Nirvana: A Meditation Mobile-based Application Specializing in Stress-Relief of Academic Workload for College Students

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Article Info

Article History

Received:
13 July 2024
Accepted:
29 November 2024

Keywords

Anxiety
Mobile application
Usability
Stress
Mental health

Abstract

The challenges of college life can place considerable stress on students, impacting their academic performance and personal well-being. Academic pressures, such as demanding coursework and the constant pursuit of high grades, can lead to anxiety and depressive thoughts. Meditation is a practice that can enhance students' mental well-being and help them navigate academic challenges. This study aims to assess the effectiveness of the Nirvana meditation mobile application in reducing academic stress among university students aged 18 to 25. The app offers stress modules, personalized plans, guided visualization exercises, and smart academic stress management features. The research utilized the User Experience Questionnaire (UEQ) and its analysis tool, incorporating reliability measures like Cronbach's Alpha and Guttman's Lambda2 coefficients. Results indicate the application's attractiveness, innovation, and efficiency strengths, highlighting its potential as a user-friendly and dependable solution. However, there is room for improvement in enhancing the app's clarity. Future work should focus on improving user-friendliness and understanding. This research provides insights for optimizing the user experience and supporting students' well-being in the academic environment.

Introduction

College life can significantly stress students, substantially impacting their health and well-being. The academic challenges of college, including demanding coursework, numerous assignments, and the constant pressure to excel, can create a stressful environment. This stress is not limited to academics alone as it also encompasses the need to balance personal and academic life. The constant pursuit of high grades to meet expectations from parents, classmates, and significant others can be a source of anxiety. This stress, influenced by various academic, interpersonal, and environmental factors, can affect students' mental and emotional states (Austria-Cruz, 2019). The stressors that college students often encounter can significantly impact their mental well-being, particularly when it comes to depressive thoughts (Acharya, 2018).

Many students experience anxiety, doubt, and sometimes even severe emotional problems. It has been observed that university or college students experience notably higher stress levels than the general population. The concept of stress is widely recognized in social, academic, and professional settings, and it is generally

acknowledged that some degree of pressure can enhance performance. However, when these pressures exceed a person's capacity to cope effectively, they can result in significant stress (Gustems-Carnicer, 2019). It is crucial to understand the dynamics of stress generation and management among university students, as it affects their academic performance and has potential long-term consequences on their well-being and adopting coping strategies. Recognizing and addressing these stressors unique to the college experience is crucial, emphasizing the importance of effective stress management strategies and support systems to help students successfully navigate this critical phase (Austria-Cruz, 2019; Acharya, 2018).

Meditation is a diverse practice encompassing various techniques and methods to enhance mental well-being and awareness. It involves various ways of focusing attention, altering emotional responses, and achieving a state of inner calm and clarity. Meditation techniques can differ significantly based on tradition, context, and purpose. Despite this diversity, the common thread in meditation is the intentional cultivation of mental and emotional states for personal growth and improved psychological health (Matko & Sedlmeier, 2019). By practicing mindfulness and meditation techniques, students can develop effective coping mechanisms to navigate the demanding circumstances of academic life. This practice encourages individuals to stay focused on the present moment, promoting self-awareness and reducing the impact of stressors. Students can experience decreased anxiety levels and improved overall well-being through regular meditation sessions. This simple yet powerful practice can enhance students' ability to handle academic challenges and maintain a healthier balance between their studies and personal life (Lemay, 2019).

The primary goal of this study is to comprehensively assess the influence, user engagement, and effectiveness of the Nirvana meditation mobile application in lowering academic stress among university students worldwide, aged 18 to 25. By examining the app's specific stress modules, personalized plans, guided visualization exercises, and smart academic stress manager features, the study aims to provide insights into its ability to reduce stress, improve attention, and promote improved academic achievement.

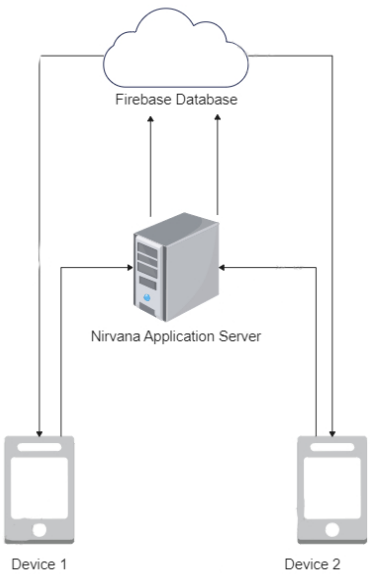

Figure 1. System Architecture for Nirvana Mobile Application

Review of Related Literature

Gabers et.al (2021) stated that stress is a natural response of the human mind to various challenges, threats, or changes in one's environment, which dictate behaviors in different forms, from acute stressors to chronic stress, that can be complex in many ways. In a school environment, a study shows that just about 67.1% of 167 adolescents in 10 schools sleep fewer than eight hours on weeknights (Sloover et.al, 2022). This lack of sleep quality from young adults can contribute to the development of anxiety, where restlessness disrupts the circadian system of the body, increasing the risk of mental health issues. A meta-analysis suggests that people with anxiety or who have gone through various trauma and stressor-related disorders can develop impaired mentalization (Sloover et.al, 2022). Puyat et.al (2021) founds that chronic stress, along with anxiety-induced activities, are significant factors in developing depression, which is the response of the body that contributes to changes in the brain and dysregulation of mood.

In the Philippines, a study shows that 8.9% of 19,007 young adults suffered from moderate to severe depression, encompassing various life backgrounds, from education, marital status, place of residence, and wealth (Moreno et.al, 2023). One way to alleviate these mental health issues would be to do meditation, which can regulate stress hormones like cortisol and break the cycle of anxious thoughts by enhancing cognitive control. A study suggested that meditation improves emotional self-regulation, leading to lower academic stress.

Moreover, Konyukhova et.al (2023) adresses that in a university setting, stress is prominent throughout the students' journey with various academic responsibilities and workloads such as homework, seatwork, exams, and projects. In order to successfully manage homework, seatwork, examinations, and projects, students might benefit from strategies including goal setting, planning, and metacognitive prompts (Xu et.al, 2023). Apart from academics, social life in and outside the university can put much stress, too, especially on the dynamic of friendships, classmates, professors, and parents. Various cultural contexts offer varying degrees of outside assistance to individuals, and the individualism/collectivism components place various values on personal objectives like scholastic accomplishment (Hanaysha et.al, 2023). Of course, high teacher competency, good facilities, and a quality classroom environment all contribute to supporting the students to reduce stress levels.

Quirk and Anderson (2023) stated that to make the development of the mobile application successful, its user interface should be visually appealing to the students, and navigation should be simple and consistent with the design elements across different parts of the app. The context for its specific users mitigates common barriers that mental health app struggles with, such as uptake and engagement to relieve stress. A study by Olugbenga Oti and Ian Pitt (2021) agrees with the importance of context through user-centered approaches because convenience, personalization, and the importance of language improve user experience. Of course, user satisfaction must be considered, especially when dealing with an application catered to mental health, as this can indicate whether it helps students with their stress levels (Shi et.al, 2021). There will always be a decline in user engagement when developing a mobile application, and it should be noted that first experience with a mental health intervention is critical.

Since mental health is a common topic, several applications cater to people of all ages, occupations, and lifestyles, where meditation practices and sleep aid features are common (Headspace, 2012; Calm, 2014). Specifically, there will be content for meditation to promote better sleep whenever the users need to relax and unwind before bedtime for Headspace, Calm, and Meditopia. Insight Timer, however, offers a social feature where users can connect with others with the same problem, creating engagement and understanding (Insight Timer, 2010). Lastly, the Smiling Mind application is designed for specific content in different age groups (Smiling Mind, 2014).

The application is unique since it has specially designed stress modules that emphasize lowering academic pressure, boosting attention, and enhancing memory (Xu et al., 2023). The app's personalized routines also include meditation exercises designed especially to withstand the demands of college. The software also offers guided visualization exercises that encourage a positive view of one's academic journey, help pupils imagine academic success, and reduce exam and assignment anxiety. By connecting with users' calendars and scheduling meditation sessions automatically around rigorous academic pursuits, the app is a useful tool for managing academic stress. In times of extreme stress, this function ensures fast support, actively assisting students in keeping a reasonable and considerate attitude toward their academic tasks (Oti & Pitt, 2021).

Mindful study reminders are another innovative feature that provides thoughtful notifications to prompt users to take brief meditation breaks, enhancing focus and reducing study-related stress (Xu et.al 2023; Oti & Pitt, 2021; Shi et al., 2021). Users may record their emotions, fears, and meditation experiences in the app's mood and stress journals. While other meditation apps offer helpful elements like various guidance styles, content accessibility, targeted goals, journaling, and a variety of website presences, our app focuses solely on lowering academic stress with specific modules, tailored plans, and clever stress management tools. This tailored approach satisfies the acknowledged need for context-specific mental health interventions in the academic setting (Oti & Pitt, 2021). Additionally, Shi et al. (2021) demonstrated by recent research, incorporating user-centered design concepts and strongly emphasizing tailoring content to meet user needs is crucial to developing and optimizing our app, resulting in a positive and beneficial user experience.

Technical Background

The proposed system, Nirvana, has used certain software and servers, which include Google Forms, Google Calendar, a web server, a database server, and Application Programming Interfaces (APIs) of YouTube and Spotify. One of the highlighted steps based on this specific proposal is the distribution of the survey questionnaires through the use of Google Forms, which assesses the stress management of college students, serving as a form of data. In addition, such questions and varying elements of selections in terms of the student’s information and scales of question in relation to stress, mental health, coping mechanisms, and many more to follow. As a feature, the said mobile system tracks schedules for the relaxation of users, which integrated Google Calendar that assesses the feeling of a user on a specific day. Furthermore, each day is marked with colors, indicating the level of stress, and it is also monthly evaluated, showing the summarization of the said assessment each day.

The incorporation of YouTube and Spotify APIs is further utilized through the help of either an extensible software development kit or data API that is used to access specific features, such as the library, within the said digital music services. Under the Android operating system, the study has managed to use Android SDK and Android Studio in terms of the general development of the mobile application, especially the use of debuggers and such tools that are available. At the same time, the overall structure of the said application has used Tech Stack, which allows the integration of different programming languages and related frameworks in the functionality process, such as the back-end.

The said mobile application has managed to use a web server, allowing users to connect in real-time by utilizing related features, including specialized stress modules, personalized plans, guided visualizations, integration with calendars, mindful study reminders, and mood and stress journals. Moreover, it is also responsible for handling the flow of requests and the reciprocated responses alongside the stored file between browsers and the internet. Concerning the data management procedure of Nirvana, as per Figure 1, the system architecture has used the Firebase database, a cloud-based form of database that uses JavaScript Object Notation (JSON) in storing such data. Additionally, it is supported through a powered database server, which processes the collection of the data that are about to be gathered, including user information, visual records, module history, journals, and calendar scheduling or entries and notes creation.

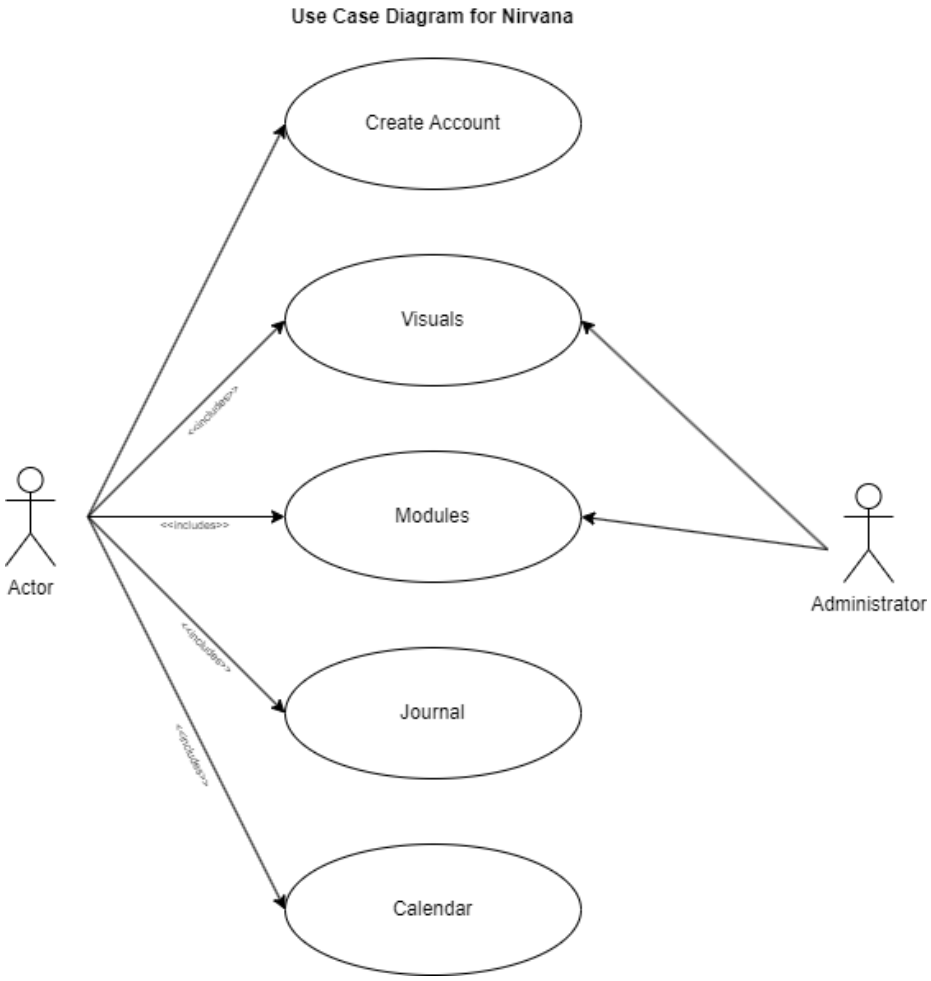

Figure 2. Use Case Diagram

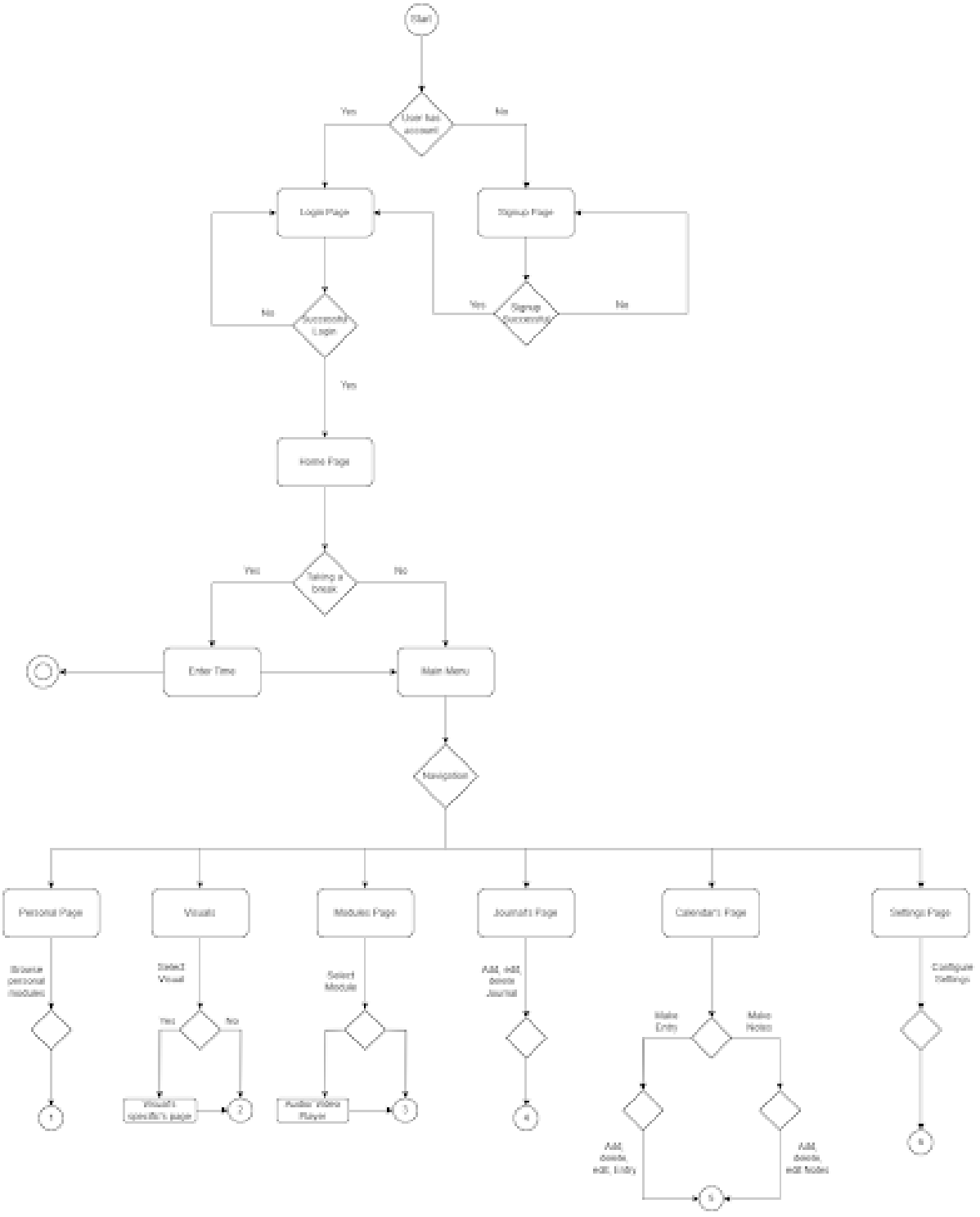

Figure 3. Process Flow Diagram

The research design for this specific study is quantitative methods, as surveyed data will be statistically analyzed based on the said mobile application's effectiveness as a prototype. As the study focuses on both the user experience and the usability of the proposed mobile application, it also assessed the user information and related experiences regarding stress management, considering how they adapt or how pressured they are. Through the use of Google Forms, college students from different universities have taken part in the study, with a total of thirty (30) responses, which is the desired population that will be used for the results and discussion,

considering the use of the simple random sampling as the type of probability and short version of the User Experience Questionnaire (UEQ-S) as the data analysis tool. The Nirvana mobile application is designed to accommodate users in managing their levels of stress through the given features of calendar tracking. Since Nirvana focuses on the personal experience of the user, the User Experience (UX) is applied, especially in survey questionnaires that have assessed and numerously scaled what they feel in relation to the provided instrument. Based on Figure 2, the said diagram has shown the scope of Nirvana, considering the relationship and interaction of the user as the actor and administrator directly to the presented features of the said application. The actor, in this specific diagram, has included all components of Nirvana, from the creation of the account all the way up to the calendar schedule. The administrator focuses on the visuals and modules, as both features are recognized to be used on the data analysis tool in effectively managing the user experience in managing stress.

The prototyping of processes involved in the proposed mobile application has used Figma, considering the presented initial design in creating the user interface (UI). The UI/UX for Nirvana is shown in Figure 3, specifically, the flowchart structure that deals with conditions scoping from account creation of the user all the way to its navigational features, considering the personal page, visuals, modules page, and many to follow.

Results and Discussion

The User Experience Questionnaire (UEQ) analysis tool represents a specialized software application designed to cater to the needs of researchers and designers engaged in the rigorous evaluation of data acquired from the UEQ questionnaire. This purpose-built tool expedites the process of data interpretation by enabling users to create graphical representations and conduct comprehensive analyses of the collected data. This, in turn, empowers researchers to derive significant insights into the user experience of products, services, or interfaces. In a formal context, this tool is a pivotal resource for individuals operating within research and design, facilitating a more profound comprehension of user experiences through systematic feedback and meticulous data analysis (Zhu et al., 2022).

The utilization of the UEQ analysis tool proved instrumental in the research by allowing a thorough assessment of the user experience. It facilitated the calculation of vital statistical metrics, including the mean per item distributions, giving a perspective on users' perceptions and interactions with the application. This tool was pivotal in the computation of critical coefficients, specifically, Guttman's Lambda2 and Cronbach's Alpha, thereby ensuring a rigorous evaluation of the internal consistency and reliability of the employed scales. The UEQ analysis tool enabled benchmarking based on the UEQ General Benchmark, offering a valuable reference point for contextualizing and interpreting the user experience data within a broader framework.

To ensure the accuracy of the analysis, the researchers initiated the data processing phase by transforming the original 1-7 scale to a standardized -3 to 3 scale. This strategic adjustment ensured that the UEQ analysis tool could effectively interpret and compute the statistical metrics. The tool could seamlessly process the values and generate precise statistics by aligning the data with a uniform and centered scale, ranging from -3 as the lowest

to 3 as the highest.

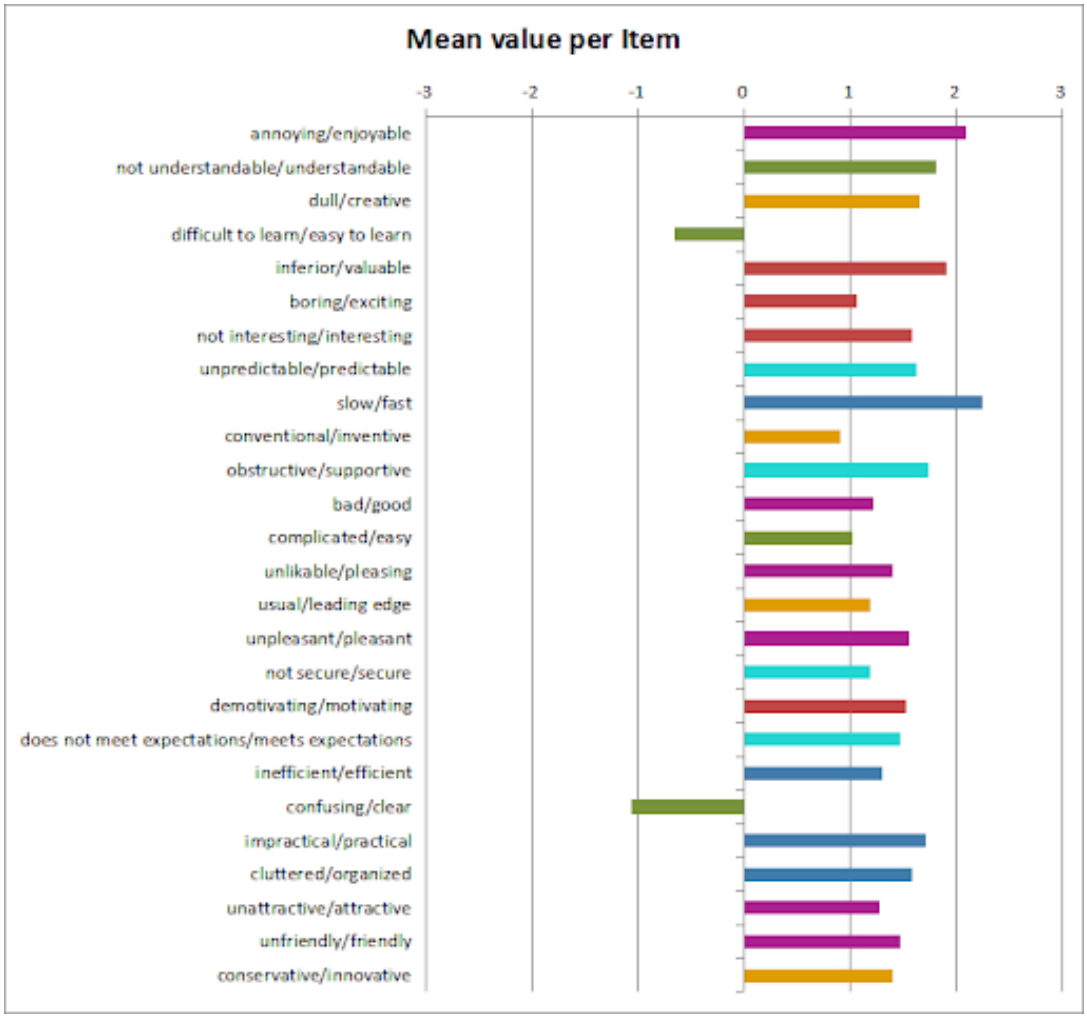

Figure 4. Mean per Item

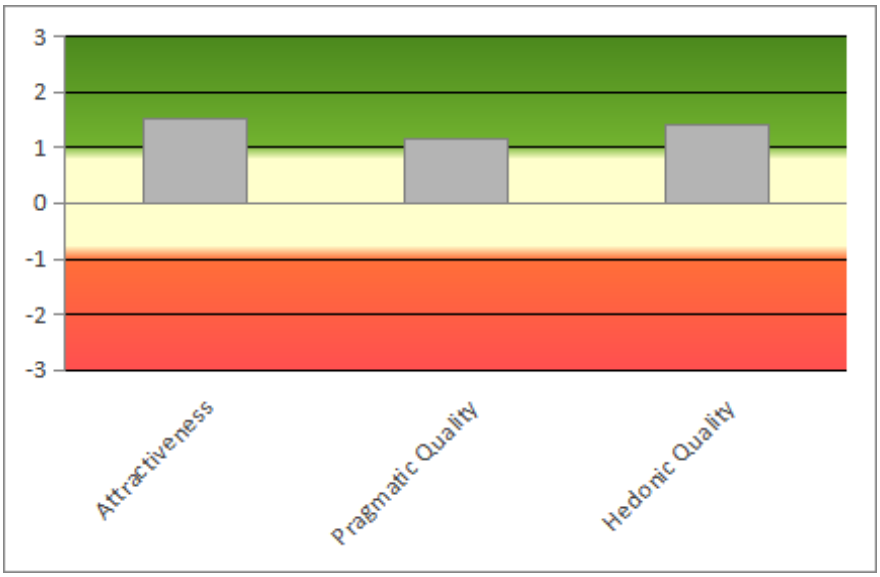

Figure 5. Grouped Scales of the UEQ

Users generally found the product or service attractive, understandable, and innovative, with positive ratings for attractiveness, clarity, novelty, dependability, and efficiency. However, there was a varied response to attributes reflecting the emotional and motivational aspects of the user experience, indicating differing user perspectives. The data highlights the importance of achieving a balanced user experience, considering clarity, novelty, and dependability, and emphasizes the value of data-informed decisions for product or service improvement.

The User Experience Questionnaire (UEQ) scales can be classified into two main categories: pragmatic quality, encompassing Perspicuity, Efficiency, and Dependability, and hedonic quality, comprising Stimulation and Originality. Pragmatic quality pertains to task-related quality aspects, while hedonic quality pertains to non-task-related quality aspects. Subsequently, the mean values for the three pragmatic and two hedonic quality aspects are computed as a part of the analysis.

In Figure 6, it shows that a significant number of users expressed their perception of the application as being on the "confusing" end of the spectrum, and this observation aligns with the application being perceived as "difficult to learn." While these aspects garnered negative responses, it is noteworthy that the majority of the responses fell within the positive spectrum. Users generally found the application to be "creative," "fast," "practical," "innovative," and "pleasant," indicating a positive overall impression of these specific attributes.

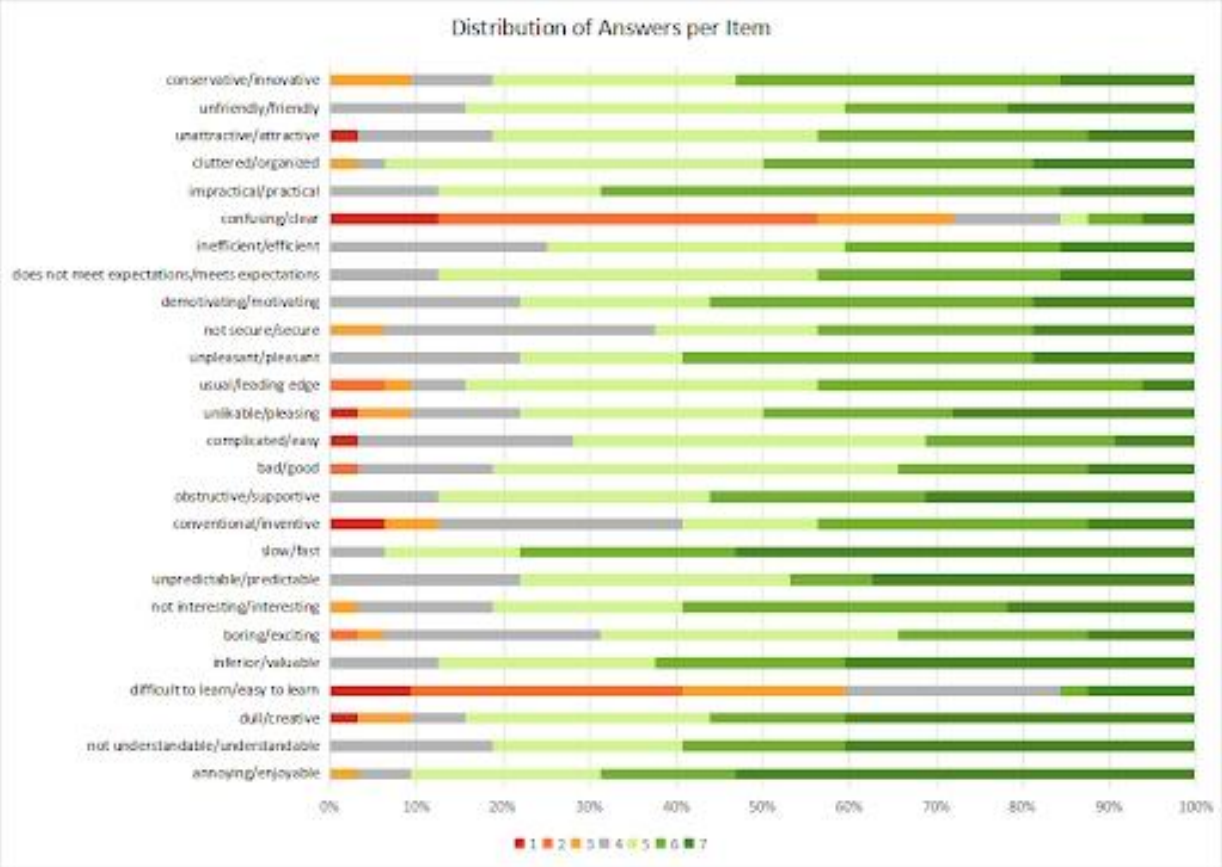

Figure 6. Distribution of Answers per Item

Having consistent and dependable measurement scales is crucial. It ensures that the data collected is trustworthy

and can be compared accurately. The researchers used two essential tools: Cronbach's Alpha and Guttman's Lambda2 coefficients. Cronbach's Alpha checks how closely related items within a scale are, with higher values indicating firmer internal consistency. Guttman's Lambda2 is a more refined measure of reliability. It helps researchers assess how well a scale is working. Ensuring scale consistency using these coefficients makes the research results more reliable and leads to more precise insights into the user experience.

Table 1. Comparison of Measurement Scales Coefficients

Scale	Cronbach's Alpha-Coefficient	Guttman's Lambda2 coefficient
Attractiveness	0.74	0.77
Perspicuity	0.75	0.79
Efficiency	-0.03	0.17
Dependability	0.32	0.37
Stimulation	0.28	0.33
Novelty	0.75	0.73
Attractiveness	0.74	0.77

Table 1 provides insights into the internal consistency and reliability of the scales used in the study, as measured by Cronbach's Alpha and Guttman's Lambda2 coefficients. Notably, the "Attractiveness," "Perspicuity," and "Novelty" scales demonstrate relatively high internal consistency, with Cronbach's Alpha values exceeding 0.70, indicating strong reliability. The Guttman's Lambda2 coefficients for these scales also align with this finding, reinforcing their reliability. However, the "Efficiency," "Dependability," and "Stimulation" scales exhibit lower internal consistency, with both Cronbach's Alpha and Guttman's Lambda2 values falling below the desired threshold. This suggests that these scales may benefit from refinement to enhance their reliability.

Table 2. General UEQ Benchmark

Category	Attractiveness	Perspicuity	Efficiency	Dependability	Stimulation	Originality
Excellent	1.84	2.00	1.88	1.70	1.70	1.60
Good	1.58	1.73	1.50	1.48	1.35	1.12
Above average	1.18	1.20	1.05	1.14	1.00	0.70
Below Average	0.69	0.72	0.60	0.78	0.50	0.16

Table 3. Mean Values of Scales

Scale	Mean
Attractiveness	1.51
Perspicuity	0.28
Efficiency	1.72
Dependability	1.51
Stimulation	1.52
Novelty	1.29

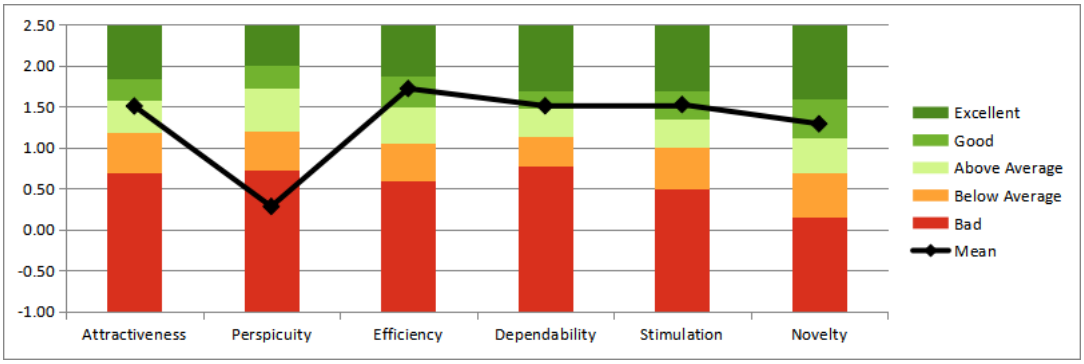

Figure 7. Scale's Benchmark

Upon computing the means for each scale, our assessment of the application's usability was further enriched by referencing the UEQ General Benchmark table. As illustrated in Figure 7, this benchmark table was a valuable reference point for evaluating the application's performance in various aspects. Notably, the application's "Attractiveness" scale yielded a mean rating of 1.51, positioning it just a few points shy of being considered "good." This suggests that users generally find the application above average regarding its appeal and overall impression.

However, a notable contrast emerges in the "Perspicuity" scale, where the application received a lower mean rating of 0.28, indicating that it is perceived as challenging to understand or potentially confusing to users. This highlights where improvements may be necessary to enhance user comprehension and ease of use. On a positive note, the scales of "Efficiency," "Dependability," "Stimulation," and "Novelty" all received mean ratings in the "good" range. This collectively suggests that the application is highly usable but also efficient, innovative, and reliable. The findings underscore the application's vital usability attributes, signaling its potential as a user-friendly and dependable solution that offers efficiency and innovation in its design and functionality.

Conclusion

This research study employed a comprehensive approach to assess the user experience of a particular application, utilizing the User Experience Questionnaire (UEQ) and a specialized analysis tool. Through meticulous analysis, we derived valuable insights into the various facets of the user experience, encompassing attributes like attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty. Scale consistency was established as a critical prerequisite for this endeavor, and the application of reliability measures, including Cronbach's Alpha and Guttman's Lambda2 coefficients, contributed to a robust evaluation of scale reliability. The results revealed that the application excels in attractiveness, innovation, and efficiency, underscoring its potential as a dependable, user-friendly solution. However, there exists room for improvement, particularly in enhancing the application's perspicuity to make it more understandable to users.

As for future work, enhancing the application's user-friendliness and clarity presents an essential avenue for improvement. By addressing the challenges related to user understanding, the application can aspire to offer a more intuitive and user-friendly experience. In summary, this research sheds light on the strengths and areas for

refinement in the evaluated application and underscores its potential as a highly usable and efficient solution. It serves as a foundation for further enhancements to optimize the user experience.

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