International Journal of Instruction *January 2027 ● Vol.20, No.1*
e-ISSN: 1308-1470 ● www.e-iji.net *p-ISSN: 1694-609X*
pp. 127-148

Article submission code: 20260307033645
Received: 07/03/2026 Revision: 31/05/2026
Accepted: 10/06/2026 OnlineFirst: 01/10/2026

A Cross-sectional Study on Smartphone Screen Time, App Category Usage, and EFL Academic Performance at a Japanese University

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Excessive smartphone use has been associated with a range of negative outcomes among university students, including reduced well-being and poorer academic performance. This cross-sectional quantitative study investigated the relationship between smartphone screen time, smartphone application categories, and EFL academic performance among first-year Japanese university students at a mid-sized private university in Tokyo during the 2025–2026 academic year. Data from 134 iPhone users were analyzed using linear regression, Welch's ANOVAs, and Games–Howell post hoc comparisons. The mean daily smartphone screen time was found to be 8.45 hours (SD = 2.67), higher than in many similar studies on this topic. The regression analysis indicated that greater screen time was associated with lower final grades. However, this relationship was not statistically significant ($p = .106$) and explained little variance in academic performance ($R^2 = .02$). Welch's ANOVA showed a statistically significant difference in final grades across primary smartphone categories ($p = .023$). Games–Howell post hoc comparisons showed lower final grades for students who selected Gaming as their primary category than for those who selected Social Networking or Entertainment. However, the effect size was negligible and the subgroup size was small. The implications of this study show that, while it is clear that smartphone usage among participants is higher than what most researchers recommend, more research is needed to decisively conclude what aspects of smartphone usage may lead to better or worse academic outcomes.

Keywords: smartphone, screen time, smartphone addiction, mobile assisted language learning, academic performance, EFL learners, Japanese university students

INTRODUCTION

Over the last two decades, much research has been conducted in an attempt to understand the impact smartphone technology has had on society and education. While many studies have focused on the positive benefits that technology has had on the field

Citation: Saarna, C., Goodhew, M., & Anderson, D. (2027). A cross-sectional study on smartphone screen time, app category usage, and EFL academic performance at a japanese university. *International Journal of Instruction*, *20*(1), 127-148.

of education, instructional theories focusing on cognitive psychology, such as Sweller's cognitive load theory (CLT) may see smartphones as a potential hindrance to learning. In an EFL context, there is some debate about whether smartphones should be banned due to being too distracting and undermining academic performance or actively used to aid in language learning in the classroom (Gheytasi et al., 2015; Machmud, 2018; Ward et al., 2017).

Until now there has been a significant gap in existing research. The authors found very little literature dedicated to screen time and its relationship with EFL academic performance. Thus, the current study seeks to fill this gap in the literature by attempting to understand smartphone use from an educational perspective, and measuring smartphone screen time, app category usage, and EFL academic performance of 134 Japanese students at a mid-sized private university in Tokyo.

LITERATURE REVIEW

Prevalence of Smartphone Use Among Students

The prevalence of smartphones is now ubiquitous in many countries around the world. Pew Research reports that 98% of US adults own a cell phone or smartphone. Of particular relevance to this study is that among those 18–29 years old, 97% own a smartphone (Pew Research Center, 2025). Similarly, in a recent study of 337 Japanese university students between the ages of 18 and 20, it was found that 100% of students owned a smartphone (Selwood, 2025). Studies conducted in the Philippines and Pakistan found similar rates of smartphone ownership among students (Chan et al., 2025; Riaz et al., 2025).

Clearly, in 2026, smartphones are extremely prevalent and almost unavoidable tools, owned by the vast majority of university students worldwide. This was not necessarily the case as recently as 2011, when just 35% of American adults reported owning a smartphone (Pew Research Center, 2025). It was also a departure from Japanese students in 2012, when 31% of Japanese university students reported owning a smartphone (Selwood, 2025). But how much do students use their smartphones, for what purposes are smartphones used, and what effects do smartphones have on these students?

Average Screen Time

Pre-smartphone

The average screen time of children, adolescents, and adults from countries around the world has been gradually increasing since the mid-2000s. Studies conducted prior to the inception of the iPhone usually characterized screen time as time spent watching television or movies, playing video games, and using computers. One study of younger American children found that the average child spent about one hour and 58 minutes per day using screens, while a study of older children found an average of 3.4 hours per day was spent watching screens (Must et al., 2007; Rideout et al., 2003). In the largest scale study available from that time, Caruso and Salaway (2007) surveyed over 27,000 American university students from 103 institutions and found that students spent about

18 hours per week on online activities, including those related to school, work, and recreation.

Self-reported screen time

More recently, a myriad of self-reported studies in a wide array of countries on the topic of screen time has been conducted in the 2020s. Studies that estimated total screen time for all devices among university students from Mexico, Thailand, Germany, and the USA found average screen times varied between 7.1 and 10.2 hours per day (Hernández-Chávez, 2025; Kumban et al., 2025; Liebig, 2025; Sy et al., 2024).

In studies that focused on self-reported smartphone screen time, research found that screen time ranged from 4.6 hours to 8.49 hours with much variance between institutions of different countries (Alkaabba et al.; Chen et al., 2023; Kumban et al., 2025; Shabani et al., 2025). In general it seems that students from Asian countries such as China and Thailand (Chen et al., 2023; Kumban et al., 2025) reported using their smartphones for longer periods than their Saudi and Albanian counter-parts (Alkaabba et al., 2025; Shabani et al., 2025).

Objective screen time

Some studies have used more objective measures of screen time, and have particularly focused on smartphone screen time. By using screen time data recorded by the participants' own devices, many studies have begun to more accurately measure screen time rather than relying on self-reported statistics. The studies have measured average smartphone screen times for Austrian, Canadian, American, Saudi, and Thai students discovering daily screen times fluctuating between 4.6 and 11.81 hours (Bradley & Howard, 2023; Kaeoyotkao et al., 2025; Osailan, 2021; Pieh et al., 2025; Sapci et al., 2021). Additionally, a study of 49 Japanese adults found that they spent an average of 5.02 hours per day on their smartphones (Nishi et al., 2025). The findings once again showed that Thai students spent more time on their smartphones than other nationalities (Kaeoyotkao et al., 2025)

The contemporary studies show that smartphone screen time ranges anywhere between 4.6 hours and 11.81 hours depending on the study (Kaeoyotkao et al., 2025; Pieh et al., 2025; Shabani et al., 2025). However, all of these usage numbers are well above the average online activity time of 18 hours per week or 2.57 hours of screen time as reported by university students in 2007 (Caruso & Salaway, 2007). It can be concluded that screen time has increased steadily between 2007 and 2026 with the widespread adoption of smartphones. Perhaps the best evidence of this is the longitudinal study conducted by Harvey et al. (2022), which collected data from over two million adult participants across 46 countries and found that average daily screen time across all devices, increased from 9 hours in 2012 to 11 hours in 2019. Overall, there is much variance between studies, countries, and age of participants on the amount of time spent in front of devices.

Excessive screen time

There is also some disagreement among scholars on how much screen time should be considered excessive. Older studies conducted in Brazil and China considered an average daily screen time of over 2 hours to be excessive (de Lucena et al., 2015; Wang et al., 2018). Another older study of Lebanese university students concluded that screen time exceeding 5 hours was excessive and increased the risk of smartphone addiction (Matar Boumosleh & Jaalouk, 2017).

On the other hand, newer studies recommend daily screen time should not exceed between four and eight hours (Dai & Ouyang, 2026; Kaewpradit et al., 2025; Zhang et al., 2025). From another perspective, Deloitte, in a report commissioned by the American Optometric Association, defines excessive screen time as more than 7 hours, and views screen time beyond this threshold as putting individuals at risk of eye, neck, and back pain, as well as migraines and headaches (Deloitte Access Economics, 2024).

Categories of Smartphone Use

Many use cases exist for smartphones, and they can be categorized in numerous ways. Selwood (2025) uses broad categories such as internet, dictionary, texting, calls, homework, and social media. Similarly, Shi et al.'s (2023) study opts for categorizations such as browsing social media, contacting other people, music, videos, browsing other websites, games, and sharing social media. Perhaps the most impartial way to categorize smartphone usage is to use the Apple iPhone's own internal screen time application. When enabled, the screen time application records the total daily screen time, applications, and categories used during the time in which the iPhone is unlocked. There has been some variance in categories over time. Currently, the authors found 12 categories reported within the iPhone screen time application. Table 1 shows these designations, with examples of apps that typify each category. It should be noted that as new iPhones have been released and apps have been updated, apps have occasionally changed category or lost their classification altogether, sometimes falling under the umbrella *Other* category.

Table 1
Categories with examples

Category	Examples
Social Networking	Instagram, Facebook
Gaming	Minecraft, Pokémon Go
Entertainment	YouTube, Netflix, music apps
Creativity	Google Photos, drawing apps, photo editing apps
Productivity & Finance	Mail, Calendar, Microsoft Office, Venmo, PayPal
Education	Duolingo, Quizlet
Information & Reading	Safari, news apps, browsers
Health & Fitness	MyFitnessPal, Fitbit
Shopping & Food	Amazon, Uber Eats, Apple Store
Travel	Google Maps, Booking.com
Utilities	Calculator, Settings
Other	Apps which don't fit the other categories

Within these classifications, research has been conducted to determine which kinds of apps and categories of apps are most used. The categories that stand out as being the

most used in a wide variety of studies are *Social Networking, Gaming, Information and Reading, Education,* and *Entertainment* (Atas & Çelik, 2019; Chaudhary et al., 2025; Chen et al., 2023; Cherif, 2025; Cho & Yanase, 2020; Hernández-Chávez et al. 2025; Iskandar, 2021; Kaeoyotkao et al., 2025; Liu, 2025)

Cognitive Load Theory

Cognitive Load Theory (CLT) was proposed in the 1990s and attempts to build a framework for understanding learner cognition and processing of information from short term memory to long term memory (Sweller, 2010). The key elements of CLT are intrinsic cognitive load, extraneous cognitive load, and germane cognitive load.

Intrinsic cognitive load is the inherent exertion of learning new material and information which is unfamiliar to the learner (Sweller, 2010). An example of high intrinsic cognitive load would be the beginning point of learning a new language which is completely unfamiliar to the learner. An example of lower intrinsic cognitive load would be learning a new word in the native language of the learner. The learner already possesses complex schema related to their native language which makes the processing easier. However, a learner's schema related to a new language is very limited which makes the intrinsic load of learning the new language much more demanding.

Extraneous cognitive load is the inefficient application of mental energy due to poor instructional design or other distractors (Sweller, 2010). One prominent example of a potential distraction to learning could be smartphones. One study suggests that the mere presence of a learner's smartphone in close proximity expends more cognitive resources than when the smartphone is physically in another room (Ward et al., 2017). Learners seem to perform worse on tasks that require attention when a smartphone is nearby, and therefore the ever presence of smartphones can be seen as a source of constant stress or extraneous cognitive load on learners seeking to learn cognitively difficult subjects (Iskander, 2021; Krumsvik, 2025; Ward et al., 2017).

Negative Effects Due to Excessive Screen Time

Numerous academic studies across a variety of disciplines show varying levels of negative effects on users who operate their devices excessively. These negative effects can be physical, psychological, and academic.

Physical health impacts

Many studies have assessed the physical health risks associated with excessive screen time. Among them, studies have linked excessive screen time with potential eye and vision problems (Albalawi et al., 2023; Deloitte Access Economics, 2024; Trott et al., 2022), neck and back problems (Almutairi et al., 2024; Deloitte Access Economics, 2024; Yue et al., 2023) and reduced physical activity, which can lead to obesity (Dai & Ouyang, 2026; Nakshine et al., 2022; Trott et al., 2022; Wang et al., 2018).

Among the most well-cited and prominent physical concerns related to excessive device usage is declining quality and quantity of sleep (Albalawi et al., 2023; Alkaabba et al., 2025; Cherif, 2025; Dai & Ouyang, 2026; Kaewpradit et al., 2025; Kao, 2023; Nakshine et al., 2022; Sy et al., 2024; Trott et al., 2022). Many of the burdensome physical

impacts associated with excessive screen time are increasingly coming to light. However, the mental health impacts associated with excessive screen time are more considerable.

Mental health impacts

The rise in hours of screen viewing over the last two decades seems to have contributed to an increase in mental health concerns. It is well documented that excessive screen time can lead to feelings of anxiety and depression in both adolescents and adults (Dai & Ouyang, 2026; Matar Boumosleh & Jaalouk, 2017; Nakshine et al., 2022; Santos et al., 2024; Trott et al., 2022; Zhang et al., 2025). Additionally, feelings of loneliness, particularly among young adults, have risen over the past decade (Kao, 2023; Sy et al., 2024). Several studies have also reported that excessive device use has increased stress among young people (Iskander, 2021; Nakshine et al., 2022; Santos et al., 2024; Trott et al., 2022). Lastly, some studies have found reduced attention and difficulty in concentrating on tasks among both children and young adults who engage in excessive screen time (Liebherr et al., 2022; Montagni et al., 2016; Santos et al., 2022). These attention deficits are in line with CLT and may be explained by extraneous cognitive load of mental resources which could cause smartphone users to be cognitively overwhelmed.

Negative academic impacts

Given the findings that excessive screen time increases the risk of mental and physical health problems, including anxiety, depression, stress, and lack of physical activity, it seems likely that academic performance would also be negatively impacted. Indeed, several studies and meta-analyses have found negative correlations between excessive screen time and academic performance.

A study of 305 second-year Mexican university students found that excessive screen time led to a reduction of both cognitive ability and academic scores on a standardized test (Hernández-Chávez et al., 2025). Another study of 435 college students in Malaysian institutions found that 40% of students admitted to moderate levels of smartphone addiction. Additionally about 16% of participants in this study experienced negative academic results which could be attributed to excessive smartphone usage (Chan et al., 2022). A study of 1879 Chinese university students found that there was a relationship between high screen time viewing short-form videos and increased levels of academic anxiety and lower academic engagement (Li et al., 2024).

Social media use also seems to be linked to academic performance. One study of 153 Japanese university students found that increased use of *Social Networking* applications, such as Line and Twitter, as well as *Entertainment* platforms, like YouTube, led to worse academic outcomes (Cho & Yanase, 2020). The authors of that study suggest that *Social Networking* is a probable cause of distraction and reduced study time which is in line with CLT.

Another study of 270 Malaysian university students found that higher GPAs were associated with students who spent less than one hour per week on video games compared to students who spent more than 10 hours (Salman et al., 2024). In a review

of datasets consisting of 30,000 US students, it was found that the relationship between gaming and academic performance was complicated, with results generally indicating that students who spent more time gaming on weekdays performed worse than students who spent time gaming on weekends (Hartano et al., 2018). The authors theorize that with time limited on weekdays, gaming on weekdays is more likely to replace or interfere with study time which could also be in line with CLT.

Multifaceted academic impacts

Additional research shows that the relationship between screen time and academic performance is not straightforward. A meta-analysis of 63 studies spanning 28 countries and 124,166 students found that social media use had a small positive effect on academic performance, though the relationship was found to be statistically insignificant (Kuş, 2025). The same meta-analysis found that smartphone addiction and video game use had a weak negative impact on academic performance. This is further supported by another meta-analysis, which found that, in 24 of 27 studies, problematic levels of gaming were negatively correlated with academic performance (Alzahrani & Griffiths, 2024). However, Alzahrani and Griffiths conclude their meta-analysis by suggesting that it may be poor academic performance that leads to excessive gaming rather than vice versa.

Results are further complicated by a study of 116 female Pakistani university students, which found a weak positive but not statistically significant correlation between screen time and academic performance (Latif et al., 2025).

Despite the utility, convenience, and manifold functions that smartphones provide, their popularity and screen time usage has grown in conjunction with declines in both physical and psychological well-being among people of all ages. However, research results regarding smartphone usage and academic performance are mixed and often multifaceted.

Screen Time and EFL Academic Performance

There are several studies which investigate mobile assisted language learning specifically under the lens of EFL academic outcomes. Unfortunately, research that focused specifically on screen time and EFL performance was extremely sparse. However, some articles showing positive and negative effects of smartphone usage on EFL learning were found. The most directly related study showed that Iranian learners possessing moderate levels of screen time usage on mobile phones obtained higher EFL reading comprehension scores by learning from a reading application compared to a control group (Gheytasi et al., 2015). Despite these results, a qualitative survey found that most participants believed that mobile phone usage would lead to more distraction and addiction to the learners (Gheytasi et al., 2015).

A study of 587 Taiwanese university students found that students who reported high rates of smartphone addiction had poor sleep quality and higher rates of inattentiveness in EFL classes (Kao, 2023). A study conducted in China concluded that students who reported higher levels of smartphone addiction were more likely to experience anxiety in EFL writing tasks (Song et al., 2023). Finally, in one review of literature, Metruk

(2022) did not specifically make a claim on whether smartphones lead to better or worse EFL outcomes. However, his review of the literature finds several studies which report student disinterest in learning English through smartphones and a tendency for students to use smartphones for communication and pursuing information instead of for language learning.

Other studies have shown positive effects on EFL academic performance as a result of using smartphones. One such study of 140 Japanese students finds that students who were allowed to use smartphones during EFL classes for language learning purposes were significantly more likely to report longer English study times at home as well as higher levels of learner autonomy (Leis et al., 2022). Additionally, a meta-analysis as well as a study of Palestinian university students found that, if implemented effectively, mobile devices can result in improved English vocabulary acquisition (Dan, et al., 2025; Shehadeh, 2024).

Overall, support in the literature for teacher directed usage of smartphones for language learning purposes can be found. However, there is very little exploration that specifically seeks to measure the relationship between screen time and EFL performance.

Research Questions

This international literature has found varying results, including a wide range of total screen time between different studies, a small range of different application categories that students spend their screen time on, and somewhat contradictory results on the relationship between screen time and academic performance. Within the context of this literature and the framework of CLT, a quantitative cross-sectional correlational study was conducted to investigate smartphone screen time, application category usage, and EFL academic performance among Japanese university students. The following research questions are addressed in the present study:

RQ1. What is the average screen time of the authors' students?

RQ2. What categories are these students spending their screen time on?

RQ3. To what extent is screen time related to final grades?

RQ4. To what extent are smartphone usage categories related to final grades?

METHOD

Questionnaire

At the time of the study, the three authors were all affiliated with the same mid-sized private university in Tokyo. During Week 9 of the spring semester of the 2025–26 academic year, the authors asked their Freshman English (FE) students to complete a Google Form questionnaire in Japanese, created by the authors, which contained five questions. The five questions asked in the survey have been translated from Japanese to English and are available below:

1) Which smartphone do you use?

a. iPhone
b. Android

2) What is the average time you spent using your smartphone per day last week? *Example: 9 hours and 25 minutes*
3) List the top category in which you use your smartphone the most. *Example: Information and Reading*
4) List the second top category in which you use your smartphone the most. *Example: Gaming*
5) List the third top category in which you use your smartphone the most. *Example: Education*

Class time was allotted for completing the survey. Instructions were provided on how to access this information on their phones using the internal screen time application, and students were guided through the process of locating and reporting the information. The questionnaire was designed to collect descriptive information directly from students' smartphone screen time applications rather than subjective estimates of usage. Because the items focused on factual reporting of objectively recorded smartphone data and app categories rather than subjective attitudes or perceptions, formal scale validation procedures were not considered necessary. These procedures also helped reduce potential reporting errors during data collection. To improve reliability and reduce potential response bias, students completed the questionnaire privately by viewing their smartphone screen time data directly on their own devices rather than relying on memory or estimation.

Participants

Freshman English (FE) is a required two-semester course that all incoming students in all faculties must take. Students are placed into groups of similar English ability as determined by a TOEIC IP test taken prior to the start of classes. For the 2025–2026 academic year, the three authors collectively taught a total of 10 FE courses across the Faculties of Business Administration, Economics, International Relations, and Law.

All participants provided informed consent prior to participating in the study. The study followed the ethical guidelines and consent procedures established by the authors' department for classroom-based research involving students. Participation was voluntary, responses remained confidential, and participation did not affect course grades.

Out of 191 students, 154 completed the questionnaire, a response rate of 80.6%. Because Android operating systems vary across manufacturers and do not always provide screen time category data in a standardized format comparable to Apple's Screen Time application, 18 Android users could not be reliably incorporated into the analysis. To maintain consistency in the measurement and categorization of smartphone usage across participants, only iPhone users were included in the final dataset, leaving 136 participants. Of these 136 iPhone users, two students failed their FE course prior to the end of the semester due to lack of attendance, so no final grade could be reported. The remaining 134 survey responses were then linked to each student's final grade for the Spring semester.

Analyses

Clock time was converted to decimal format (e.g., 5 hours 30 minutes is equivalent to 5.5 hours). Prior to conducting the analyses, assumptions relevant to each statistical procedure were examined. For the linear regression analysis, scatterplots were examined to assess linearity and homoscedasticity. For the ANOVA analyses, group distributions, sample sizes, and homogeneity of variance were examined. Because sample sizes across category groups were unequal and the assumption of homogeneity of variance was not consistently met, Welch's ANOVAs were conducted instead of standard ANOVAs, as Welch's ANOVA is better suited to unequal group sizes and variances. Sample sizes for each group can be seen in Table 7. All statistical analyses were conducted using JASP (version 0.95.2).

FINDINGS

RQ1. What is the average screen time of the authors' students?

A total of 134 students were included in the analysis, with a mean daily screen time of 8.45 hours (*SD* = 2.67). The majority of students reported between 4 and 12 hours of daily smartphone screen time, while relatively few reported less than 4 hours or more than 12 hours (Table 2).

Table 2
Freshman English screen time

Variable	Percentage	*N*
Total Students	–	134
Mean Daily Screen Time	–	8.45 (2.67)
Daily Screen Time by Hours		
< 4	3.0	4
4 to < 8	46.3	62
8 to < 12	38.8	52
≥ 12	11.9	16

RQ2. What categories are these students spending their screen time on?

Of the 134 students, 100 students (74.6%) provided their top three categories of smartphone use. *Social Networking* and *Entertainment* were the most commonly reported categories across all three rankings, while *Gaming* was also frequently reported, particularly as a second or third category. Other categories, such as *Creativity* and *Productivity & Finance*, appeared less frequently (Table 3).

Table 3
Freshman English top three categories

Variable	Percentage	*N*
Total Students	–	134
Provided Categories Data	74.6	100
Category 1		
Social Networking	47	47
Entertainment	41	41
Gaming	5	5
Creativity	0	0
Prod. & Finance	0	0
Other	7	7
Category 2		
Social Networking	30	30
Entertainment	37	37
Gaming	17	17
Creativity	6	6
Prod. & Finance	6	6
Other	4	4
Category 3		
Social Networking	13	13
Entertainment	12	12
Gaming	21	21
Creativity	14	14
Prod. & Finance	14	14
Other	26	26

RQ3. To what extent is screen time related to final grades?

The mean final grade of the 134 students was 83.17 (*SD* = 9.18). Students who reported less daily screen time tended to have somewhat higher average final grades than students with more screen time. However, these differences were small and not statistically significant (Table 4).

Table 4
Freshman English final grades

Variable	Mean (*SD*)
Mean Final Grade	83.17 (9.18)
Daily Screen Time by Hours	
< 4	89.59 (14.14)
4 to < 8	83.96 (9.45)
8 to < 12	82.77 (8.73)
≥ 12	79.79 (7.70)

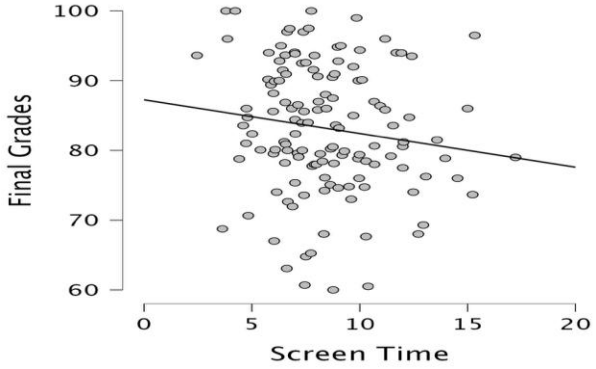
A linear regression was conducted to examine whether screen time predicted final grades. The model was not statistically significant, $F(1, 132) = 2.65$, $p = .106$, and screen time explained only 2% of the variance in final grades ($R^2 = .02$), indicating a very small effect size. The unstandardized regression coefficient was −0.48 (*SE* = 0.30, 95% *CI* [−1.07, 0.10]), indicating that each additional hour of screen time was

associated with an estimated decrease of 0.48 points in final grades. However, this relationship was not statistically significant (Table 5).

Table 5
Linear regression results

	Coefficient (b)	Standard Error	*t*	*P*	95% *CI*
Intercept	87.26	2.63	33.19	<.001	[82.05, 92.46]
Screen Time	–0.48	0.30	–1.63	.106	[−1.07, 0.10]

Chart 1
Screen Time vs. Final Grades



RQ4. To what extent are smartphone usage categories related to final grades?

Welch's ANOVAs were conducted to examine whether the categories of screen time were associated with differences in final grades. For Category 1, the test indicated a statistically significant difference in final grades across the categories, $F(3, 19.32) = 3.98$, $p = .023$. However, the effect size was negligible, $\omega^2 = .000$, indicating that the categories explained virtually none of the variance in grades. Post hoc Games–Howell comparisons indicated that students who selected *Gaming* as their primary category had lower average final grades than students who selected *Social Networking* or *Entertainment* (Tables 6–8). No other pairwise comparisons were statistically significant.

Table 6
Welch's ANOVA results for category 1

	df (Welch)	*F*	*p*	ω^2
Category 1	3, 19.32	3.98	.023	.000

Note: ω^2 = omega squared effect size

Table 7
Final Grades by Category 1

Category 1	*n*	Mean (*SD*)
Social Networking	47	83.62 (10.23)
Entertainment	41	83.56 (9.02)
Other	7	82.27 (6.98)
Gaming	5	78.01 (2.66)

Table 8
Games–howell post hoc comparisons for category 1

Comparison	Mean Difference	*p*
Social – Entertainment	0.06	.999
Social – Other	1.35	.969
Social – Gaming	5.60	.036*
Entertainment – Other	1.29	.971
Entertainment – Gaming	5.55	.033*
Other – Gaming	4.26	.494

* $p < .05$

Table 9
Welch's ANOVA results for categories 2 and 3

	df (Welch)	*F*	*p*	ω^2
Category 2	5, 15.86	0.78	.578	.000
Category 3	5, 39.33	0.48	.786	.000

DISCUSSION

In this study, the authors sought answers to four research questions regarding Japanese university students' smartphone screen time, what categories of applications students used the most, and whether there was a relationship between screen time and academic performance or between most prevalent categories and academic performance. For RQ1, it was found that students at the authors' institution averaged a mean of 8.45 hours (*SD* = 2.67) of daily smartphone screen time. This result was higher than the average smartphone screen time as measured objectively in numerous other studies (Bradley & Howard, 2023; Nishi et al., 2025; Osailan, 2021; Sapci et al., 2021). However, it was still much lower than the average daily smartphone screen time (11.81 hours) observed in one study of Thai students (Kaeoyotkao et al., 2025). Thus, it can be concluded that in the 2025–2026 academic year, these Japanese university students used their smartphones for more hours per day than students in most previous studies. In accordance with CLT, it could be said that students in the current study may face higher extraneous cognitive loads due to the distraction caused by smartphones in the classroom. This extra burden on mental resources could exist regardless of whether students used the smartphones in the classroom or not (Ward et al., 2017).

For RQ2, the authors looked at what categories of applications were most commonly used by students. It was found that students overwhelmingly favored *Social Networking* and *Entertainment* applications. *Gaming* applications were the third most used category, but other categories, such as *Creativity* and *Productivity & Finance,* were also moderately popular. The result of *Social Networking* as the most popular category is in keeping with the existing literature (Atas & Çelik, 2019; Chaudhary et al., 2025; Cherif, 2025; Cho & Yanase, 2020; Hernández-Chávez et al. 2025; Liu, 2025). The finding that *Entertainment* was also a popular usage of smartphones was in line with results found in some studies (Chaudhary et al., 2025; Chen et al., 2023; Cherif, 2025; Hernández-Chávez et al., 2025). The third most popular category in this study, *Gaming,* can be seen as somewhat divergent from these other studies, which found *Information & Reading* or *Education* to be more notable (Atas & Çelik, 2019; Chaudhary et al., 2025; Cherif,

2025). However, some literature finds *Gaming* to be a popular category of usage for smartphones (Chen et al., 2023; Hernández-Chávez et al., 2025; Kaeoyotkao et al., 2025). Krumsvik (2025) cites several studies and meta-analyses which point towards attention deficits due to students attempting to multitask between academic tasks and social media activities. Krumsvik also points to extraneous cognitive load caused by the intense usage of social media by many students.

Subsequently, RQ3 investigated the relationship between smartphone screen time and academic performance as measured by final grades in compulsory EFL courses. It was found that screen time had a small but not statistically significant effect on final course grades. The regression analysis estimated that each additional hour of screen time was associated with a 0.48-point decrease in final grades. Students with less screen time also tended to have somewhat higher average final grades than students with more screen time. However, these results were not statistically significant (p = .106). This finding differs from much of the literature surrounding screen time and academic performance, which has found statistical significance (Cho & Yanase, 2020; Hernández-Chávez et al., 2025; Li et al., 2024). However, there were also some studies in the literature which showed mixed, nuanced, or not statistically significant results in terms of the relationship between screen time and academic performance (Latif et al., 2025; Kuş, 2025). One explanation for this finding is that excessive screen time is not well-defined and studies may vary in how much screen time is considered excessive. Another explanation for the current finding is the small subgroup sizes at the authors' institution. With just four students using their smartphones for less than 4 hours per day, and 85.1% of students maintaining a daily average of between 4 and 12 hours of screen time, it was difficult to find a large variance in final grades among students. CLT would seem to suggest that smartphones provide extraneous cognitive load to students, and using them excessively would distract students from better academic outcomes. However, the literature around this topic finds results to be mixed. Certainly, more research is needed before excessive screen time can be said to contribute heavily towards worse EFL academic outcomes.

Lastly, RQ4 investigated the relationship between categories and academic performance. CLT would seem to suggest that high levels of *Social Networking* and *Gaming* may be associated with worse academic outcomes. A statistically significant difference in final grades was found across primary smartphone categories (p = .023). Students who selected Gaming as their primary category had lower average final grades than students who selected Social Networking or Entertainment. However, the effect size was negligible, and only five students selected *Gaming* as their primary category. No other statistically significant difference between application category and academic performance was observed. Similar results can be found in other studies (Alzahrani & Griffiths, 2024; Kuş, 2025; Salman et al., 2024). However, at least one study contradicts this finding and found no statistically significant relationship between gaming and academic performance (Kaeoyotkao et al., 2025). Therefore, the findings of the present study should be interpreted with caution.

Despite clearly elevated levels of screen time among the authors' students, there was little evidence that EFL academic performance was significantly related to excessive

screen time or a particular category of smartphone usage. CLT predicts that smartphone usage, particularly very intense usage of *social networking* and *gaming* applications should lead to cognitive overload. However, the results of the current study showed only small or insignificant effects on EFL academic performance. One explanation for these results is that the sample size was too small with too few gamers and too few students with less than four hours of screen time per day. Another potential explanation for the results is that teachers typically grade on a scale between 60 and 100% for students who complete the course. Students who fail the course receive an EFL score of 0%. The current analyses essentially score students on a 40 point scale from 60 to 100% and therefore may cause results to cluster together and appear insignificant. Another explanation for the mixed findings of this study is that most teachers at the authors' institution strictly prohibit or limit smartphone usage in the classroom. Although Ward et al. (2017) found that students are affected by extraneous cognitive load just from the presence of smartphones in the room; perhaps the students in the current study were not as affected by this phenomenon. Finally, there could be properties exclusive to EFL itself which lead to less distraction and cognitive overload from students. One unique aspect of EFL is the prominence of speaking activities and discussion which may be less conspicuous or not present in other courses. If student participation in speaking and active discussion in the classroom leads to less impact from smartphone cognitive overload, this could have far reaching implications on EFL and education as a whole. Future research could focus on whether there are differences between cognitive resources used for speaking, listening, reading, and writing activities, and if smartphones play a role in distraction for the different skills learned in EFL.

LIMITATIONS

This study had a number of limitations. First, all participants in this study were freshmen studying at the same Japanese university. The sample sizes of n = 134 for RQ1 and RQ3 and n = 100 for RQ2 and RQ4 limit the statistical power, and may not be representative of students residing in other countries. Unfortunately, despite clear visual and verbal instructions given by the authors, 34 students filled out the latter portion of the survey incorrectly. Most of the mistakes consisted of students simply writing the name of an application such as *Instagram* or *Youtube* instead of writing the category of application as instructed. Other participants simply wrote a numerical value such as *1:30* but failed to mention which category they used for this amount of time.

In addition, while students were guided through the process of locating their screen time data on their smartphones, this information was then self-reported, and thus may not be a completely objective measure of smartphone screen time. The authors decided to conduct the study in this way to avoid inducing a feeling of invasion of privacy, which students might experience if asked to upload screenshots of their actual screen time data. Additionally, no data indicating income levels or gender were collected in this study. Thus any conclusions regarding these characteristics should be considered outside of the scope of this study and a topic for future research.

It should also be noted that while smartphone screen time was measured to be 8.45 hours of daily usage on average, this does not include devices other than the smartphones on hand in the study. In reality, total screen time of participants could be

much higher for students who use TVs, iPads, computers, game consoles, or even another mobile device in addition to their smartphones. In particular, many gamers probably use dedicated gaming devices rather than smartphones for gaming. Problematic gaming behaviors may have an impact on EFL academic performance. However, it would be extremely difficult, if not impossible, to accurately assess total gaming time spent on other devices.

Another limitation of the study, as mentioned in the literature review, is the proclivity for applications to sometimes change or lose their classification. For example, although the web browser application Safari is listed under the *Utilities* category in the App Store, in practice it functions as an *Information & Reading* application. However, after using the Safari application on an iPhone, one author discovered that it did not have a category classification and instead fell into the *Other* category when counted on the screen time application. This means that categories on iPhone are not entirely representative of their actual functions and can occasionally be subject to change with updates.

Another issue is the blending of usages for certain apps. A prime example of this is the application TikTok. TikTok is listed as an *Entertainment* app in the Japanese App Store, but it also maintains elements of *Social Networking*. Applications such as YouTube, Facebook, and Instagram also feature elements of *Entertainment* and *Social Networking*, but are only given one classification in the screen time app. In reality, some students may be using these applications for both *Entertainment* and *Social Networking* purposes, yet this usage can only be classified into one category.

The final limitations to mention are the two distinct phenomena of dual screening, using two apps at the same time on one smartphone, and dual-wielding, the simultaneous use of two smartphones. Although dual screening on an Apple iPhone is not normally possible, there are special applications which can be downloaded to allow for it. A small number of users may also engage in using the *Picture in Picture (PiP)* function, which allows a user to watch a miniature version of a video while operating a separate app. While this type of behavior is uncommon, engaging in the *PiP* function on iPhones can potentially cause both categories of apps to be counted, thus doubling the total screen time while *PiP* is in use. Finally, the authors have observed an increasing habit of students using two smartphones or similar devices simultaneously. Often, one device will be used to play music or videos as background stimuli while working on something educational or productive on the other device. This could lead to over-reporting of actual screen time, especially when the device was used primarily for aural rather than visual input, similar to when a TV is turned on for background noise rather than active viewing.

CONCLUSION

This study is limited in scope, as only 134 participants from one Japanese university could be included, which limits the generalizability of the findings to other universities and educational contexts. However, the results of the study suggest that many Japanese university students in 2025 spent a considerable amount of time on their smartphones. Data from a larger number of participants would be needed to draw more concrete

conclusions about the effects of screen time and application categories on academic performance.

In addition, because the study used a cross-sectional correlational design, the findings cannot establish causal relationships between smartphone use and academic performance. Some smartphone usage categories also contained very small subgroup sizes, which may have reduced statistical power and limited the stability of certain findings. Therefore, the present study found little statistical evidence that smartphone screen time was strongly associated with academic performance.

To be clear, smartphones should not be demonized. Studies in mobile assisted language learning have found that smartphone usage in the L2 can be used to increase student vocabulary knowledge and reading comprehension among other educational benefits when used effectively (Dan et al., 2025; Gheytasi et al., 2015; Shehadeh, 2024). Although further research is needed, designing engaging speaking and discussion activities may be another effective way to keep students' cognitive resources focused on EFL tasks rather than on smartphones. However, teachers should maintain vigilance as studies related to CLT suggest that smartphones can pose a threat to cognitive resources needed to effectively learn difficult subjects such as EFL (Gheytasi et al., 2015; Krumsvik 2025; Machmud, 2018; Ward et al., 2017).

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