Vol 9 No 2, Juni 2025
ABDI DOSEN
Jurnal Pengabdian Pada Masyarakat
pISSN: 2614-6509
eISSN: 2620-5156

MOBILE APPLICATION USER INTERFACE & USER EXPERIENCE DESIGN WITH GAMIFICATION AS A SOLUTION TO GADGET DEPENDENCY

Rya Sandra Devi *, Pratama Bayu Widagdo
Universitas Negeri Semarang
Jl. Taman Siswa, Sekaran, Kec.Gn. Pati, Kota Semarang, Jawa Tengah 50229, Indonesia
Email: ryasandradevi@students.unnes.ac.id

Abstract

Fast technological developments have brought various conveniences to everyday life. However, behind these conveniences, there are serious challenges in the form of increasing dependence on gadgets, especially among teenagers and young adults. Excessive use of devices has a significant impact on psychological, social, and cognitive aspects. This study offers a solution through a visual communication design approach by designing a mobile application with UI/UX design. The design process was carried out using the Design Thinking method, which consists of five stages: empathize, define, ideate, prototype, and test. Gamification was applied as a strategy to increase user motivation, along with the application of the Laws of UX in the creation of the work. This study project produced four UI/UX design pages: home, add activity, statistics, and profile. The app achieved an average success rate of 98.66%, an average missclick rate of 49.8%, and an average time of 41.16 seconds after being tested on 15 users. This study project demonstrates the importance of implementing UI/UX principles in app development.

Keywords: Mobile Application, User Interface, User Experience, Gamification, Device Dependency

INTRODUCTION

Nowadays, we are in an era full of technology and its developments. Technological developments have brought about major changes in our daily lives, both in terms of opportunities and challenges (Satria, 2023). Tons of opportunities can be created with technology to make life easier for people in many ways. But, this convenience can be a challenge for people who rely too much on technology.

As globalization grows along with the need for fast information exchange, communication technology has become super important. As a result, users have less control over themselves when it comes to using this technology (Marpaung, 2018).

The continuous development of technology has led to the emergence of gadgets that have experienced a rapid increase in user adoption every year. The estimated number of gadget users in 2015 was 55 million. In the following years, there was a significant increase. The peak was reached in 2019, with the number of gadget users exploding to 92 million (Heriyanto, 2016).

The growing number of gadget users reflects the amount of time spent using gadgets with

Submitted: May-2025 Received: May-2025 Available online: June-2025

all their conveniences. According to data released by Data.ai in its report titled “State of Mobile” (2023), Indonesians spent an average of 5.7 hours per day using gadgets in 2022. This figure increased from 5.4 hours per day in 2021.

This is reinforced by Kristina's research, as cited by (Putri, 2024) which shows that over 19% of teenagers in Indonesia are addicted to gadgets. More specifically, 19.3% of teenagers and 14.4% of young adults were identified as individuals addicted to gadgets. In another study, internet and device dependency was more commonly found among teenagers aged 12-25 years compared to other age groups (Gunawan, 2020).

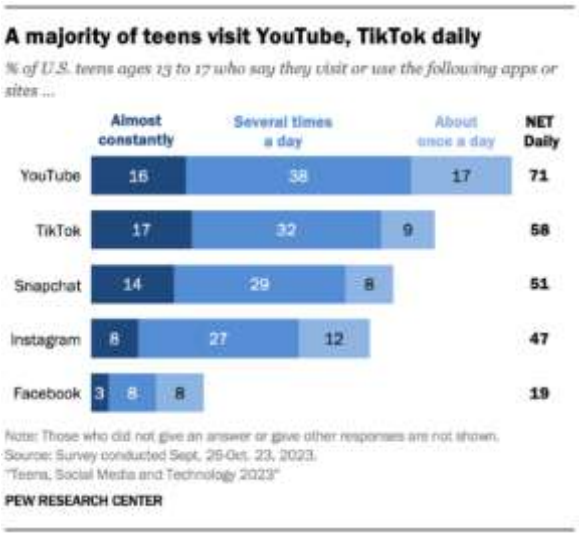

Figure 1 Data on App Usage Among Teenagers

Device dependency refers to excessive use that disrupts an individual's daily activities and life balance (Rini, 2020). Device dependency is related to adapting to the digital world (Nayak, 2025). Similarly, the acceleration of digitalization has shifted teenagers' social media habits. According to research conducted by Pew Research (2023), teenagers aged 13 to 17 tend to spend their free time accessing information from various social media platforms. Video-based platforms have recently become more popular among teenagers. This habit has given rise to a new phenomenon, with the Oxford English Dictionary introducing the term “BrainRot,” used to describe the decline in brain function and cognitive abilities as a result of excessive viewing of short, meaningless videos (Gan, 2025). One of the main factors contributing to this condition is the bombardment of information, instant dopamine, and relentless stimulation (Nayak, 2025). This has the potential to significantly influence the current lifestyle patterns of teenagers.

Excessive use of gadgets has a significant impact on development, both psychologically, cognitively, socially, and intellectually (Suhana, 2018). One of the most noticeable impacts is that teenagers become overly dependent on gadgets, neglecting other essential activities such as social interaction and physical activities. This condition can hinder cognitive development, social skills, reduce the ability to communicate directly, and decrease empathy toward the surrounding environment (Gabriela dkk., 2021).

Observing this phenomenon, there is an urgent need to understand and find effective

solutions to overcome gadget addiction and to design strategies that can help manage gadget use wisely and in a balanced manner. One type of visual communication design that can help users reduce gadget addiction is UI/UX design in mobile applications. This is also related to the ease of incorporating supporting features into mobile applications (Wang, 2013).

Mobile applications are software designed to operate independently on mobile devices such as smartphones, tablets, and similar devices (Efriyanti, 2020). These applications run on an operating system that supports the software's performance, enabling users to access various functions practically and flexibly through their mobile devices (Satria, 2023). Mobile applications are a practical form of the media needed, offering ease of access, flexibility, and the ability to provide an interactive and responsive user experience, making them the ideal medium to address the needs of today's digital society.

Mobile applications are supported by user interface and user experience in their implementation (Putra, 2024). UI design is the visual aspect that determines how a system or application looks, including the arrangement of elements within it and the hierarchical relationships between components. In the design process, various elements such as font selection, color schemes, graphics, icons, buttons, and menu styles are important aspects that must be considered to create an optimal user experience (Sharma, 2021).

Meanwhile, UX design focuses on the process of creating products that provide relevant experiences for users (Garrett, 2011). It is also tailored to user behavior analysis, such as user strengths and limitations (Wiwesa, 2021). UX that aligns with user needs can enhance the quality of user interaction with the product (Kurnianto, 2022). UX design also has a significant influence on user interface design. This is explained in the Law of UX theory, which categorizes various design approaches into four main categories: heuristics, principles, gestalt, and cognitive biases. These four categories provide a conceptual foundation for understanding how users interact with interfaces intuitively and efficiently (Yablonski, 2024).

User interaction in this study project is maximized through gamification. Gamification refers to the principles of games that are utilized as an alternative approach to solving problems through the mindset commonly used when playing games (Prasetyo, 2016). Gamification generally utilizes humans' natural drive for competition as a strategy to increase motivation and encourage positive and constructive behavior (Glover, 2013). Users of gamification tend to experience greater ease of use, engagement, and satisfaction, leading to longer retention periods (Widagdo, 2024).

The creation process of this study project utilized the Design Thinking framework. Design Thinking is a design methodology that provides a solution-based approach to problem-solving (Cross, 2023). Design thinking is a relevant approach to the issues in this study project. This is because the Design Thinking method is human-centered, enabling it to solve problems according to users' needs and challenges (Nasution, 2021).

This study project aims to produce an interactive and flexible UI/UX design for a gamified mobile application. It also serves as a solution to device dependency for users through the Design Thinking approach.

IMPLEMENTATION METHOD

The development process in designing the UI/UX of mobile applications to decrease dependence on devices utilizes the design thinking framework. Through the design thinking approach, solutions to problems can be identified based on user needs.

Figure 2 Design Thinking Process

The following are the stages of design thinking in the design process: Empathize to gain deeper insights into user needs, Define to identify the core problem, Ideate to generate effective solutions after understanding the users and the challenges they face, then Prototype to apply the ideas in the form of designs, and the final stage is Testing to assess the success of the solutions we propose in addressing user needs.

The development process of this study project involved a target audience of 35 people in the questionnaire and 6 of them participated in In-Depth Interviews, with the following criteria: individuals aged 12 to 25 years, which constitutes demographic segmentation. They have the daily habit of using gadgets for more than 4 hours, which is behavioral segmentation. Additionally, they are residents of Indonesia, which is demographic segmentation.

RESULTS AND DISCUSSION

1. Empathize

This stage is carried out to gain more insight into the needs, expectations, and challenges faced by users. It is also to gain an empathetic understanding of the problems to be solved. There are several ways to obtain user information, such as through in-depth interviews, questionnaires, and observation. In addition to conducting research, this stage involves analyzing the target audience, creating personas, user journey maps, and empathy maps. After collecting data, it was found that users find it difficult to focus on their work because they are distracted by their devices and end up spending too much time playing with them.

Figure 3 User Persona & User Journey Map

2. Define

At this stage, the information obtained is analyzed to define the core problem. The define stage involves a series of processes, including creating pain points, affinity diagrams, and problem statements. At this stage, the core problem identified from users is the lack of tools to control excessive gadget use and tools to help them focus for long periods of time.

Figure 4 Define, Afinity Diagram & Problem Statement

3. Ideate

This stage is conducted to think of effective solutions after understanding the users and the problems they face. The process involves creating how-might-we statements, prioritizing ideas, and user flows. At this stage, several ideas emerged based on the users' problems that had been formulated. The findings are shown in the image below:

Figure 5 How Might We & Prioritization Matrix

4. Prototype

Based on the research results from the previous stage, it can be concluded that the majority of respondents experience device dependency and have an interest in reducing their device dependency. The research findings show that 94.4% of respondents spend more than 4 hours using their devices. Another finding is that 100% of respondents use gadgets for social media. Additionally, in-depth interviews with users revealed that the majority of respondents use gadgets to search for specific information and for entertainment. However, in practice, users often experience excessive urges to scroll through social media, which can have physical and mental impacts. Another finding is that notifications on gadgets are the primary factor driving people to use gadgets.

Data collection from users also yielded new insights into users' needs for specific features in applications. These include features such as app blockers for distracting apps, do not disturb modes, time limits for specific apps, leaderboards, and reward systems within apps.

Additionally, users expressed interest in apps with casual writing styles.

Based on several findings from the research, it can be concluded that an app that is effective in reducing device dependency is one with clear features but a visually and textually relaxed design and gamification elements. Thus, after going through the design thinking process, the Mindful app was created as a solution in the form of an app design comprising four pages as follows:

A. Home

The home page is the main screen that users see when they open the Mindful app. This page contains several key features, such as today's achievements, create new activities, today's activities, friends' activities, and focus sessions with friends.

Figure 6 Homepage

This page applies the principles of UX, including Hick's Law, where the focus of the action is clear and does not confuse users, as reflected in the CTA button, which does not have many options. Additionally, Fitts' Law is applied on this page through the easily accessible CTA button and its ideal size. Jakob's Law is evident in the app's familiar design, allowing users to adapt quickly. Tesler's Law is applied on this page, presenting complex features through a simple UI. This design ensures users can easily navigate the Mindful app from their first use.

B. Add Activity

This page contains several features designed to create and start tracking focus activities throughout the day.

Figure 7 Tambah Aktivitas

This page incorporates several UX Laws as follows: Miller's Law, where information of the same type is grouped together to prevent users from feeling overwhelmed. Then, the Aesthetic-Usability Effect can be seen in the colors and elements used to support the perception of digital wellbeing. In addition, Hick's Law is applied in the simplicity of the CTA button so that users do not take long to make decisions. Then, the application of Fitts' Law on this page is reflected in the play button located in the center and other CTA buttons that are easily accessible to users.

C. Statistics

This page contains user report statistics such as time spent, activities, frequently opened applications, and rankings with friends. This page is crucial for users to track productivity and evaluate activities and time spent on a given day or over a month.

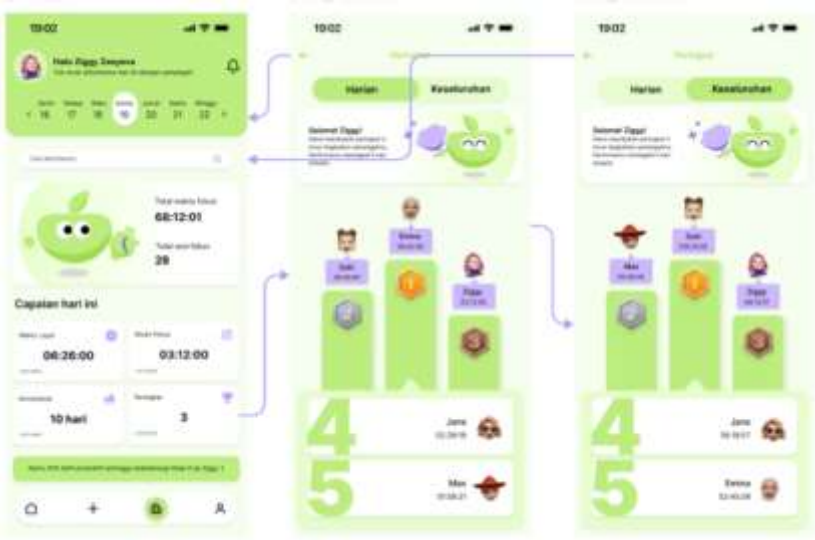

Figure 8 Statistics

The application of UX Laws on this page is as follows: Tesler's Law, where the complexity of the data is simplified into playful visuals and numbers that are easy for users to understand. Then, Hick's Law can be seen on this page in the ease with which users can decide on an action due to the simplicity of the choices presented. Next, Miller's Law is applied in that the amount of information displayed is not too much, making it optimal for the user's cognitive process. Additionally, the application of the Peak-End Rule on this page can be seen in the user reflection section, which displays the user's progress, creating a memorable and motivating effect for the user. Another application of the Laws of UX is the Aesthetic-Usability Effect, where the expressive mascot and avatar on this page make users feel more comfortable even when viewing statistical data.

D. Profile

The profile page contains more personal information. Such as rankings, coin counts, friends, and personal data for the application.

Figure 9 Profil

The application of UX Laws on this page includes Jakob's Law, where the application design is very familiar to users. Fitts's Law is reflected in the CTA button, which is large, high-contrast, and easy to access. Additionally, Hick's Law is applied on this page to minimize cognitive load for users.

5. Testing

The final stage in the UI/UX design process is testing. At this stage, testing was conducted on 15 respondents using a maze application to determine the success of an application based on three key factors: direct success, misclick rate, and average duration. The details of the testing process that was carried out are as follows.

No	Task	Direct success	Missclick Rate	Average Duration
1	Create a new activity	100%	51.7%	12.5 s
2	Explore Consistency	93.3%	34.0%	24.5 s
3	Create a group focus session	100%	71.9%	16.4 s
4	Manage distracting apps	100%	54.7%	27.1 s
5	View leaderboard	100%	39.0%	125.3 s

The data above demonstrates users' success in completing a mission. This reflects positive sentiment toward the Mindful app. Direct success shows an average rate of 98.66%, which falls into the good category. The missclick rate for the “Explore Consistency” and “View Leaderboard” missions is relatively low, indicating that the app's flow is already very clear and comfortable for users. However, it is important to note that the “create a new activity” mission has a relatively high missclick rate of 51.7%, followed by the “manage distracting apps” mission at 54.7%, and the “create a focus session group” mission at 71.9%, indicating that certain parts of the app are unclear to users.

After reviewing the data, heatmap, and evaluation, the high missclick rate is attributed to the CTA button in the “create a group focus session” feature not being sufficiently prominent and the color lacking contrast with other elements. Therefore, iterations are needed to address these findings. Below are the results of the iteration on the CTA button for the “create a group focus session” section.

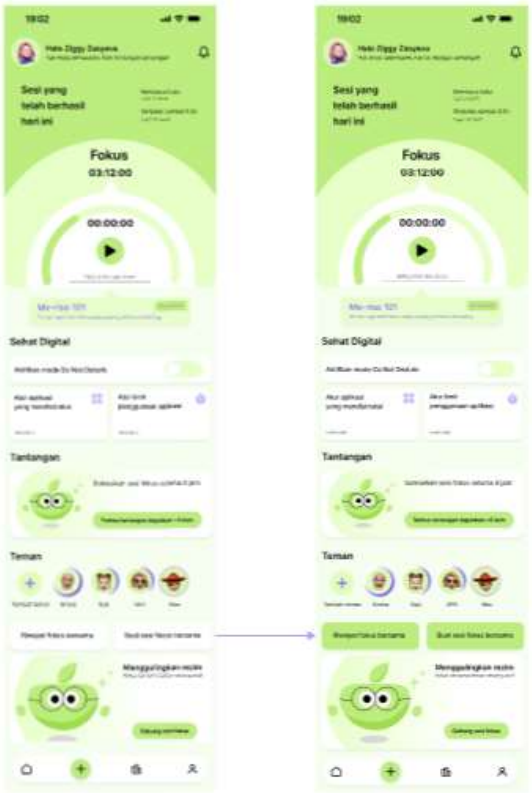

Figure 10 Iteration on the CTA button for the "create a group focus session"

After completing the usability testing on the Maze website, respondents were directed to fill out a post-usability testing questionnaire with five questions using a Likert scale. The results showed that the majority of respondents expressed positive sentiments toward the application. The overall user experience with the application scored 42.6, the ease of completing tasks scored 41.3, the ease of finding elements within the application scored 40.6, the clarity of the information displayed scored 42.6, and the ease of learning the application scored 3.8. The last figure represents the lowest score among the other questions posed to users. Therefore, special attention is needed regarding the ease of use of the app for future development.

CONCLUSION

The study project titled "Mobile Application User Interface & User Experience Design with Gamification as a Solution to Gadget Dependency" produced a UI/UX app design consisting of four pages: home, add activity, statistics, and profile, each containing a series of features.

The application's performance in maze testing was successful, but some users experienced minor difficulties in operating the application for the first time. The maze test results showed an average success rate of 98.66%, indicating a positive response to the application. However, missed clicks during testing serve as an indicator for further iterations of the application. The findings from the iteration of the mindful app indicate the need for improvements related to the CTA button to make the focus session more prominent for user convenience. Additionally, special attention is needed regarding the ease of use of the mindful app for beginners as part of

future app development. Another shortcoming that needs to be developed in this study project is that the information contained in the application should be more detailed. This will enable users to use the application easily and as a one-stop solution to help overcome problems faced by users related to gadget dependence.

REFERENCES

Cross, N. (2023). *Design Thinking: Understanding How Designers Think and Work.* Great Britain: Bloomsburry Publishing Plc.

Data.ai. (2024). *State of Mobile 2024.* https://sensortower.com/state-of-mobile-2024.

Efriyanti, L. &. (2020). Aplikasi Mobile Learning sebagai Sarana Pembelajaran Abad 21 Pada Era Revolusi Industri 4.0. *JURNAL EDUCATIVE: Journal of Educational Studies*, 20-41.

Firman Kurnianto, E. G. (2022). Penerapan Metode Design Thinking Dalam Perancangan UI/UX Pada Aplikasi Basis Data Sekar Kawung Untuk Pegawai Lapangan Perusahaan Sosial Sekar Kawung. *journal.uii.ac.id*.

Gan, Y. (2025). A chain mediation model of physical exercise and BrainRot behavior among adolescents. *Scientific ReportS*, https://doi.org/10.1038/s41598-025-02132-6.

Garrett, J. J. (2011). *The Elements of User Experience: User-Centered Design for the Web and Beyond,.* New Riders1249 Eighth Street Berkeley, CA 94710.

Glover, D. I. (2013). Play As You Learn: Gamification as a Technique for Motivating Learners. *Sheffield Hallam University Research Archive*, 1999-2008.

Gunawan, R. (2020). Adiksi Media Sosial dan Gadget Bagi Pengguna Internet di Indonesia. *Jurnal Techno-Socio Ekonomika, Volume 14No. 1*, 1-14.

Heriyanto, A. P. (2016). *Mobile Phone Forensics : Theory : Mobile Phone Forensics dan Security Series* . Yogyakarta: Andi.

Hsiu-Yu Wang, C. L.-H. (2013). What Affects Mobile Application Use? The Roles of Consumption Values. *International Journal of Marketing Studies; Vol. 5, No. 2; 2013*, 11-22.

Isnanto Adi Prasetyo, S. D. (2016). Penerapan Konsep Gamifikasi pada Perancangan Aplikasi Pembelajaran Al-Qur'an. 37-42.

Jenny Gabriela, B. M. (2021). Dampak Penggunaan Gadget terhadap Perkembangan Perilaku Anak Remaja Masa Kini. *Jurnal Excelsis Deo: Jurnal Teologi, Misiologi dan pendidikan* , 99-110.

Julia Novita Putri, T. S. (2024). Penggunaan Gadget dan Perubahan Perilaku Remaja di Sekolah Menengah Atas Tuban. *Jurnal Ilmu Kesehatan Mandira Cendikia*, 376-382.

Liza Efriyanti, F. A. (2020). Aplikasi Mobile Learning sebagai Sarana Pembelajaran Abad 21 Pada Era Revolusi Industri 4.0. *JURNAL EDUCATIVE: Journal of Educational Studies*, 20-41.

Marpaung, J. (2018). PENGARUH PENGGUNAAN GADGET DALAM KEHIDUPAN. *Jurnal KOPASTA*, 55-64.

Mentari Kusuma Rini, T. H. (2020). Prevalensi dan Dampak Kecanduan Gadget Pada Remaja. *Jurnal Keperawatan Muhamadiyah*, 185-194.

Nayak, P. (2025). ‘Brain rot’ – Unintended consequence of digital lifestyle? *Indian Journal of Physiology and Allied Sciences, Volume 77 Issue 1* , DOI: 10.55184/ijpas.v77i01.512.

Pew Research Center. (2023). *Teens, Social Media and Technology 2023.* https://www.pewresearch.org/internet/2023/12/11/teens-social-media-and-technology-2023/.

Putra, Y. S. (2024). Designing UI/UX Design OF Mobile Application at Solaria Restaurant Using Lean UX Method. *ANTIVIRUS: Jurnal Ilmiah Teknik Informatika*, 191-198.

Putri, J. N. (2024). Penggunaan Gadget dan Perubahan Perilaku Remaja di Sekolah Menengah Atas Tuban. *Jurnal Ilmu Kesehatan Mandira Cendikia*, 376-382.

Roby Satria, I. A. (2023). Rancang Bangun E-Marketplace Berbasis Mobile Untuk Meningkatkan Pelayanan Penjualan. *JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA) Volume 4, Nomor 1*, 89-95.

Rudy Gunawan, S. A. (2020). Adiksi Media Sosial dan Gadget Bagi Pengguna Internet di Indonesia. *Jurnal Techno-Socio Ekonomika, Volume 14No. 1*, 1-14.

Satria, R. (2023). Rancang Bangun E-Marketplace Berbasis Mobile Untuk Meningkatkan Pelayanan Penjualan. *JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA) Volume 4, Nomor 1*, 89-95.

Sharma, V. (2021). A Study on User Interface and User. *World Journal of Research and Review ISSN: 2455-3956, Volume-12, Issue-6*, 41-44.

Suhana, M. (2018). Influence of Gadget Usage on Children’s Social-Emotional Development. *Advances in Social Science, Education and Humanities Research (ASSEHR), volume 169*, 224-227.

Vatsal Sharma, A. K. (2021). A Study on User Interface and User. *World Journal of Research and Review ISSN: 2455-3956, Volume-12, Issue-6*, 41-44.

Wang, H.-Y. (2013). What Affects Mobile Application Use? The Roles of Consumption Values. *International Journal of Marketing Studies; Vol. 5, No. 2; 2013*, 11-22.

Widagdo, P. B. (2024). The impact of gamification in user interfaces on user experience and retention: An empirical study. *Catharsis*, 1-8.

Winda Suci Lestari Nasution, P. N. (2021). UI/UX Design Web-Based Learning Application. *Nasution, et.al., ARRUS Journal of Engineering and Technology, Vol. 1, No. 1*, 18-27.

Wiwesa, N. R. (2021). User Interface dan User Experience untuk Mengelola Kepuasan Pelanggan. *Jurnal Sosial Humaniora Terapan: Vol. 3: Iss. 2, Article 2*, Available at: https://scholarhub.ui.ac.id/jsht/vol3/iss2/2.

Yablonski, J. (2024). *Law of UX.* Gravenstein Highway North: O Reilly Media.

Yan Gan, Z. H. (2025). A chain mediation model of physical exercise and BrainRot behavior among adolescents. *Scientific ReportS*, https://doi.org/10.1038/s41598-025-02132-6.

Yoga Setia Putra, M. G. (2024). Designing UI/UX Design OF Mobile Application at Solaria Restaurant Using Lean UX Method. *ANTIVIRUS: Jurnal Ilmiah Teknik Informatika*, 191-198.