# Smartphone in-Class Use and Academic Performance: A Case from the South East European University in North Macedonia

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## Abstract

Nowadays, it is difficult to imagine life without a smartphone anywhere in the world. It is an inevitable phenomenon of the modern society and influences all spheres of existence from a psychological, social, educational and technological perspective. However, despite the many benefits it brings, excessive use of smartphones can have some adverse effects. The purpose of this paper is to investigate the impact of in-class smartphone use on students' academic performance. Students from the South East European University (SEEU) in North Macedonia participated in the study through an online survey. We aimed to provide answers to the following questions: How smartphones are used in class? Does that use to contribute to learning that is more successful or distract students from it? What kind of other effects do smartphones have on students while in class? The results have confirmed the hypothesis that in -class smartphone use negatively affects student academic performance measurable through the number of European Credit Transfer System (ECTS) credits awarded and students' grade point average (GPA). Some other negative effects have also been identified. Recommendations based on findings might be useful for policymakers, higher education management and professors in order to provide some ways to regulate the use of smartphones in class.

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# Introduction

Nowadays, when entering a traditional classroom, it is very common to see students interacting with their smartphones. This is a phenomenon characteristic for all domains of the society and classrooms are not an exception. The same happens in cafeterias, restaurants, at home, in shopping malls, on streets, in parks and young people are not the only ones affected by it. The 'smartphonia' is so widely present in the lives of people today, that its influence on different segments, such as health, education, career and the whole society is inevitable. Smartphone use affects everything that depends on human behaviour. It goes to the extent that with the development of technology and the means of communication through social networks, people become addicted to smartphones and when left without them, they suffer from depression (Ezemenaka, 2013, in Ifeanyi and Chukwuere (2018).

There are many benefits of smartphone use in educational settings and they are mostly related to the easy access to information and resources. Smartphones are also found to be useful for communication and interaction with peers for collaborative learning (Buck et al., 2013). However, everyday classroom experiences indicate that there might be some disadvantages to the excessive use of smartphones in higher education. This paper aims to analyse how in-class smartphone use influences students' academic performance. How smartphones are used in class? Does that use contribute to more successful learning or distract students from it? What kind of other effects does smartphone use have on students while in class? These are the research questions that the study has addressed. The study postulates the following hypotheses: There is no relationship between awarded ECTS and smartphone use in class; there is a relationship between Awarded European Credit Transfer System (ECTS) credits and smartphone use in class, and; there is no relationship between students' grade point average (GPA) and the use of social networks in class; there is no relationship between students' GPA and the use of social networks in class. Awarded ECTS credits and students' GPA are considered as indicators of students' academic performance.

In the next section, some findings from the existing literature about the influence of in-class smartphone use on students' achievements are presented based on which the research methodology has been selected.

# In-class smartphone use

The literature confirms that students use smartphones a lot while they are in the classroom. Kibona and Mgaya (2015) argue that students mostly use smartphones for relaxation purposes and only a few use them for educational development purposes. Similarly, Grosseck, Bran and Tiru (2011) conclude, based on the findings from their study, that students use smartphones for spending significant time on Facebook more for social interaction and less for academic aims, although they have also discovered that students do use smartphones for taking part in discussions about their assignments, lectures, study notes or share information about research resources. It appears that for some students, smartphones are useful devices for accomplishing tasks at universities or classrooms, while for others; they have become a form of distraction. Barnwell (2016) points out that some students can switch their focus between the smartphone as a form of an entertainment device and at the same time, a learning platform. The conclusions of a study about the influence of smartphone use on student academic performance conducted by Ifeanyi and Chukwuere (2018) suggest that even though the use of smartphones is common

among undergraduate students, "there lie with it some factors that are detrimental to the increase of the academic performance of students who use them".

Previous research provides evidence about the negative effect of in-class smartphone use on students' academic performance. It is mainly about defocusing students' attention, but there are also studies reporting findings related to the negative effect on students' GPA. For example, Jacobsen and Forste (2011) have identified a negative relationship between calling, texting, and self-reported GPA among university students in the United States. Similarly, Kirschner and Karpinski (2010) have demonstrated that Facebook users have a lower self-reported GPA and spend less time a week studying than non-users. Furthermore, since students very often do multiple tasks with their smartphones while in class, such as texting, Internet use, email writing etc. there is an indication about the negative influence of the multitasking on their academic performance, concretely on their test scores (Junco & Cotton, 2012; Wood et al., 2002). However, we have not identified any research, which examines the relationship between in-class smartphone use and academic performance linked with the number of ECTS credits.

Therefore, the purpose of this paper is to analyse how in-class smartphone use influences students' academic performance measurable through the number of ECTS credits and students' GPA. Another purpose is to analyse whether social media were accessible through smartphones in class influence students' performance. Hence, the following hypotheses are postulated:

(i) H:1 There is the negative relationship between awarded ECTS and smartphone use in class, and

(ii) H:2 There is the negative relationship between student's GPA and the use of social networks in class. In other words, students who use the smartphone in class more often have lower awarded ECTS and GPA.

The paper presents the results gathered from a student questionnaire examining students' perceptions about the influence of smartphones on their performance, it also analyses if, and how smartphone use affects the number of accumulated credits and achieved GPA.

## Methodology

The study used both qualitative and quantitative approach for gathering the data. A structured questionnaire was distributed to students at the university using a random sampling technique. A structured questionnaire was distributed online to 2nd and 3rd academic year students of the South East European University (SEEU) in North Macedonia, from the following faculties: Faculty of Business and Economics (FBE), Faculty of Contemporary Sciences and Technologies (FCST), Faculty of Law (FL), Faculty of Languages, Cultures and Communication (FLCC) and Faculty of Contemporary Social Sciences (FCSS). The survey was constructed with questions linked to student's GPA and their time spent on smartphones and social networking sites during class.

The survey was carried on during the fall semester of the academic 2018/2019, by 2nd and 3rd academic year students that passed the required exams and earned credits. Second-year students must accumulate a minimum of 36 ECTS and a maximum of 60 ECTS, while 3rd-year students stand between a minimum of 92 ECTS and maximum of 120 ECTS, based on the University regulations. The first part of the survey contained questions about surveyor's demographic information, like gender, study year, their field of study, etc. There were two variables linked to student's performance, accumulated ECTS (credits) and their GPA attained through study years. Then, the survey had questions about student's smartphone usage during

class, with a four-level variable, respectively: never, sometimes, often and always. The second part of the questionnaire contained demographic data, study year, gender and study field. The GPA's variable was split into four levels: 6-6.99, 7-7.99, 8-8.99 and 9-10, while ECTS' variable was taken as a dummy variable, like 0 or 1, as follows:

For 2nd year students there were:

$$\text{Awarded ECTS}=\begin{cases} 0 & \textit{if the student has accumulated } 36\text{-}42 \text{ ECST} \\ 1 & \textit{if the student has accumulated } 48\text{-}60 \text{ ECST} \end{cases}$$

For 3rd year students there were:

$$\text{Awarded ECTS}=\begin{cases} 0 & \textit{if the student has accumulated } 96\text{-}102 \text{ ECST} \\ 1 & \textit{if the student has accumulated } 108\text{-}120 \text{ ECST} \end{cases}$$

Since the variables were of the qualitative type, to confirm the hypotheses, the Chi-Square Test (x2) was used, referring to Pearson Chi Square's coefficient.

## Results

Data analysis was conducted by using SPSS software, version 23. The sample held data of 418 students that had registered summer semester 2019, which could be their 3rd or 5th semester at SEEU. The descriptive analysis resulted in these percentages: 54.1% of the respondents belong to the male gender, whereas 45.9% to the female group. Concerning the year of the study 56.5% were to 2nd-year students, and 43.5% to 3rd-year students. Concerning faculties, the majority 28.7% of students were from the Faculty of Business and Economics (FBE). Second-year students were represented with 88.1% and 48 to 60 accumulated ECTS credits and finally, 82.4% of 3rd-year students that accumulated 108 to 120 ECTS credits had a GPA of 8-8.99 (37.3%.) The respondents were also asked which brand of smartphone they used, where 61.2% selected Apple's iPhone, 47.8% of them had changed their smartphones more than four times from their very first smartphone and 34.9% of students had monthly expenses between 10 and 20 euros. These data are illustrated in Table 1 below.

*Table 1*
Descriptive characteristics of respondents

| Characteristic | | % |
|---|---|---|
| **Gender** | Male | 54.1 |
| | Female | 45.9 |
| **Year of study** | Second-year | 56.5 |
| | Third-year | 43.5 |
| **Faculty** | Faculty of Business and Economics | 28.7 |
| | Faculty of Contemporary Sciences and Technologies | 24.4 |
| | Faculty of Law | 17.7 |
| | Faculty of Languages, Cultures and Communication | 15.3 |
| | Faculty of Contemporary Social Sciences | 13.9 |
| **Awarded_ECTS** | Second-year (36-42 ECTS) | 11.9 |
| | Second-year (48-60 ECTS) | 88.1 |
| | Third-year (96-102 ECTS) | 17.6 |
| | Third-year (108-120 ECTS) | 82.4 |

| | | |
|---|---|---|
| **GPA** | 6-6.99 | 6.2 |
| | 7-7.99 | 26.8 |
| | 8-8.99 | 37.3 |
| | 9-10 | 29.7 |
| **Model Mobile Phone Use** | iPhone | 61.2 |
| | Samsung | 31.6 |
| | Huawei | 4.3 |
| | Sony | 1.0 |
| | Other | 1.9 |
| **How much have you changed your cell phone since you started using one?** | 1 time | 5.7 |
| | 2 time | 18.7 |
| | 3 time | 27.8 |
| | 4 times more | 47.8 |
| **Monthly spending on mobile in Euro** | Less than 5 | 11.5 |
| | 5-10 | 34.0 |
| | 10-20 | 34.9 |
| | 20-30 | 5.7 |
| | Over 30 | 10.5 |
| | N/A | 3.3 |
| **Total** | | 100 |

Source: SPSS Result and Author's Field Survey, 2019

Results showed that 80.4% of students had used their smartphone while in class, while 45.8% of them said that it had sometimes happened to go out of the classroom to use their phone (e.g.: phone calls) as illustrated in Table 2, while Table 3 illustrates the reasons for using smartphones in class..

*Table 2*

Mobile phone use by students in the classroom

| Characteristic | | % |
|---|---|---|
| **Cell phone use in the classroom** | Yes | 80.4 |
| | No | 19.6 |
| **Number of times they accessed their phones while in class** | Never | 50.1 |
| | Sometimes | 45.8 |
| | Usually | 2.9 |
| | Always | 1.2 |
| **Cell phone use in classrooms** | To communicate with relatives and friends | 42.1* |
| | To read social networks | 26.3 |
| | To request information on lessons | 43.5 |
| | To perform calculations | 28.7 |
| | Other | 12.4 |
| **Number of times they accessed their phones to communicate with family or friends in class** | Never | 9.6 |
| | Sometimes | 76.1 |
| | Usually | 11.5 |
| | Always | 2.9 |
| **The use of social networks during class** | Yes | 45.9 |
| | No | 47.4 |
| | N/A | 6.7 |
| **Number of times they visit social networks during class on the cell phone** | Never | 34.4 |
| | Sometimes | 51.2 |
| | Usually | 12.4 |
| | Always | 1.9 |
| **Social networks used** | Facebook | 24.4* |
| | Instagram | 57.4 |
| | Twitter | 7.2 |
| | Snapchat | 40.2 |

| | | |
|---|---|---|
| | Other | 34.4 |
| **The student is distracted when other colleague uses a cell phone** | Yes | 78.8 |
| | No | 9.6 |
| | N/A | 11.6 |
| **Professor is distracted when a student uses a cell phone** | Yes | 80.9 |
| | No | 9.6 |
| | N/A | 9.5 |
| **The lecturer is defocused on lecturing when students use cell phones** | Yes | 61.24 |
| | No | 22.49 |
| | N/A | 16.27 |

Source: SPSS Result and Author's Field Survey, 2019

*Table 3*
The Impact on academic performance by Mobile phone use

| **Characteristic** | | **%** |
|---|---|---|
| **Use of mobile phone/social networking during classes affects your performance in a particular subject** | Yes | 41.6 |
| | No | 37.3 |
| | N/A | 21.1 |
| **The Impact on academic performance by social networks is** | Little | 37.8 |
| | Very little | 8.6 |
| | Not at all | 17.2 |
| | N/A | 36.4 |
| **Use of mobile phone/social networking during classes affects your performance in overall success at University** | Yes | 35.4 |
| | No | 45.9 |
| | N/A | 18.7 |
| **Opinion on the prohibition of cell phone use in the classroom by the Ministry of Education** | Yes | 22.0 |
| | No | 62.2 |
| | N/A | 15.8 |
| **Attitude towards banning cell phone use in class during our classes at our university** | Yes | 31.6 |
| | No | 59.8 |
| | N/A | 8.6 |

Source: SPSS Result and Author's Field Survey, 2019

The hypotheses were tested using Chi Square's Independence Test, referring to Pearson Chi Square's coefficient, with a confidence interval of 95%. The first hypothesis' Asymp.Sig's value is 0.003 < p = 0.05, showed that there is a relationship between accumulated credits (ECTS) and smartphone usage. Therefore, the hypothesis of the relationship between the usage of smartphone in the class and awarded ECTS was inversely related (Table 4). The cross-tabulation of the usage of smartphones and ECTS is presented in Table 5.

*Table 4*
The independence test of ECTS and smartphone use Chi-Square Tests

| | **Value** | **Df** | **Asymp. Sig. (2-sided)** | **Exact Sig. (2-sided)** | **Exact Sig. (1-sided)** |
|---|---|---|---|---|---|
| **Pearson Chi-Square** | 8.750[a] | 1 | 0.003 | | |
| **Continuity Correction[b]** | 7.352 | 1 | 0.007 | | |
| **Likelihood Ratio** | 7.586 | 1 | 0.006 | | |
| **Fisher's Exact Test** | | | | 0.006 | 0.005 |
| **Linear-by-Linear Association** | 8.708 | 1 | 0.003 | | |
| **N of Valid Cases** | 210 | | | | |

Note: a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.00.
b. Computed only for a 2x2 table

Table 5
Cross tabulation of teh usage of smartphones and ECTS

| | | Awarded_ECTS_CODE | | Total |
|---|---|---|---|---|
| | | 36-42-S3 and 96-102-S5 | 48-60-S3 and 108-120-S5 | |
| **Cell phone use in classrooms** | Yes | 60.0% | 83.8% | 80.4% |
| | No | 40.0% | 16.2% | 19.6% |
| **Total** | | 100.0% | 100.0% | 100.0% |

Regarding the second hypothesis, Asymp.Sig's value is 0.005 < p=0.05, the data showed that variables were dependent and therefore student's GPA level was proven to be tightly connected to students using social networking sites while in class as illustrated in Table 6. The cross tabulation of teh usage of smartphones andGPA is illustrated in Table 7.

*Table 6*
The independence test of GPA and *social network* use Chi-Square Tests

| | Value | Df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| **Pearson Chi-Square** | 12.954[a] | 3 | 0.005 |
| **Likelihood Ratio** | 13.151 | 3 | 0.004 |
| **Linear-by-Linear Association** | 4.808 | 1 | 0.028 |
| **N of Valid Cases** | 164 | | |

Note: 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.78.

Table 7
Cross tabulation of the use of smartphones and students' GPA

| | | GPA | | | | Total |
|---|---|---|---|---|---|---|
| | | 6-6.99 | 7-7.99 | 8-8.99 | 9-10 | |
| **The use of social networks during class** | Yes | 30.8% | 57.1% | 51.3% | 32.3% | 45.9% |
| | No | 53.8% | 42.9% | 38.5% | 61.3% | 47.4% |
| | N/A | 15.4% | 0.0% | 10.3% | 6.5% | 6.7% |
| **Total** | | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

# Discussion

The analysis of results from students' perceptions shows that the majority of them (80.4%) do use smartphones while in class and with that use they distract both their colleagues and the professors. However, the reason for using the smartphones, as conveyed by students, are almost equally split between contacts with family members and looking for information related to their lessons. Half of the students' report visiting social networks while in class although they do not believe that this use is harmful to their academic performance. An even greater percentage (62.2%) of students is against banning smartphone in-class use. However, the analysis of the relationship between in-class smartphone use and the number of accumulated ECTS credits, as well as the analysis of the relationship between in-class smartphone use and students' GPA, show a correlation indicating that in-class smartphone use does affect students' academic performance. Furthermore, in the same way, it has been demonstrated that the use of social networks (through in-class smartphone use) also affects students' academic performance.

The study provides some other interesting information that is not closely related to academic performance but can be a useful indicator for the mobile phone market and social media use. I-phone seems to be the most popular phone and Instagram is more popular than Facebook among students of SEEU in North Macedonia.

# Conclusion

The main conclusion is that even though students might not be aware of it; in-class smartphone use does hurt their academic performance. This has been demonstrated by correlating the time and frequency of phone use in class with the number of accumulated ECTS credits and students' GPA. The use of social networks in class also harms their academic performance. Students do not seem aware of these effects and this is probably due to their addiction to smartphone use. Therefore, the universities must provide some rules about in class smartphone use and students are informed about them. Professors should set their examples and serve as models regarding the use of phones while in class. Complete banning of this use is probably a very radical measure and inappropriate for this age group, but definitely, some regulations and mechanisms of control of their applications should be adopted.

The limitation of the study is the fact that it does not include a very thorough analysis of the particular uses of smartphones in class. Such an analysis might lead to more accurate results, concerning the use and the contribution of smartphones in students' classroom activities. A new study can be carried out to find out the impact of other devices that might have an impact on students' performance and outcome in different classes.

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