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ZINSOMNIA: ONLINE APPLICATION TEST OF INSOMNIA DISORDER AMONG STUDENTS

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Abstract

Insomnia is a sleep disorder that negatively impacts a student's academic achievement, physical health, mental well-being, and overall quality of life. In addition, it also impairs critical thinking, problem-solving skills and can lead to hindering academic success among students. Such occurrence is due to insomniac individuals are unaware of their condition. The trepidation relating to acquiring treatment also poses a hindrance to these insomniac individuals. The purpose of this study is to design a mobile application about Insomnia disorder initial treatment addressing the problems on awareness and the distress related insomnia. The project implemented the Waterfall methodology and utilized the usability evaluation with a 5-point Likert scale as a data collection method.

Keywords: Insomnia; Sleep disorder; Mobile application; Waterfall Methodology; Usability

INTRODUCTION

Insomnia is a frequent sleep condition characterized by difficulty getting asleep, remaining asleep, or experiencing non-restorative sleep while having ample sleep opportunities. Research by Schlarb et al (2017) mentioned that up to 60% of all college students have poor sleep quality, with 7.7% meeting all the criteria for an insomnia condition. Sleep issues have a significant impact on students' daily lives, including their grade point average (Jalali et al, 2020). Insomnia also can have a negative impact on many elements of a student's

life, including academic achievement, physical health, mental well-being, and general quality of life. Due to irregular daytime routines, chronotype changes, side jobs, and exam periods, they need treatments for improving their sleep to be more productive and improve their social life. Providing insomnia resources and counseling services can help students address underlying psychological factors contributing to insomnia.

For degree candidates, insomnia can cause a wide range of issues and have a significant negative influence on both their academic and personal lives (Fatema Habbash et.al, 2022). One major obstacle is the absence of awareness regarding insomnia problem. According to research by Fatema Habbash et al. (2022), 65% of bachelor's degree is reported having insomnia is a bachelor's degree as an educational level. For example, irregular sleep patterns emerge as a common symptom, further disrupting daily routines and academic schedules. In the end, the cumulative effect of insomnia leads to a diminished quality of life for degree students, impacting not only their academic pursuits but their overall well-being and personal growth. Besides, the effect of economy also can be reason why they do not get a treatment and it can increase stress and anxiety of the students. The stress of academic responsibilities and lack of encouragement to go treatment combined with the anxiety of not getting enough sleep can create a vicious cycle. Students with insomnia may experience heightened stress levels and anxiety, making it even more challenging to fall asleep. Moreover, the cognitive repercussions of insomnia extend to impaired critical thinking and problem-solving skills, undermining the core competencies essential for a successful academic journey.

This study proposes a mobile-based insomnia test system to reduce insomnia disorder problems among degree students. The system aims to increase test accuracy, assist users in finding suitable applications, and aid in diagnosing health insomnia issues. The system aims to improve sleep, minimize symptoms, and educate patients on the importance of treatment, ultimately reducing sleep disorders and human difficulties.

Project Scope

The project aims to develop a telemedicine mobile application system for insomnia disorder, specifically designed for degree students experiencing sleep disturbances. The application focuses on identifying patients with insomnia disorder and their relationship with the target users, aiming to encourage early treatment and understanding of symptoms. The

content is in English, powered by Android, and uses Cognitive Behavioural Therapy for Insomnia (CBT-I) methods to treat sleep and circadian disturbances associated with depression. The application includes information about insomnia, tests using the Pittsburgh Sleep Quality Index (PSQI), sleep relaxing music, sleep diaries, and an Objectives-Based Evaluation (OBE) questionnaire. By providing early prevention and early intervention, the number of insomnia patients experiencing chronic insomnia can be reduced.

LITERATURE REVIEW

Insomnia, a universal sleep disorder, is characterized by continuous difficulties in initiating or maintaining a restful and uninterrupted sleep pattern. Individuals with insomnia often experience symptoms, including trouble falling asleep, frequent awakenings during the night, and the inability to return to sleep, even when the desire for slumber is strong. The consequences of insomnia extend beyond the night, as it can lead to daytime fatigue, mood disturbances, impaired cognitive function, and a diminished quality of life (Kaur et al., 2022). Insomnia can be acute, short-term, or chronic, depending on its duration and underlying causes. While various factors, such as stress, medical conditions, lifestyle choices, and environmental factors, can contribute to the development of insomnia, its impact is far-reaching, affecting millions of individuals worldwide.

Its effects can include everything from decreased productivity and cognitive decline to an increased chance of accidents and long-term health issues. In addition, the widespread nature of insomnia can impair a person's general quality of life, interfere with day-to-day activities, and strain relationships. Understanding insomnia is crucial for both those seeking restorative sleep and healthcare professionals aiming to provide effective intervention and treatment strategies (Bollu & Kaur., 2019), making it a significant concern in the realm of sleep health and overall well-being.

Contemporary Treatment on Insomnia and Its Delivery Regarding Insomnia

Normally insomnia treatment and test are delivered by face-to-face approach. A physical treatment is do the psychoeducation about sleep and sleep hygiene, sleep restriction, stimulus control, and challenging beliefs and perceptions of sleep by providing a description of the week-by-week interventions (Kallestad et al,2021). Basically, in face-to-face treatment, the patient needs to do some assessment about insomnia of the person's sleeping habits, routines, and any underlying causes of their insomnia. This could entail talking about past sleep patterns, daily schedules, stressors, and general health (Xu et al., 2021). After that, the patient has negative attitudes and ideas regarding sleep that are addressed through cognitive restructuring. By challenging and altering harmful ideas, therapists help their clients feel less anxious and adopt a more optimistic outlook on getting enough sleep. Lastly, the patient does frequent follow-up appointments that enable medical professionals to evaluate the patient's progress, handle difficulties, and modify the treatment plan as needed. For sleep to continue improving over time, this continuous support is essential (Xu et al., 2021). Additionally, addressing, and challenging beliefs and perceptions related to sleep is a crucial aspect of helping individuals develop a healthier mindset toward sleep. This personalized and in-person approach allows for immediate feedback, tailored guidance, and the establishment of a therapeutic alliance between the healthcare provider and the individual, enhancing the total efficiency of insomnia treatment.

Issues Concerning Insomnia Disorder

Face-to-face delivery of insomnia treatment offers numerous benefits, but it may have limitations related to information, accessibility, scheduling, and the potential for patients to feel uncomfortable discussing personal sleep concerns in person. It can be quite challenging to be accessible, particularly for people 11 who live in rural or underdeveloped areas who may have trouble getting to sleep by doctors or other medical professionals (Campbell et al., 2021). Restrictions on scheduling may also make it difficult to keep appointments, which could postpone the start or continuation of therapy. Furthermore, some people could find it awkward to talk about private sleep issues in front of others, which could impede candid communication and reduce the treatment process efficacy.

Besides Face-to-face sessions can be cumbersome, especially for those with busy lives or irregular work hours and hard to go for face-to-face treatment (Sake et al.,2017; Yu., 2021). According to that problem, the information and awareness about insomnia cannot be received

because of the detail information about insomnia disorder does not expose them either in home through parents or in school through teacher or healthcare professionals. In many cases, insomnia might not be explicitly addressed in educational curricula or family discussions about health, leading to a gap in understanding. The nuanced nature of sleep disorders like insomnia, often considered a less-discussed topic, may contribute to this lack of awareness (Sake et al., 2017). Efforts to enhance awareness need to encompass comprehensive education strategies that involve parents, educators, and healthcare providers to ensure a more informed and supportive environment for individuals grappling with insomnia.

Other than that, people also do not seek treatment through face-to-face ways because of what people in the surrounding think about having psychological difficulties that can be a barrier to treatment seeking to the people (Pfeiffer & In-Albon, 2022). This thing happens because of wrong stigma about mental health such as insomnia. Moreover, people also do not seek treatment because of economic factors and time to go treatment.

Theory of learning

In this application, cognitive theory is the way people behave as a product of the information they gather externally and the way they interpret that information internally (Hayes, 2023). There are a few theories under the cognitive theory categories but in this application, Cognitive-Behavioral Therapy (CBT) theory is selected. Cognitive-Behavioral Therapy (CBT) model theory is a theory that was developed by psychiatrist Aaron Beck in the 1960s. Cognitive-behavioral therapy is a flexible and adaptable approach, incorporating elements from various psychological theories. It emphasizes the active collaboration between therapist and client and empowers individuals to develop effective coping strategies for managing their mental health (Chand et al., 2023). Working with a therapist helps people recognize their negative thought patterns and develop the ability to challenge the veracity and truth of these beliefs. The application's foundation in CBT reflects a commitment to a client-centered, goal-oriented, and evidence-based approach, promoting positive outcomes in mental health management.

Besides, using CBT also is suitable for initial treatment to mental health disorder (Chand et al., 2023) because CBT also emphasizes the importance of behavioral changes. Using behavioral experiments and exposure treatment, reorganizing cognitive patterns, and detecting and confronting negative beliefs, CBT assists people in rewiring their minds to create healthy

thought patterns and behaviors. Moreover, the focus of CBT is on recognizing and combating abnormal thought processes that fuel emotional suffering (Nakao et al., 2021). Through the targeting of these fundamental cognitive processes, people can modify their reactions to circumstances and encourage long-term transformation. The practical and evidence-based nature of CBT, together with its versatility in many settings, these factors lead to its extensive application and favorable results in the realm of mental health treatment.

Characteristics of The Mobile Application

The platform chosen in this application is mobile. This is because mobile applications are suitable as telehealth or telemedicine applications that can be used by users (Qudah & Luetsch, 2019; Chu et al, 2018). Using mobile applications gives the user a smooth user experience that facilitates feature access and navigation for users. Enhancing user engagement and retention results in heightened consumer loyalty. Besides, using mobile applications also can make the user feel more convenient because mobile applications can be accessed in offline mode and do not need internet access. Also, using a mobile application is effective because the user can manage and monitor their sleep disorder by using it anytime and everywhere by using hand-carry technology such as smartphones and tablets (Wang et al, 2018). If using web applications, it might be a little inconvenient to bring it or to use it everywhere.

Mobile applications also have great user-interface designs that make users easier to use because of simple design and support complicated facilities (Aldayel & Alnafjan, 2017). Regarding the design of mobile apps, these are the primary displays that users engage with. They are made with the functions and features the app offers in mind. Users can quickly access the material by typing their desired query into the search field. In conclusion, mobile applications are becoming a common marketing and platform tool for many sectors include mental health sector, it is necessary to have a deeper understanding of how various aspects of mobile applications affect user engagement and the potential implications of that involvement.

METHODOLOGY

The waterfall model, first defined by Royce in the 1970s, is a software development life cycle model that divides the project lifecycle into discrete phases. Core phases include

requirements gathering, system design, implementation, testing, and maintenance. The model starts with an analysis phase, defining project needs and success criteria. Its linear, non-iterative nature ensures a solid project plan before planning and execution. The waterfall technique is best suited for projects with clear, stable requirements and minimal changes. It emphasizes thorough planning, meticulous record-keeping, and orderly task completion.

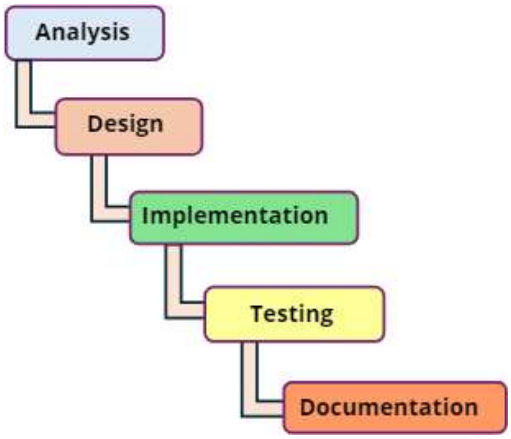

Figure 1: Waterfall Methodology Phases in This Project

Table 1: Phases of waterfall Software Development Lifecycle

Phases	Activities	Deliverable
Analysis	• Create objective. Project • Document detailed requirements	• Project objective was determined • Determined the requirement specification
Designs	• Draw the flowchart of the application • Design a low fidelity storyboard.	• The process of flowchart is determined • Design the low fidelity storyboard

Implementation	• Integrating components • conducting unit testing • Developing application • Coding using Android Studio • Connect the application with Firebase	• Know the software and hardware use
Testing	• Executing tests • Reporting the deficiency • Evaluate usability using SUS evaluation.	• Testing the application • Know the appropriate procedure • Know the appropriate evaluation
Documentation	• Comprehensive documentation is created	• The application release • Compile the result findings evaluation

RESULT AND DISCUSSION

Objective-Based Evaluation

The thesis evaluates the understanding of insomnia information in the Zinsomnia telehealth application using an Objective-Based Evaluation (OBE) questionnaire. The questionnaire consists of 10 questions assessing participants' awareness of the information. The developer gains insights into the application's design flaws and strengths in user comprehension of insomnia information.

Result of OBE Questionnaire

Every piece of information required was successfully gathered using Google Forms. 30 persons completed the OBE questionnaire, and the information gathered from them was used

to select the right response for each question. Each item or question from each factor has its own calculation. Figure 2 below displays the understanding point score of Zinsomnia application, with the average, median, and range determined by the computations.

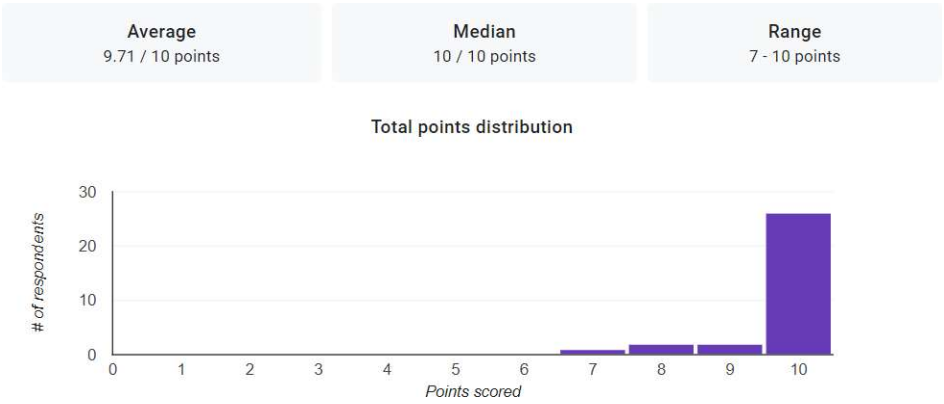

Figure 2: The Result of OBE Questionnaire to Evaluate Understanding

The Zinsomnia application, an online test for insomnia among students, achieved project objectives with an average correct answer score of 9.7 out of 10, indicating a general understanding of insomnia information. The median score was 10 points, indicating its effectiveness in improving knowledge about insomnia.

System Usability Scale (SUS)

The thesis evaluates participant usability in telehealth application testing using the System Usability Scale (SUS) questionnaire. The questionnaire assesses the usability of the Zinsomnia mobile application, a telehealth tool. The questionnaire, which includes both positive and negative worded statements, provides valuable insights into the application's design and usability, ensuring its success in achieving its goals.

Result of SUS Questionnaire

Every piece of detail required was successfully gathered using Google Forms. The SUS questionnaire was completed by thirty individuals, and a scale from "Strongly Disagree" to "Strongly Agree" was used to rank the data. The questions or items for each

factor have all been computed independently. The processes needed to calculate the overall usability score are all recorded.

Raw Score = (5-Even Number) +(1-Odd Number)

Final Score = Raw Score*2.5

Total Final Score = Final Score + Final Score from other participants

Average Score = Total Final Score/ Total respondents

Table 2: The Result of SUS Participnats

No. Question / No. responses	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	SUS raw score	SUS final score
1	4	2	4	2	4	2	5	2	4	2	31	77.5
2	5	2	4	2	5	2	4	2	4	3	31	77.5
3	5	4	5	1	5	1	5	1	5	1	37	92.5
4	5	2	5	3	4	2	4	1	4	2	32	80
5	5	1	5	2	5	2	5	2	5	2	36	90
6	4	1	5	2	5	2	4	2	5	2	34	85
7	4	1	4	2	5	2	5	2	5	2	34	85
8	5	1	4	2	5	1	5	2	4	2	35	87.5
9	4	3	4	3	4	3	4	2	4	2	27	67.5
10	5	2	5	2	4	2	4	2	4	3	31	77.5
11	5	1	4	2	4	2	4	2	5	2	33	82.5
12	5	1	5	3	5	1	5	2	4	3	34	85
13	5	1	4	2	5	1	4	2	4	2	34	85
14	4	1	5	2	4	1	5	1	4	2	35	87.5
15	5	1	5	1	5	1	5	1	5	1	40	100
16	5	2	5	1	5	1	5	1	5	1	39	97.5
17	4	2	5	2	5	2	4	1	4	2	33	82.5
18	5	5	5	5	5	5	5	5	5	5	20	50
19	4	3	5	2	4	2	5	1	5	3	32	80
20	4	2	4	2	4	2	4	2	4	2	30	75
21	4	1	3	2	4	2	3	2	3	3	27	67.5
22	5	1	4	2	4	2	4	2	4	2	32	80
23	4	2	4	1	4	2	4	2	4	2	31	77.5
24	5	2	5	2	5	1	5	2	5	2	36	90
25	5	1	5	1	5	1	5	2	5	2	38	95
26	5	2	5	2	5	2	5	2	4	2	34	85
27	5	1	4	2	4	2	5	1	5	2	35	87.5
28	5	2	4	2	5	2	5	2	4	2	33	82.5
29	4	2	4	4	4	2	4	2	4	3	27	67.5
30	5	1	4	2	4	2	5	1	5	2	35	87.5
Average												**82.17**

Based on the table above, the average score is 82.17. This shows that the score of usability for the application is above average. The telehealth mobile application was generally recognized as usable by the participants, as indicated by the excellent average score.

To sum it up, the mobile application Zinsomnia: Online Application Test of Insomnia Disorder Among Students has successfully achieved the project objectives.

CONCLUSION

The project's main objective of this project was to tackle two major issues that insomnia users face especially for student when seeking about insomnia information and treatment services, as well as the fear to them to get treatment who afraid about people stigma, budget and time. With the introduction of an initial insomnia treatment app, it was possible to provide easy insomnia testing and information to the users, thus reducing the need for them to undertake physical treatment at hospital. After an exhaustive evaluation of the content application, it was determined with the highest confidence that the objective of providing information and preliminary testing had been effectively fulfilled. According to the results, the initial insomnia therapy performed better methods in identifying and suggesting alternative approaches for evaluating insomnia to users, reducing the necessity for physical treatment to determine the user's level of insomnia.

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