Syntax Admiration: p-ISSN 2722-7782 | e-ISSN 2722-5356 Vol. 5, No. 12, Desember 2024

The Effect of Gadget Use Duration on Informatics Students' Eye Health

Ottopianus Mellolo[1], Prayti Noviana Daleno[2], Desvita Christi Kilis[3], Valentino William Dumais[4], Stefanie Virginia Mongi[5], Syalom Karunia Kowimbin[6]
[1,2,3,4,5,6] Politeknik Negeri Manado, Indonesia
Email: ottopianus.mellolo@yahoo.com[1], praytidaleno1106@gmail.com[2], desvitakilis85@gmail.com[3], valentinodumais194@gmail.com[4], mongivirginia5@gmail.com[5], majesqty@gmail.com[6]

Abstract

The technology that is developing in the current era can be seen in its progress. One of the technologies that is developing is the use of gadgets today. The use of gadgets today certainly helps users to communicate or find out existing information. However, the use of gadgets today is no longer used properly, especially the use of gadgets with excessive duration. This means that we often look at the gadget screen longer which can trigger bad things to happen in our lives. This writing aims to find out how students, especially informatics students, use gadgets in their daily lives. The use of gadgets by informatics students is certainly very necessary to help them in their daily lives on campus for their academics, help in making coding, etc. This research was conducted using a qualitative method, namely conducting observations through surveys distributed to students. From existing research, we see the results that informatics students on average use gadgets for more than 4 hours a day, even almost all day they use gadgets. Therefore, as students who often use gadgets, of course we must continue to pay attention to health or the impacts that will occur so that students are expected to maintain the duration of using gadget screens considering that it can have an impact on our eye health.

Keywords: eye, gadget, screen, student

Introduction

The development of technology today is very advanced, so that the use of gadgets can be seen everywhere. Gadgets are tools or devices used by humans to communicate or search for information (R. Hidayati, 2020; Indriana et al., 2024; Nissa'M & Maisaroh, 2024). The use of gadgets is no longer foreign because on average everyone uses gadgets, even small children are familiar with gadgets (Handayanik et al., 2024; Salnia, 2019). Informatics students are certainly very helped by gadgets because gadgets help informatics students in carrying out tasks and even help them in coding. Gadgets provide various interesting features with various models such as cellphones, laptops, computers, iPads, etc. This is what will make it easier for users to access existing information. The gadget models that are often used by students are cellphones and laptops.

However, the use of gadgets makes us unaware of the time that has been missed, because the use of gadgets by students on campus, especially in class, is very free, besides the free use of gadgets, gadgets are also something that informatics students rely on. The duration of gadget use which should be limited but we use it exceeds the actual duration limit (Febriyanti, 2023; N. R. Hidayati, 2023). This can be felt by students, because the use of gadgets to meet the educational needs of students requires us to use gadgets. This is what will trigger disorders in our eye health where the eyes are the sense of sight which of course plays an important role in our lives, because our eyes are the windows to the world, meaning we can see everything that is recorded in our eyes. Informatics students have knowledge that is certainly more about technology, but many informatics students pay less attention to their physical health (Adiputra, 2020; Asmawati, 2021).

According to research conducted by Islami et al., (2021) entitled The Relationship between Gadget Use and the Incidence of Myopia in UMI Faculty of Medicine Students Class of 2016, 2017, 2018. This study aims to determine the Relationship between the Duration of Gadget Use and the Incidence of Myopia in Students of the Faculty of Medicine, Muslim University of Indonesia Class of 2016, 2017, and 2018. The results of the study obtained a significance level of $p = 0.315$. These results indicate that $p < 0.05$, indicating that Ho is accepted, meaning that the duration of gadget use does not affect the incidence of myopia.

This study has novelty in several aspects that distinguish it from previous studies. Most previous studies focused on medical, general, or pediatric students. This study specifically examines informatics students, who have a higher intensity of gadget use due to academic needs such as coding, design, and use of computer-based software. This study aims to identify the most common eye health symptoms experienced by students who use gadgets excessively. While the benefits of this study are to encourage students to apply healthy habits in using gadgets, so that they can reduce long-term risks such as myopia, asthenopia (tired eyes), and dry eye syndrome.

Research Methods

This study uses a descriptive qualitative method to understand the pattern of gadget use and its impact on the eye health of informatics students (Herdianto & Syahidin, 2020). The main focus is to explore the relationship between the duration of gadget use and symptoms of eye disorders such as dry eyes, fatigue, and blurred vision.

Data Collection

Data were collected through the following stages:

1. Questionnaire Survey (Google Form)

The questionnaire was designed to collect information related to the duration of gadget use, the type of device most frequently used, and symptoms of eye disorders experienced.

2. The questionnaire questions include

a. Duration of gadget use per day (less than 4 hours, 4-6 hours, more than 6 hours).
b. Symptoms experienced (dry eyes, eye fatigue, blurred vision).

c. Types of gadgets most frequently used (smartphones, laptops, tablets).
d. Rest patterns when using gadgets (do they follow the 20-20-20 rule).
e. The questionnaire was distributed online to 100 informatics students from various classes.

3. Direct Observation

Observation was conducted to validate the answers to the questionnaire, especially regarding the duration of gadget use during lectures, outside of lecture hours, and when working on coding assignments.

4. Structured Interview

Some respondents were interviewed further to gain in-depth insights regarding gadget usage habits and how they deal with eye fatigue.

Population and Sample

Informatics study program students at a technological university. 100 informatics students selected by purposive sampling based on availability and willingness to participate.

1. Inclusion Criteria

a. Active students who use gadgets for more than 4 hours a day.
b. Students who use gadgets for academic purposes (coding, design, or research).

Data Analysis Techniques

1. Descriptive Analysis

Data obtained from the questionnaire and interviews were analyzed descriptively to understand gadget usage patterns and the frequency of eye disorder symptoms. Frequency Distribution was used to group respondents based on the duration of gadget use and symptoms experienced.

2. Correlation Analysis (Pearson's Correlation)

Used to measure the relationship between the duration of gadget use and the severity of eye disorder symptoms. The correlation value (r) indicates the level of relationship, with significance ($p < 0.05$) as an indicator of a meaningful relationship.

3. Data Triangulation

The questionnaire results were compared with the results of observations and interviews to ensure data consistency and validity.

Results and Discussion

The study involved 100 informatics students, with a gender distribution of 60% male and 40% female, aged between 18 and 24 years. Participants were categorized based on their average daily gadget use into three groups: less than 4 hours (35%), 4–6 hours (40%), and more than 6 hours (25%). The most frequently reported symptoms included dry eyes (65%), eye fatigue (58%), and blurred vision (47%). A detailed breakdown revealed that students who used gadgets for more than 6 hours per day were significantly more likely to experience these symptoms. For instance, dry eyes were reported by 75% of heavy users (>6 hours/day), compared to only 30% of light users (<4 hours/day).

Similarly, eye fatigue affected 70% of heavy users, while only 25% of light users reported the same. Blurred vision was prevalent in 55% of heavy users versus 15% of light users.

The relationship between gadget use duration and eye health was analyzed using Pearson's correlation coefficient. The analysis showed a strong positive correlation ("r" value = 0.68, $p < 0.05$) between the duration of gadget use and the severity of eye symptoms. This indicates that longer durations of gadget use are associated with increased eye health issues.

Gadget use exceeding 6 hours per day is associated with a significantly higher prevalence of dry eyes, eye fatigue, and blurred vision. Moderate usage (4–6 hours) still showed notable impacts compared to light usage (<4 hours). Statistical analysis confirms a significant correlation between gadget use duration and the severity of eye health symptoms ($p < 0.05$). These findings emphasize the need for strategies to mitigate the negative effects of prolonged gadget use on eye health among informatics students.

Discussion

The results of the study showed that informatics students used gadgets for more than 4 hours or the limit that should be. This is because the use of gadgets is always needed by informatics students to support their activities in lectures. Informatics students use gadgets for their needs in pursuing knowledge such as making assignments given, making coding so that they spend more time with laptop or computer screens. However, the duration of gadget use if too long can cause bad things for students' lives:

Mental problems

Excessive gadget use can affect mental health because it can trigger the risk of depression and difficulty focusing (Kamaruddin et al., 2023).

Eye disorders

Excessive gadget use can cause eye disorders due to staring at the screen for too long. This triggers tired eyes, blurred vision, and can cause nearsightedness (Oishi & DHANMONDI, 2023).

Lack of sleep

In addition to assignments, excessive gadget use usually causes students to experience lack of sleep and disrupts the lecture process due to suboptimal brain development (Edeh et al., 2024). As students we need to be aware that the use of gadgets needs to be limited considering that our eye health must be maintained. Limiting the use of gadgets such as, when you have free time to rest, use the rest time well, resting our eyes. There are time limits for using gadgets that need to be considered. Based on research released by the World Health Organization (WHO), the ideal time for playing gadgets for children aged 6 years and over should be limited to 2 hours per day or less than 3 hours per day. In addition to limiting the duration of playing gadgets, it is also recommended to rest your eyes periodically. Every 20 minutes of using gadgets, we are advised to look at something 20 meters away for 20 seconds. In addition, maintaining a safe viewing distance, which is around 40-50 centimeters from the screen, is also very important. Therefore, there are several ways so that we can maintain the health of our eyes, such as:

Maintain viewing distance

As written above, the distance between our screen and the gadget is about 40-50 centimeters from the screen, so that the light exposure received by our eyes can be reduced.

Reduce screen brightness & Eye relaxation

When we reduce the brightness level of our screen, this can reduce the fatigue of our eyes in using gadgets and do eye relaxation.

Divide time

The use of gadgets must be limited, then get enough rest

The findings of this study highlight the significant impact of prolonged gadget use on eye health among informatics students. The results align with previous research, which suggests that extended screen exposure is a major contributor to digital eye strain (DES), characterized by symptoms such as dry eyes, eye fatigue, and blurred vision. The high prevalence of these symptoms among heavy gadget users (>6 hours/day) underscores the pressing need for intervention strategies (Gufraan & Rahmat, 2024).

The correlation analysis revealed a strong positive relationship ("r" = 0.68, $p < 0.05$) between gadget use duration and the severity of eye symptoms. This finding reinforces the hypothesis that longer exposure to screens exacerbates eye discomfort. One plausible explanation is the reduction in blink rate during prolonged screen use, leading to insufficient lubrication of the eyes and an increased likelihood of dry eyes and fatigue. Additionally, the glare from screens and improper lighting conditions may contribute to visual discomfort.

Interestingly, even moderate gadget use (4–6 hours/day) was associated with a noticeable increase in eye health symptoms compared to light use (<4 hours/day). This suggests that even within moderate usage limits, students are not immune to the adverse effects of digital devices. Therefore, educating students on proper screen habits, such as following the 20-20-20 rule (looking at something 20 feet away for 20 seconds every 20 minutes), is essential.

Another notable aspect of the findings is the potential long-term implications of sustained digital eye strain. While the current study focused on self-reported symptoms, chronic exposure without intervention could lead to more severe eye health issues, such as myopia progression or even irreversible damage. This highlights the importance of integrating ergonomic and health-centered practices into students' daily routines, particularly for those in fields like informatics that demand extended screen time.

It is also important to acknowledge certain limitations of this study. First, the reliance on self-reported data may introduce recall bias, as participants might underreport or overreport their gadget usage and symptoms. Second, the study did not account for other potential contributing factors, such as pre-existing eye conditions, environmental lighting, or the type of devices used. Future studies could address these limitations by incorporating objective measures of screen time and conducting comprehensive eye examinations.

Informatics students certainly need to have limits in using gadgets, although gadgets are tools that will help us, but we must be aware that there are some times that we must take to rest our eyes from gadgets or our physical when using gadgets. Some tips that are used and we need to apply as informatics students or maybe existing readers:

Gadget usage schedule

This applies on campus days, especially on holidays. When you finish using gadgets on campus, rest at home or do activities outside of using gadgets. Or on holidays there are limits to gadget usage hours.

Reduce Access to Social Media and Online Games

By reducing access to social media and online games, the duration of gadget use will certainly be reduced, so that gadget use will be needed when we do things that will be related to our academics.

Conclusion

This study underscores the significant impact of prolonged gadget use on the eye health of informatics students. The findings reveal a strong correlation between the duration of gadget usage and the prevalence of symptoms such as dry eyes, eye fatigue, and blurred vision. Students using gadgets for more than 6 hours per day reported the highest frequency and severity of these symptoms, while even moderate usage posed notable risks. These findings align with global concerns regarding digital eye strain and its increasing prevalence in populations with high screen exposure.

The results highlight the urgent need for adopting preventive measures to mitigate digital eye strain. Strategies such as adhering to the 20-20-20 rule, maintaining proper screen ergonomics, ensuring adequate lighting conditions during screen use, and limiting screen time wherever possible can significantly alleviate symptoms. Educational institutions and workplaces must play a proactive role by implementing awareness campaigns, offering ergonomic training sessions, and providing access to regular eye check-ups for students and staff.

The implications of this study extend beyond the immediate discomfort caused by digital eye strain. Prolonged exposure without preventive measures may lead to chronic issues, including myopia progression and reduced productivity. These potential long-term effects necessitate a multifaceted approach that combines individual behavioral changes with institutional support.

Future research should build on these findings by incorporating objective measures of gadget use, such as screen tracking technologies, and conducting longitudinal studies to assess the cumulative impact of screen exposure over time. Moreover, evaluating the effectiveness of targeted interventions, including blue-light filters, adjustable screen settings, and periodic rest breaks, could provide valuable insights into reducing digital eye strain.

In conclusion, this study emphasizes the critical need for a balanced approach to digital device usage. By fostering healthier screen habits and adopting preventive measures, it is possible to minimize the adverse effects of prolonged screen exposure and

safeguard the long-term eye health and well-being of students and other heavy gadget users.

BIBLIOGRAFI

Adiputra, N. P. (2020). *Dasar-Dasar Teknik Informatika*. Deepublish.

Asmawati, L. (2021). Peran Orang Tua Dalam Pemanfaatan Teknologi Digital Pada Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *6*(1), 82–96.

Edeh, F. O., Edeh, B. F., Okechukwu, C. I., Mustafa, M., Christine, A., Olanipekun, D. B., Desmond, N., Oben, L. A., & Aisha, N. (2024). Smartphone Usage And Academic Performance Of Management Science Students In An Emerging Economy. *Management*, *9*(3), 516–532.

Febriyanti, D. (2023). *Peran Orang Tua Untuk Mereduksi Kecanduan Gadget Pada Anak Di Kelurahan Bugih Kecamatan Pamekasan*. Institut Agama Islam Negeri Madura.

Gufraan, G., & Rahmat, S. M. (2024). Computer Vision Syndrome In High School Students: The Role Of Gadget Use Intensity. *Sriwijaya Journal Of Ophthalmology*, *7*(2), 345–358.

Handayanik, A. R., Abdullah, S. M., & Kuncoro, M. W. (2024). The Academic Impact Of Gadget Using Behavior Among Early Age Students. *Proceeding International Conference On Psychology*, 273–283.

Herdianto, R., & Syahidin, D. (2020). Gadget & Adolescent: Its Effect Depiction On The Daily Life. *Bulletin Of Social Informatics Theory And Application*, *4*(2), 40–51.

Hidayati, N. R. (2023). *Dampak Penggunaan Gadget Terhadap Perkembangan Bahasa Anak Usia Dini Di Ra Subulul Huda Lampung Timur*. Iain Metro.

Hidayati, R. (2020). Peran Orang Tua: Komunikasi Tatap Muka Dalam Mengawal Dampak Gadget Pada Masa Golden Age. *Source: Jurnal Ilmu Komunikasi*, *5*(2).

Indriana, L. E., Utomo, D. M. B., Sinduwiatmo, K., & Alimova, M. T. (2024). Therapeutic Communication Strategies For Guidance Counseling Teachers In Handling Students Addiction To Gadgets. *2nd International Conference On Advance Research In Social And Economic Science (Icarse 2023)*, 309–320.

Islami, R. A., Natasha, R., Musa, I. M., Mokhtar, S., Julyani, S., & Darkutni, D. T. (2021). Hubungan Penggunaan Gadget Terhadap Kejadian Miopia Mahasiswa Fakultas Kedokteran Umi Angkatan 2016, 2017, 2018. *Fakumi Medical Journal: Jurnal Mahasiswa Kedokteran*, *1*(2), 129–136.

Kamaruddin, I., Leuwol, F. S., Putra, R. P., Aina, M., Suwarma, D. M., & Zulfikhar, R. (2023). Dampak Penggunaan Gadget Pada Kesehatan Mental Dan Motivasi Belajar Siswa Di Sekolah. *Journal On Education*, *6*(1), 307–316.

Nissa'm, S. K., & Maisaroh, S. (2024). Dampak Penggunaan Gadget Terhadap Kesehatan Mental Anak Usia Emas Di Paud-Tk Dharma Wanita Kecamatan Randuagung. *Triwikrama: Jurnal Ilmu Sosial*, *4*(2), 41–58.

Oishi, A. R., & Dhanmondi, D. (2023). *Electronic Gadgets Use And Digital Eye Strain Among Adult Population During The Covid-19 Pandemic In Bangladesh*.

Salnia, S. (2019). *: Perilaku Pencarian Informasi Mahasiswa Di Perpustakaan*

Universitas Islam Negeri Sumatera Utara Dengan Menggunakan Gadget (Studi Deskriptif Perilaku Pencarian Informasi Model Ellis). Universitas Islam Negeri Sumatera Utara.