# THE EFFECT OF GADGET USE DURATION ON PROGRAMMING ABILITIES AND COMPUTER COURSE GRADES

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**Abstract**

This study aims to analyze the relationship between gadget usage duration and programming skills and computer course grades. Data was collected through questionnaires from 56 respondents aged 10–20 years. The methods used include descriptive statistics, Pearson correlation, t-test, and Chi-Square test. Results indicate no significant relationship between gadget usage duration and programming skills ($r = 0.0557$; $t = 0.4098 < 2.00$) or computer course grades ($r = 0.196$; $t = 1.384 < 2.01$). The Chi-Square test ($\chi 2$ calculated $= 11.074 < \chi 2$ table $= 12.592$) also confirmed no significant relationship between gadget duration and computer grades. The conclusion of this study is that the duration of gadget usage does not significantly affect programming skills and computer course grades in the respondents.

**Keywords**: Gadget; Computer grades; Correlation; Programming skills; Statistics.

**INTRODUCTION**

In today's fully digital era, gadgets have become an integral part of daily life, especially among teenagers and university students. Modern gadgets are used for various purposes, ranging from entertainment and communication to learning tools. The increasing duration of gadget use has often sparked debates regarding its impact on academic performance. Many are concerned that excessive gadget use—particularly for entertainment such as social media or gaming—may distract students from studying and potentially lower academic achievement. However, on the other hand, gadgets also hold great potential as powerful learning tools, particularly in the field of programming, where various applications and online learning platforms can be accessed quickly and conveniently.

Previous research on the impact of technology use in education has shown varying results. Some studies indicate negative effects of excessive technology use on concentration and academic outcomes. Nevertheless, there are also studies showing that gadgets can serve as effective learning media, depending on the type of device used and the user's mindset.

Although there has been extensive discourse regarding the negative effects of gadget use on the learning process, gap analysis reveals that empirical studies examining the relationship between duration of gadget use and programming ability among students remain very limited. Therefore, this study aims to empirically examine whether there is a significant relationship between the daily duration of gadget use and an individual's skills in the field of computer science, particularly in the context of programming abilities and computer subject grades.

Several previous studies present mixed findings regarding the influence of gadget use on academic performance. Gunawan (2019) states that excessive gadget use can disrupt students' learning focus. Conversely, Suryani (2021) found that gadgets can function as effective learning media when used properly and wisely. In the domain of programming skills, Prasetyo (2020) indicates that the use of gadget-based learning applications can enhance basic understanding of programming concepts. However, research explicitly investigating the link between general gadget use duration and students' programming abilities is still scarce. Therefore, this study seeks to fill that gap by analyzing the extent to which gadget usage duration affects programming skills and academic performance in computer-related subjects.

**METHODS**

In our effort to untangle the relationship between gadget use and computer-related abilities, we employed a quantitative research approach, with a correlational design as the primary framework. This approach was chosen because our objective was purely to examine the strength and direction of the relationship between the variables without introducing any form of intervention or manipulation.

The main target of our study consisted of students aged 10 to 20 years. From this broad population, we successfully collected data from 56 respondents. The selection of these respondents was not entirely random; instead, we used purposive sampling. In other words, we deliberately selected individuals who actively use gadgets and have experience in computer-related coursework—criteria we deemed essential to ensure that the data collected would be relevant to the goals of the study.

To gather our "data treasure," we distributed questionnaires both online and offline. The questionnaire was structured into several sections to obtain a comprehensive overview:

Respondent Profile:

This section documented the respondents' ages, ensuring they fell within our targeted age range.

Daily Gadget Usage Duration:

Respondents were asked to select the category that best represented the number of hours they used their gadgets outside academic activities. Options were scaled, such as "less than 1 hour," "1–3 hours," "4–6 hours," or "more than 6 hours." This variable was treated as a potential determinant.

Frequency of Programming Attempts:

To measure this variable, respondents indicated how often they attempted to write or modify program code using categories such as "never," "1–2 times," "2–3 times," or "more than 3 times." We treated this data as ordinal.

Computer Subject Grades:

Finally, respondents were asked to report their average grade in computer-related subjects. This information could be provided in numeric form (e.g., 1–100) or categorical (e.g., A/B/C/D). This variable was examined to determine whether it was influenced by gadget usage.

Once the data was collected, the next step was to analyze it. We used the statistical software SPSS version [insert version, e.g., 26.0] to process and interpret the data. Several analytical tools were applied:

Descriptive Statistics:

This analysis provided an initial summary of the data. We calculated means, standard deviations, and frequency distributions for each variable to gain a clear general overview of our respondents.

Pearson Correlation Test:

This was our main tool for determining whether a linear relationship existed—and how strong it was—between gadget usage duration and programming ability or computer subject grades. Although gadget usage duration was originally categorical, we interpreted it on a scale that allowed correlation analysis to be conducted.

t-test for Correlation Significance:

After obtaining correlation coefficients, we proceeded to test their statistical significance. The t-test helped us determine whether the correlations were meaningful or simply occurred by chance. This test was conducted at a confidence level of 95%.

Chi-Square ($\chi^2$) Test:

Lastly, we applied the Chi-Square test to determine whether there were significant relationships between variables in categorical form. In our case, this involved examining the relationship between gadget usage categories and categorized computer grades (e.g., "Good," "Average," "Poor"), as well as the relationship with programming frequency. This test allowed us to see whether patterns in gadget use corresponded with patterns in computer performance or programming habits.

Through these methods, we aimed to present an accurate and reliable depiction of the correlation between time spent using gadgets and two key aspects of computer proficiency.

**FINDINGS AND DISCUSSION**

**GENERAL OVERVIEW OF RESPONDENT DATA**

This section presents the findings from the statistical analysis we conducted to explore the relationship between the duration of gadget use and respondents' programming abilities as well as their computer subject grades.
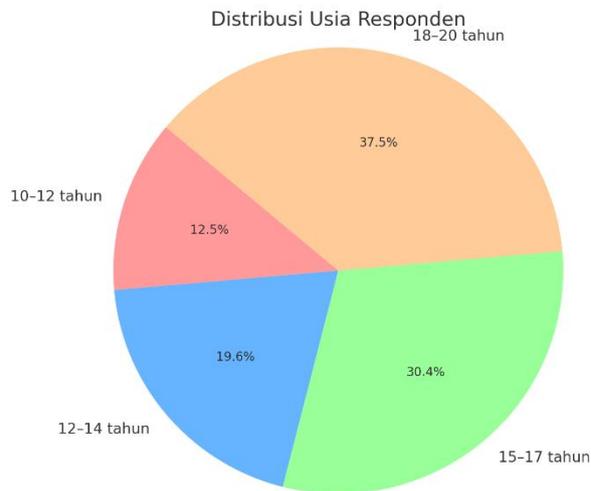


_Overview of Respondents' Age Distribution_

The study involved 56 respondents aged between 10 and 20 years. The majority of respondents, representing 37.50%, were in the 18–20 age group. This was followed by 30.36% who were 15–17 years old, 19.64% in the 12–14 age group, and the remaining 12.50% were respondents aged 10–12 years.
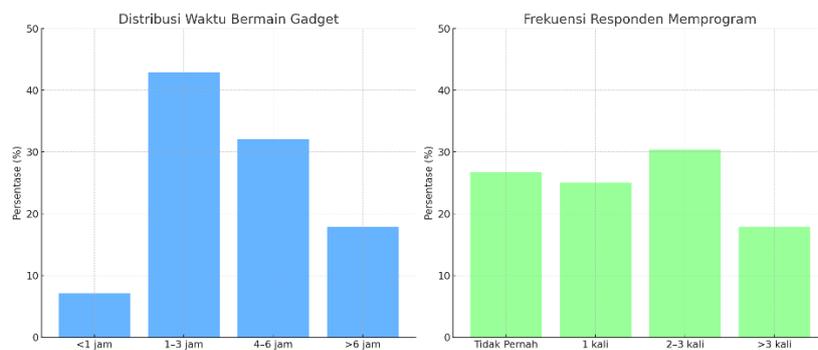


_Overview of Game Playing Distribution and Frequency in Respondents' Programming_

Gadget Usage Duration (Variable X):

The average amount of time respondents spent using gadgets outside of academic purposes was approximately 4.07 hours per day, with a data variation of 2.07 hours (standard deviation). In terms of distribution, the majority of respondents (42.86%) reported using their gadgets for 1–3 hours, followed by 32.14% who spent 4–6 hours. Additionally, 17.86% of respondents used their gadgets for more than 6 hours, while only a small portion (7.14%) reported using them for less than 1 hour.

Frequency of Programming Attempts (Variable Y):

The average frequency at which respondents attempted to create or modify programs was 1.72 times, with a standard deviation of 1.44. Interestingly, 30.36% of respondents reported attempting to program 2–3 times. However, 26.79% stated that they had never attempted programming at all, while 25.00% reported doing it once, and the remaining 17.86% attempted it more than three times.
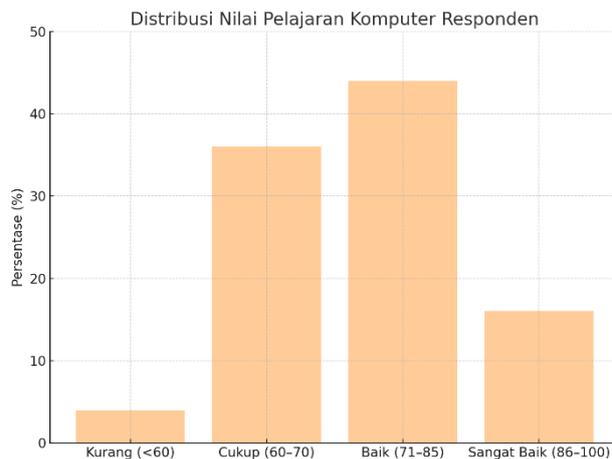


*Distribution of Respondents' Computer Lesson Grades*

Computer Subject Grades (Variable Y):

The average computer subject grade among respondents was 74.6, with a standard deviation of 10.87. The majority of respondents (44%) reported receiving a "Good" grade (71–85), while a considerable proportion (36%) earned a "Fair" grade (60–70). Additionally, 16% achieved a "Very Good" grade (86–100), and only 4% received a "Poor" grade (below 60).

**THE RELATIONSHIP BETWEEN GADGET DURATION AND PROGRAMMING ABILITY**

| Durasi Gadget | <1 jam | 1–3 jam | 4–6 jam | >6 jam |
|---|---|---|---|---|
| Tidak pernah | 2 | 8 | 10 | 6 |
| 1 kali | 0 | 4 | 8 | 2 |
| 2 – 3 kali | 1 | 6 | 12 | 4 |
| >3 kali | 1 | 6 | 6 | 4 |

*Data tabung silang*

When examining whether a linear relationship exists between gadget usage duration and the frequency of programming activities, the Pearson Correlation test produced a very low coefficient of r = 0.0557. This value indicates that the relationship between the two variables is extremely weak—almost negligible.

To verify whether this very small correlation holds any statistical significance, we conducted a t-test. The calculated t-value was 0.4098. With a total of 56 respondents, the degrees of freedom

(df) for this test were 54. When compared to the critical t-value of ±2.00 at the 95% confidence level (α = 0.05), the result shows that the calculated t-value (0.4098) is far below the threshold.

Therefore, we cannot conclude that there is a statistically significant relationship between gadget usage duration and programming ability. In other words, our initial hypothesis—that there is no significant relationship between the two variables—remains supported.

**THE RELATIONSHIP BETWEEN GADGET DURATION AND COMPUTER COURSE VALUES**

| Durasi Gadget (per hari) | Kurang | Cukup (60–70) | Baik (71–85) | Sangat Baik (86–100) |
|---|---|---|---|---|
| <1 jam | 1 | 1 | 2 | 1 |
| 1–3 jam | 2 | 6 | 10 | 3 |
| 4–6 jam | 1 | 8 | 8 | 3 |
| >6 jam | 0 | 3 | 4 | 1 |

_Cross tube data_

Next, we analyzed the relationship between gadget usage duration and computer subject grades. The Pearson Correlation produced a value of r = 0.196. Although this value is slightly higher than the previous correlation, it still indicates a very weak positive relationship. This suggests that the amount of time spent using gadgets does not have a meaningful association with computer subject grades.

We then conducted a t-test to examine the significance of this correlation. With r = 0.196 and a sample size of 50 respondents, the calculated t-value was 1.384. At 48 degrees of freedom (df = n − 2) and a significance level of 0.05, the critical t-value is 2.01. Since the calculated t-value (1.384) is still below the critical value (2.01), we conclude that the correlation is not statistically significant.

This means we fail to reject the null hypothesis, which states that there is no significant relationship between gadget usage duration and computer subject grades.

**FURTHER ANALYSIS WITH CHI-SQUARE TEST (Gadget Duration vs. Computer Lesson Grade)**

| Durasi Gadget | Kurang | Cukup | Baik | Sangat Baik | Total |
|---|---|---|---|---|---|
| <1 jam | 1 | 1 | 2 | 0 | 4 |
| 1–3 jam | 0 | 8 | 14 | 2 | 24 |
| 4–6 jam | 1 | 8 | 8 | 1 | 18 |
| >6 jam | 1 | 3 | 3 | 2 | 9 |
| Total | 3 | 20 | 27 | 5 | 55 |

_Cross tube data_

To obtain a more comprehensive understanding of the relationship between these two categorical variables (gadget usage duration and computer subject grades), we also employed the Chi-Square Test. The results showed a Chi-Square ($\chi^2$) value of 11.074.

With 6 degrees of freedom (df) and a critical Chi-Square value of 12.592 at the 0.05 significance level, the calculated $\chi^2$ value falls below the critical threshold. Since the computed value (11.074) is smaller than the critical value (12.592), we must conclude that there is insufficient evidence to state that a significant relationship exists between gadget usage duration and computer subject grades.

In summary, our null hypothesis—stating that there is no significant relationship— is accepted, confirming that gadget usage duration does not significantly affect computer subject grades in the dataset we analyzed.

This study stemmed from a simple yet compelling curiosity: to what extent does the amount of time we spend in front of our gadgets influence our programming skills or our performance in computer-related subjects? After carefully processing the data, the picture that emerged was fairly clear: the duration of gadget use—at least as measured in this research—does not show any statistically significant relationship with either of these abilities.

Both the Pearson correlation analysis and the subsequent t-tests revealed remarkably low correlation coefficients. This indicates that there is virtually no meaningful relationship between the amount of time someone spends on their gadget outside of learning activities and how often they experiment with programming, let alone their computer subject grades. Correlation values such as r = 0.0557 and r = 0.196, statistically speaking, are simply too small to be considered meaningful. The fact that the calculated t-values consistently fell below the critical t-values further strengthens the conclusion that these correlations are not significant.

To reinforce the findings, the Chi-Square test also echoed the same conclusion. The obtained Chi-Square value of 11.074, which is lower than the critical value of 12.592, serves as an additional confirmation: there is no noticeable pattern linking categories of gadget usage duration with the distribution of computer subject grades among our respondents. In essence, students' computer grades do not differ significantly regardless of how many hours they spend on gadgets.

These findings are rather thought-provoking. Considering how frequently people express concerns that excessive gadget use might hinder academic performance, our study paints a different picture. The amount of time spent on gadgets for non-learning purposes does not automatically lead to a decline in computational skills or related academic achievement. This challenges the commonly held assumption.

So, what might explain these results? Several possibilities emerge.

First, the category of "gadget usage duration outside learning" may be too broad. Gadgets are multifunctional tools. Even when used for entertainment, individuals may unintentionally develop cognitive or problem-solving skills that could actually be beneficial in computational tasks.

Second, the way we measured "programming ability"—based solely on how frequently an individual attempts to create or modify a program—may not fully capture the depth of their

understanding or true programming talent. Some individuals may rarely attempt programming yet possess strong conceptual foundations, while others may do it frequently without deep comprehension.

Third, computer subject grades themselves are shaped by numerous factors. Teacher quality, intrinsic motivation, home learning environment—all of these likely play a much larger role than simply the number of hours spent using gadgets.

Of course, this study is not without limitations. Our sample size of 56 respondents is relatively small. Moreover, all data were self-reported, which may carry biases or inaccuracies. Additionally, the categories of gadget usage duration were still quite general, leaving out important details such as which specific applications were used most often, or whether the usage was interactive or purely passive.

In conclusion, the findings of this study seem to whisper an important reminder: perhaps it is time to shift from asking "how long" someone uses a gadget toward asking "how" and "for what purpose" it is used. Ultimately, a gadget is merely a tool. And like any other tool, its impact depends greatly on how individuals integrate it into their daily lives—especially in the context of learning and developing skills.

## CONCLUSION

Based on the series of statistical analyses we conducted, several key points emerged regarding gadget use among our respondents:

Gadget Use and Programming Ability:

The amount of time an individual spends on their gadget does not show a meaningful correlation with their programming ability. We found no significant relationship—whether positive or negative—between the hours spent in front of a screen and how often respondents engage in designing or modifying program code. The correlation values were notably weak.

Gadget Use and Computer Subject Grades:

The same pattern applies to computer subject grades. Although many respondents reported spending one to six hours per day on their gadgets, this duration did not show any significant impact on their academic performance in computer subjects. In other words, the amount of time spent using gadgets does not appear to play a major role in determining whether their computer grades are high or low.

Chi-Square Results Reinforce the Findings:

Our Chi-Square test further confirmed these results, showing no significant relationship between gadget usage duration and computer subject grades. This means that differences in the amount of time respondents spend on their gadgets do not correspond to noticeable differences in the computer grades they achieve.

Overall, these findings provide a counterpoint to the concerns frequently raised in public discourse. The assumption that longer gadget use inevitably leads to poorer programming skills or lower computer grades may not fully apply—at least within the context of our research sample. Instead of focusing solely on limiting screen time, it may be wiser to emphasize how gadgets can be used productively, serving as tools for learning and exploration rather than merely sources of entertainment.

For future researchers, we suggest exploring this topic more deeply. There may be other factors—potentially far more influential—that affect programming ability and computer subject performance but were beyond the scope of our study. Additionally, employing richer and more detailed data collection methods that capture the "quality" and specific "purpose" of gadget use would help provide a more comprehensive and nuanced understanding of the issue.

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