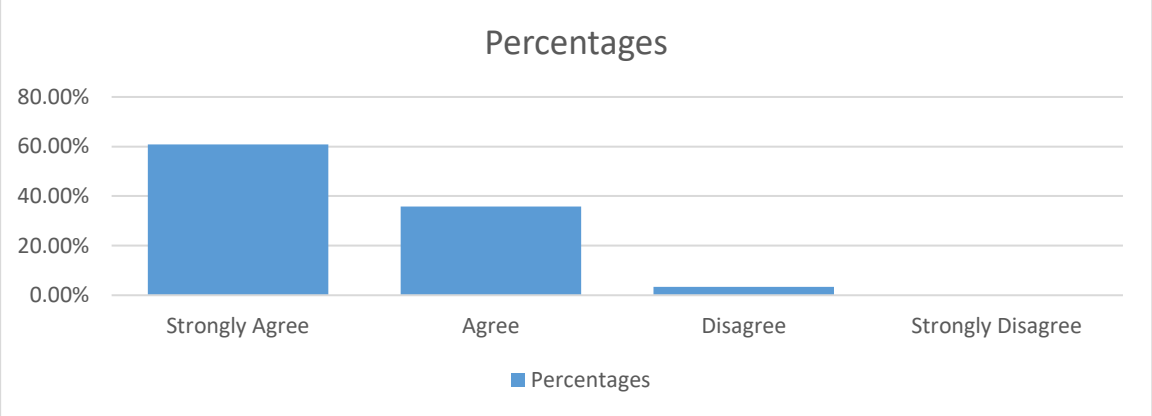

Figure 5: Bar chart showing the User Satisfaction and Engagement (in percentages)

Adding up these weighted scores:

Total weighted score = 18 (disagreement) + 186 (agreement) + 316 (strong agreement) = 520

Based on the analysis of user satisfaction and engagement data, it's evident that respondents overwhelmingly expressed positive sentiments. A significant majority strongly agreed (60.77%) with surveyed aspects, indicating high approval and positive experiences. Furthermore, a notable percentage (35.77%) agreed, reinforcing the overall positive feedback. Dissent was minimal (3.46%) as shown in the bar chart in Figure 5, highlighting the general satisfaction and engagement facilitated by graphic design and animation techniques. These findings emphasize the importance

of incorporating visually appealing and interactive elements in user interfaces to enhance overall user experiences.

This total weighted score gives us an overall measure of the participants' sentiments across the survey questions, with higher scores indicating stronger agreement and satisfaction levels. Table 3 depicts the results of user satisfaction and engagement.

Table 3: User Satisfaction and Engagement (in percentages)

S/N	Variables	Total Scale	Percentage%
1	User Satisfaction and Engagement	520	86.6

4.2.3 Efficiency of Task Completion

The analysis of data collected for the Efficiency of Task Completion involves categorizing responses into four parameters: strongly agree, agree, disagree, and strongly disagree. From the data collected, there were a total of 9 responses indicating disagreement across three questions. This means that 7 respondents disagreed with the statements related to task completion efficiency. Moving to the "agree" category, there were 66 respondents who agreed, representing 66% of the total responses. For "strongly agree," there were also 66 responses. To calculate the weighted scores, the 66 responses in the "strongly agree" category are multiplied by 4, as strongly agree carries a score of 4. Similarly, the 66 "agree" responses are multiplied by 3, and the 9 "disagree" responses by 2, to account for their respective scores.

After performing these calculations and adding the weighted scores together, we gain a comprehensive view of the participants' sentiments regarding the efficiency of task completion across the survey questions.

Calculating the percentages using the corrected total weighted score of 476.

1**. Disagreement responses:**

Number of respondents who disagreed = 7

Weighted score for disagreement = 7 (number of respondents) × 2 (score for disagreement) = 14

Disagreement responses = $\frac{14}{476}$x 100 **=2.94%**

2. Agreement responses:

Number of respondents who agreed = 66

Weighted score for agreement = 66 (number of respondents) × 3 (score for agreement) = 198

Agreement responses = $\frac{198}{476}$x 100 **=41.60%**

3. Strong Agreement responses:

Number of respondents who agreed = 66

Weighted score for agreement = 66 (number of respondents) × 3 (score for agreement) = 264

Strong agreement responses = $\frac{264}{476}$x 100 **=55.46%**

Figure 6 is a bar chart showing the Efficiency of Task Completion (in percentages)

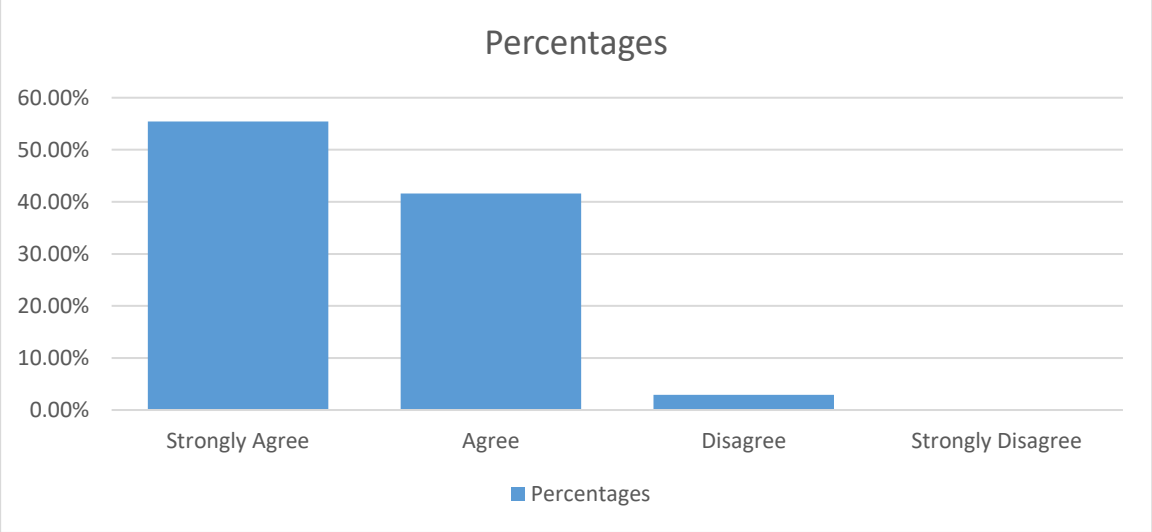

Figure 6: Bar chart showing the Efficiency of Task Completion (in percentages)

These recalculated percentages reflect the sentiments of respondents regarding the efficiency of task completion, showing the distribution of disagreement, agreement, and strong agreement based on the weighted scores and the corrected total weighted score of 476.

Analyzing the data related to the Efficiency of task completion depicts that majority of the respondents expressed positive sentiments towards the assessed aspects. A considerable number strongly agreed (55.46%) with the statements evaluated, indicating a high level of satisfaction and agreement. Additionally, a significant proportion (41.60%) agreed with the statements, supporting the overall positive feedback regarding task completion efficiency. Dissenting opinions were minimal (2.94%), underscoring the general satisfaction and efficiency facilitated by the implemented design and animation techniques. These results represented in the bar chart in Figure 6 highlight the significance of integrating visually appealing and interactive elements within interfaces to improve overall user experiences and task completion efficiency.

This analysis provides a breakdown of respondents' sentiments in terms of disagreement, agreement, and strong agreement regarding the efficiency of task completion. The efficiency of the task completion is shown in Table 4.

Table 4: Efficiency of Task Completion (in percentages)

S/N	Variables	Total Scale	Percentage%
1	Efficiency of Task Completion	476	79.3

4.2.4 Impact on Accessibility

Based on the data collected for Impact on Accessibility, analysis was conducted across four parameters: strongly agree, agree, disagree, and strongly disagree. Out of the total responses received for three questions, 10 respondents expressed disagreement. Conversely, 65 respondents agreed with the statements, while a significant number of 83 respondents strongly agreed. To calculate the weighted scores, we multiply the number of responses in each category by their respective scores: 10 (disagree) by 2, 65 (agree) by 3, and 83 (strongly agree) by 4. These calculations yield weighted scores of 20, 195, and 332, respectively. By summing these scores (20 + 195 + 332), we obtain a total weighted score of 547. This analysis provides a comprehensive view of the participants' sentiments regarding the impact of accessibility features, showcasing a predominance of positive feedback, particularly in the strongly agree category.

The percentages based on the corrected total weighted score of 476 for Impact on Accessibility are given as follows:

1. Disagreement responses:

Number of respondents who disagreed = 10

Weighted score for disagreement = 10 (number of respondents) × 2 (score for disagreement) = 20

Disagreement responses = $\frac{20}{547}$x 100 **=3.66 %**

2. Agreement responses:

Number of respondents who agreed = 65

Weighted score for agreement = 65 (number of respondents) × 3 (score for agreement) = 195

Agreement responses = $\frac{195}{547}$x 100 **=35.7%**

3. Strong agreement responses:

Number of respondents who strongly agreed = 83

Weighted score for strong agreement = 83 (number of respondents) × 4 (score for strong agreement) = 332

Strong agreement responses = $\frac{332}{547}$x 100 **=60.7%**

Figure 7 is a bar chart showing the Impact on Accessibility (in percentages)

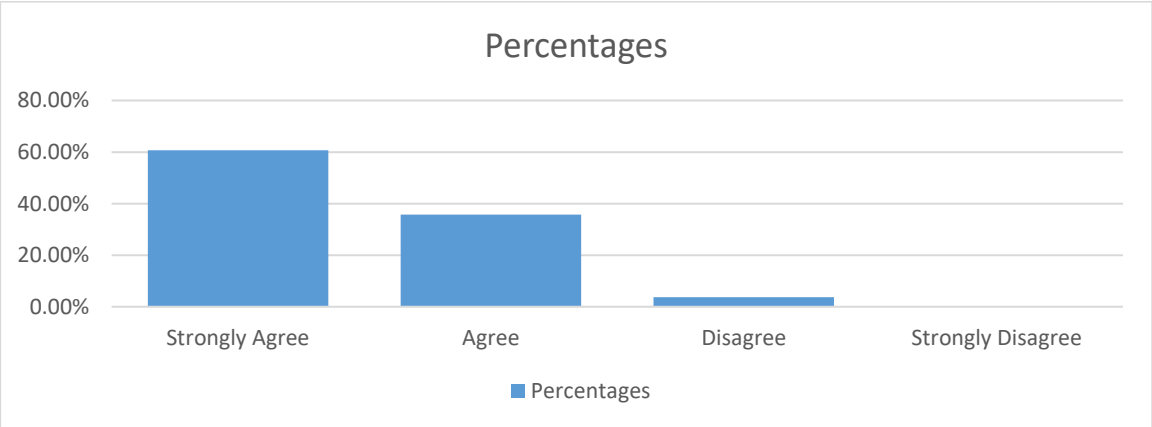

Figure 7: Bar chart showing the Impact on Accessibility (in Percentages)

Based on the recalculated percentages for Impact on Accessibility using the corrected total weighted score of 547, the findings reveal significant positive sentiments among respondents. The majority of respondents expressed strong agreement (60.7%) with the accessibility features, indicating a high level of satisfaction and positive experiences with the app's design. Additionally, a notable percentage (35.7%) agreed with the accessibility aspects, further affirming the overall positive feedback. Dissent was minimal, with only 3.66% expressing disagreement, depicting a general consensus of approval and satisfaction regarding the app's accessibility features. These findings underscore the importance of incorporating effective accessibility elements in digital interfaces to enhance user experiences and satisfaction levels; this is represented in the bar chart in Figure**7.**

These recalculated percentages provide a clearer picture of the participants' sentiments regarding the impact on accessibility, highlighting the distribution of disagreement, agreement, and strong agreement based on the corrected total weighted score. Table 5 depicts the impact on accessibility features.

Table 5: Impact on Accessibility (in percentages)

S/N	Variables	Total Scale	Percentage%
1	Impact on Accessibility	547	91.2

4.2.5 User Perception on Functional Enhancements

Based on the data collected for User Perception of Functional Enhancements, the analysis was conducted across four parameters: strongly agree, agree, disagree, and strongly disagree. Out of the total responses received for three questions, 13 respondents expressed disagreement. Conversely, 55 respondents agreed with the statements, while a significant number of 82 respondents strongly agreed. To calculate the weighted scores, we multiply the number of responses in each category by their respective scores: 13 (disagree) by 2, 55 (agree) by 3, and 82 (strongly agree) by 4. These calculations yield weighted scores of 26, 165, and 328, respectively. By summing these scores (26 + 165 + 328), we obtain a total weighted score of 519.

Recalculating the percentages based on the corrected total weighted score of 519 for User Perception of Functional Enhancements is given as follows:

1. Disagreement responses:

Number of respondents who disagreed = 13

Weighted score for disagreement = 13 (number of respondents) × 2 (score for disagreement) = 26

Disagreement responses = 26/519 x 100= 5.01%

Disagreement responses = $\frac{23}{519}$x 100 **= 5 %**

2. Agreement responses:

Number of respondents who agreed = 55

Weighted score for agreement = 55 (number of respondents) × 3 (score for agreement) = 165

Agreement responses = 165/519 x 100= 31.79%

Agreement responses = $\frac{165}{519}$x 100 =31.8%

3. Strong agreement responses:

Number of respondents who strongly agreed = 82

Weighted score for strong agreement = 82 (number of respondents) × 4 (score for strong agreement) = 328

Strong agreement responses = $\frac{328}{519}$x 100 **=63.2%**

Figure 8 is a bar chart showing the User Perception of Functional Enhancements Percentage

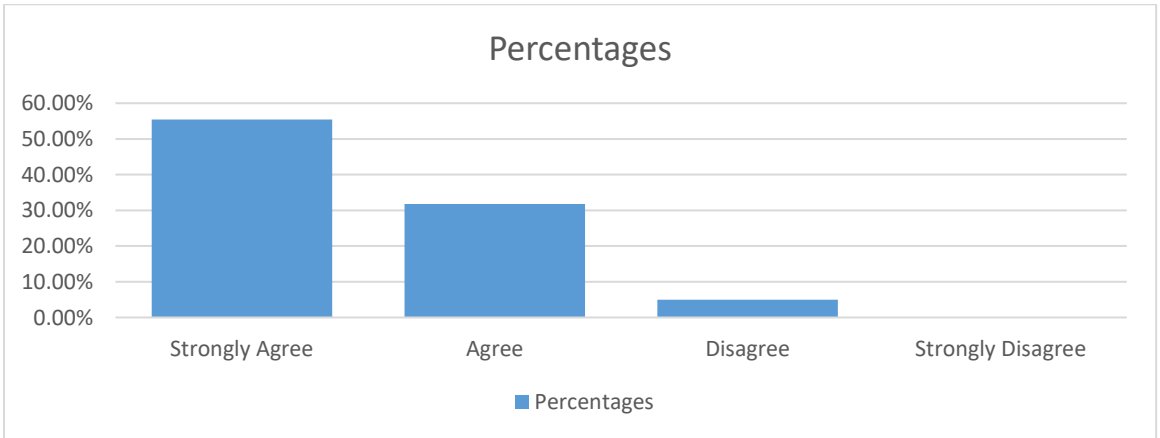

Figure 8: Bar chart showing the User Perception of Functional Enhancements (in percentages)

Based on the analysis of data collected for User Perception of Functional Enhancements, the findings indicate a generally positive perception among respondents. A significant majority (63.20%) strongly agreed with the statements related to functional enhancements, highlighting a strong endorsement of these aspects. Additionally, 31.79% of respondents agreed with the statements, supporting the overall positive feedback. Dissent was minimal, with only 5.01% expressing disagreement. These results suggest that users perceive the functional enhancements positively, emphasizing the importance of incorporating such features to enhance user experiences and satisfaction, this is depicted in Figure 8.

These recalculated percentages provide a more accurate representation of the respondents' sentiments regarding functional enhancements, showcasing a balanced distribution between disagreement, agreement, and strong agreement categories. Table 6 depicts a table of user perception of functional enhancements.

Table 6: User Perception of Functional Enhancements

S/N	Variables	Total Scale	Percentage%
1	User Perception of Functional Enhancements	519	86

4.2.6 Summary of Findings

The findings from the analysis of data collected for User Perception of Functional Enhancements indicate a positive perception among respondents. A significant majority, approximately 63.20%, strongly agreed with the statements related to functional enhancements, depicting a strong endorsement of these features. Additionally, around 31.79% of respondents agreed with the statements, providing further support for the positive feedback. Dissent was minimal, with only about 5.01% expressing disagreement. These results suggest a positive reception of functional enhancements by users, underlining the importance of incorporating such features to enhance user experiences and satisfaction levels.

Similarly, the recalculated percentages for Impact on Accessibility using the corrected total weighted score of 547 revealed significant positive sentiments among respondents. The majority of respondents, approximately 60.7%, expressed strong agreement with the accessibility features, indicating a high level of satisfaction and positive experiences with the app's design. An additional 35.7% agreed with the accessibility aspects, further reinforcing the overall positive feedback. Dissent was minimal, with only about 3.66% expressing disagreement. These findings underscore the importance of effective accessibility elements in digital interfaces to enhance user experiences and satisfaction levels.

Analyzing the data related to the Efficiency of task completion, it is evident that the majority of respondents expressed positive sentiments towards the assessed features. A significant number, approximately 55.46%, strongly agreed with the statements evaluated, indicating high satisfaction and agreement. Additionally, around 41.60% agreed with the statements, supporting the overall positive feedback regarding task completion efficiency. Dissenting opinions were minimal, at about 2.94%, highlighting the general satisfaction and efficiency facilitated by the implemented design and animation techniques. These results emphasize the significance of integrating visually appealing and interactive elements within interfaces to improve overall user experiences and task completion efficiency.

The analysis of user satisfaction and engagement data shows overwhelming positive sentiments among respondents. A significant majority, around 60.77%, strongly agreed with surveyed aspects, reflecting high approval and positive experiences. Additionally, approximately 35.77% agreed, further reinforcing the positive feedback. Dissent was minimal, at about 3.46%, showcasing the general satisfaction and engagement facilitated by graphic design and animation techniques. These

findings emphasized the importance of incorporating visually appealing and interactive elements in user interfaces to enhance overall user experiences.

5.0 Conclusion

The design and data analysis in this study revealed intricacies of enhancing user interface design and efficiency through graphic design and animation integration. The choice of Figma as the primary design tool proved instrumental in crafting visually appealing and user-friendly interfaces. Its collaborative features, versatile toolkit, and support for animations facilitated seamless teamwork, iteration, and prototyping. The Landing Page Animation, Circular Navigation Animation, and Navigation Map Animation components exemplify the practical application of animation techniques in creating engaging and intuitive user experiences. These animations not only depicted different car types effectively but also streamlined navigation, reduced clutter, and enhanced user engagement. On the data analysis front, the recalculated percentages for Impact on Accessibility and User Perception of Functional Enhancements provided valuable insights into user sentiments and satisfaction levels. The findings underscored the positive impact of well-integrated design elements on user experiences, highlighting the importance of aesthetics, functionality, and usability in digital interfaces.

This research demonstrated the power of design innovation and data-driven decision-making in creating impactful digital products. The combination of thoughtful design processes, iterative refinement, and analytical insights has contributed to a deeper understanding of user-centric design principles and their influence on user interactions and perceptions. This work will serve as a foundation for future design endeavors aimed at optimizing user experiences and driving user satisfaction in digital environments.

5.1 Recommendation

The study makes the following recommendations:

(i) Future UI/UX design and development endeavors can benefit greatly from the insights gained in this study. Leveraging advanced design tools like Figma, which offer collaborative features, a versatile toolkit, and robust animation support, can significantly enhance the design process. These tools facilitate seamless teamwork, iterative development, and effective prototyping, leading to more refined and user-friendly interfaces.

Incorporating animations thoughtfully, such as the Landing Page Animation, Circular Navigation Animation, and Navigation Map Animation, is essential for creating engaging and intuitive user experiences. These animations effectively showcase features dynamically, streamline navigation, reduce visual clutter, and enhance user engagement.

Prioritizing accessibility and usability remains crucial. The project's data analysis on user perception and accessibility underscores the importance of well-designed elements that enhance both aesthetics and functionality. Ensuring that digital interfaces are accessible and easy to use for all users is imperative. Regularly recalculating and analyzing user feedback helps identify areas for improvement and maintain high satisfaction levels.

Adopting a user-centric design approach is vital. Understanding user needs, preferences, and behaviors should be the focus, aiming to create interfaces that are not only visually appealing but also highly functional and user-friendly. Iterative refinement based on user feedback is essential for optimizing user experiences.

Combining design innovation with data-driven decision-making can lead to more impactful digital products. Analyzing user data to understand the effectiveness of design elements and making

informed adjustments enhances the overall user experience. Future study should continue to utilize data analytics to guide design choices and validate the effectiveness of design interventions.

The research emphasizes the importance of fostering a culture of continuous learning and improvement within design teams. Staying updated with the latest design trends, tools, and user research methodologies ensure that future study remains innovative and user-centric. By implementing these recommendations, future UI/UX projects can achieve higher levels of user satisfaction, engagement, and overall success, creating digital environments that are both aesthetically pleasing and highly functional.

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