

Investigating Daily Mobile Device Use Among University Students in Indonesia

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Abstract. This study investigates daily mobile device use among Indonesian university students by using survey data collected in the first quarter of 2016. The data show that 55.49% of the students spend more than five hours a day on their mobile devices. OLS regression analysis shows that female students, owners of the most expensive smartphone or tablet, and those who access social media apps and play mobile games frequently are more likely to spend more time on their mobile devices each day. Contrary to that, those who consider themselves as laggards are less likely to do so. The findings in this study help better understand how university students in Indonesia use their mobile device and lay a foundation as part of a larger research agenda about the relationship between mobile technology and education in Indonesia.

1. Background

Mobile devices have been around since the 1970s, marked by the first handheld mobile phone produced by Motorola in 1973. After few decades used solely as a communication device, for both voice-based and text-based communication, mobile phones received a major upgrade in its ability to resemble a portable personal computer with a mobile operating system, also known as smartphones. While Japanese NTT DoCoMo was among the first to release smartphones and relatively successful in achieving mass adoption within a country, it was not until the next generation of smartphone, marked by the release of Apple iPhone and Google Android OS in 2007 and 2008 respectively that smartphone became a worldwide phenomenon. With the release of iPad and multiple variants of Android counterpart in the 2010s, tablets were the latest addition to the lineup of mobile devices. The trend shows that personal computing devices are becoming more and more mobile oriented.

Meanwhile, in Indonesia, the statistics of information and communication technology (ICT) adoption are more than promising. Within the past three years, Internet penetration went up significantly from 15% in 2014 to 51% in 2017, placing Indonesia as the country with the highest growth in Internet user, more than five times of the global average between 2016 and 2017 [1-4]. The number of mobile connections in Indonesia already outnumbered the total population by 2014 (112%). In this regard, Indonesia is ahead of many developed countries like the US, France, Australia, Japan, or South Korea and this is interesting, given that digital divide has been widely accepted as a worldwide problem between developing and developed countries for the past decade [5]. Also, considering that Indonesia is the fourth most populous country in the world with roughly 260 million population, this number in growth and rate means a lot as it translates to a huge number of people. These statistics do not necessarily



represent the quality of technology use in any way, but they show that Indonesian people are thriving regarding technology adoption, especially in the mobile frontline.

The relationship between mobile devices and educational attainment has been investigated by researchers for a while. Some studies indicate mobile device use can help improve education [6-9] and emphasize the opportunity of transforming education with the use of mobile learning [10-11]. Some other, however, suggest a problematic relationship between them. In many cases, it is mostly due to addiction [12-16]. The same addiction problem has also been pointed out by researchers in terms of Internet access, also known as pathological Internet use [17-19]. Nonetheless, it is also important to note that the relationship between ICT, in which mobile device plays an important role nowadays, and education is a two-way effect. A higher participation rate in post-elementary education increases ICT utilization, which in turn helps promote better education outcomes [20].

In terms of Indonesia, particularly university student population, previous research in an Indonesian university shows that more than 95% of the students own smartphones by 2016 [21]. This number is significantly higher than the ownership rate of overall population in Indonesia (21%) or even in the United States (72%), which is one of the highest in the world in the same year [22]. It is also worth to note that mobile device ownership is growing rapidly among university students all over the world, as suggested by many studies [23-25]. In terms of the time-spent accessing internet from mobile device, a global survey of internet users aged 16-64 in the second half of 2016 shows that Indonesian users spend 235 minutes each day in average. This number is significantly higher than U.S. users who spend 122 minutes each day in average. Only users in Thailand (254 minutes) and Brazil (236 minutes) spend more time using mobile internet than Indonesian users [4].

While accessing the Internet might be one of the main activities people do on their mobile device, it is not the only activity. In fact, most people spend more time on the apps instead of mobile browser on their smartphones. A market research shows that U.S. consumers time-spent on mobile devices have crossed five hours (300 minutes) a day by the end of 2016 [26]. Unfortunately, there is no comparable data for Indonesian consumers yet. To fill that gap and to lay a foundation for a larger research agenda about the relationship between mobile technology and education in Indonesia, this study aims to investigate daily mobile device use among Indonesian university students in terms of time spent on mobile device and factors influencing it.

2. Data and Methodology

An online survey was conducted in a private university in Indonesia within the first quarter of 2016. A total of 182 undergraduate students (78 females, 42.86% and 104 males, 57.14%) participated in the study. They came from 7 different majors, categorized further into science, technology, engineering, math, and medicine (STEMM) and social sciences. They ranged from 19 to 25 years of age (Mean = 21.42, SD = 1.53). Participants were also categorized based on year in college (26 1st year, 14.29%, 30 2nd year, 16.48%, 58 3rd year, 31.87%, 39 4th year, 21.43%, and 29 other in their 5th year or above, 15.93%), place of origin (116 Java, 63.74% and 66 outside Java, 36.26%), self-perceived ICT adoption level representing their attitude toward ICT in three simplified scale (38 early adopters, 20.88%, 123 majorities, 67.58%, and 21 laggards, 11.54%), and socioeconomic status (SES) measured by the purchase price of their devices. Those who own the most expensive smartphones or tablets (i.e., priced at IDR 5 million or above) are considered as high SES (35 high SES, 19.23% and 147 middle-to-low SES, 80.77%). Students were also categorized based on their use of educational apps, social media apps, and mobile gaming apps on their mobile device. For these last three categories, regular users are defined as those who use at least one app in each category at least once a week. Data analysis includes both descriptive and inferential statistics in the form of OLS regression.

For the dependent variable in this study, students were asked to self-report their daily mobile device use in hours. Table 1 provides information on students with daily mobile device use of five hours or more, categorized by gender, age, major, year in college, place of origin, socioeconomic status, attitude toward ICT, educational apps use, social media apps use, and mobile gaming apps use. All ten independent variables are included as predictors in the initial OLS regression model. Stepwise deletion method is used to get the final model with only significant predictors included.

Table 1. Descriptive statistics of students with daily mobile device use of 5 hours or more per day

	≥ 5 hours		Base	
	Freq	% from Base	Freq	% from Total
Gender: Male	49	47.12	104	57.14
Female	52	66.67	78	42.86
Age: ≤ 20	28	57.14	49	26.92
21	26	52.00	50	27.47
22	26	60.47	43	23.63
≥ 23	21	52.50	40	21.98
Major: STEMM	57	50.89	112	61.54
Social Sciences	44	62.86	70	38.46
Year in College: 1st year	13	50.00	26	14.29
2nd year	18	60.00	30	16.48
3rd year	33	56.90	58	31.87
4th year	21	53.85	39	21.43
≥ 5 th year	16	55.17	29	15.93
Place of Origin: Java	65	56.03	116	63.74
Non-Java	36	54.55	66	36.26
SES: High	29	82.86	35	19.23
Middle to Low	72	48.98	147	80.77
Attitude toward ICT: Early Adopter	24	63.16	38	20.88
Majority	70	56.91	123	67.58
Laggard	7	33.33	21	11.54
Educational Apps: Regular User	87	56.13	155	85.16
Non-Regular User	14	51.85	27	14.84
Social Media Apps: Regular User	101	57.06	177	97.25
Non-Regular User	0	0.00	5	2.75
Mobile Gaming: Regular User	40	65.57	61	33.52
Non-Regular User	61	50.41	121	66.48
All Samples	101	55.49	182	100.00

3. Results and Discussions

Based on the descriptive statistics in Table 1, the percentage of students who spend 5 hours or more a day on their mobile device is 55.49% for all samples, and they range from 50% to 60% in all groups when categorized based on age, major, year in college, place of origin, and educational apps use. However, it is not the case when these students are categorized based on gender, SES, attitude toward ICT, social media use, and mobile gaming use where the percentage is as low as 0% in one group (i.e., non-regular user of social media apps) and as high as 82.86% in another (i.e. students with high SES). Significant differences in the percentage of students who spend 5 hours or more a day in these categories are confirmed by applying independent group t-test and chi-square test accordingly.

Regardless of the difference, all ten independent variables are included in the original model upon running the multivariate analysis with OLS regression. After stepwise deletion method, only five predictors are found to be significant as shown in Table 2. These five significant predictors are gender ($Pr < .05$), negative attitude toward ICT ($Pr < .05$), high SES ($Pr < .001$), regular use of social media apps ($Pr < .001$), and regular use of mobile gaming apps ($Pr < .05$). Unsurprisingly, these five are also the ones with a significant difference in the percentage of students who spend 5 hours or more on their mobile device per day. The final model uses robust standard errors due to an indication of heteroscedasticity problem in the original model based on Breusch–Pagan test while Ramsey RESET test is used to confirm no omitted-variable bias. VIF value indicates no multicollinearity issue.

Of those five significant predictors, regular use of social media has the strongest effect of all. Holding everything else constant, those who use the apps at least once a week are likely to spend 3.01 hours (about 181 minutes) more on their mobile device per day than those who don't. The second strongest predictor is high SES. Holding everything else constant, those who own the most expensive smartphone or tablet are likely to spend .663 hours (about 40 minutes) more on their mobile device per day than those who don't. The next strongest predictor is negative attitude toward ICT. Holding everything else constant, those who consider themselves as laggards are likely to spend .772 hours (about 46 minutes) less on their mobile device per day than the majority and/or those who consider themselves as early adopters. The next predictor is regular use of mobile gaming apps. Holding everything else constant, those who play mobile games at least once a week are likely to spend .491 hours (about 29 minutes) more on their mobile device per day than those who don't. Finally, the last significant predictor is gender. Holding everything else constant, female students are likely to spend .464 hours (about 28 minutes) more on their mobile device per day than male students.

Some findings in this study align well with the literature. By 2016, people in the United States spend most of the five hours average spent on mobile device to access social media, entertainment, and games [26]. In 2008, female students in Greece spent 3.93 hours (236 minutes) in average on their mobile phone, significantly more than male counterparts who spent 2.75 hours (165 minutes) in average [27]. In this study, age and year in college do not have significant effect toward time-spent on mobile device. One plausible reason is that the population is the same millennial generation born in the 1990s. The age factor might have a stronger effect if the comparison was made with much older students, such as graduate students who were presumably born in the 1980s and later or with much younger ones, such as high school or middle school students born in 2000s and later. The same is true for the place of origin. Since these students are still living in the same area, it would be better if the samples were taken from different geographical location, instead.

Table 2. OLS regression estimates of time spent on mobile device daily (in hours)

Gender	.464*
<i>Female</i>	.155
	(.190)
Attitude Toward ICT	-.772*
<i>Laggards</i>	-.167
	(.353)
Socioeconomic Status (SES)	.663***
<i>Owner of the most expensive smartphone/tablet (High SES)</i>	.177
	(.186)
Social Media	3.010***
<i>Use social media mobile apps at least once a week</i>	.333
	(.786)
Mobile Gaming	.491*
<i>Play mobile games at least once a week</i>	.157
	(.182)
Constant	1.616*
	-
	(.778)
R²	.279***
Highest VIF	1.04
Mean VIF	1.03
Ramsey RESET Test	.422
Observation	182

Note: The first number reported is the unstandardized coefficient, the second number reported is the standardized coefficient and the third number reported between parentheses is the robust standard error; *p < .05. **p < .01 ***p < .001

4. Conclusion

In this paper, five significant predictors of time-spent on mobile device are found. In descending order from the strongest, they are 1) regular use of social media apps, 2) socioeconomic status, 3) negative attitude toward ICT adoption, 4) regular use of mobile gaming apps, and 5) gender. Based on the OLS regression result, females, students with the most expensive mobile device, students who use social media apps at least once a week, and students who play mobile game at least once a week are more likely to spend more time on their mobile device. Meanwhile, students who have negative attitude toward ICT adoption, or in other words those who consider themselves as laggards are less likely to spend more time on their mobile device. Furthermore, this study does not find any significant effect of age, major, year in college, place of origin, and regular use of educational apps to the time spent on mobile device.

While the findings in this study can provide a good insight into daily mobile device use among university students in Indonesia, it didn't capture a difference in the geographical location yet. Better and bigger samples from several different regions of the country might be able to overcome the limitation in this study. Also, as it turns out that homogeneity in the generation might be in play, a comparison with older and younger students or with overall Indonesian population is needed in getting the big picture of how long Indonesian people spend their time on their mobile device and what factors influence it.

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