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Smartphone and Facebook Use: Correlates of Self-Perceived Academic Performance Among Medical Students in Peru

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ABSTRACT

The study had the objective of determining the association between the use of *Smartphone* and Facebook with the self-perception of academic performance in students of a Faculty of Human Medicine in the Peruvian mountains. A prospective analytical cross-sectional study was carried out. We worked with medical students from the Continental University in Huancayo-Peru and used a survey to measure the use of *Smartphones* and Facebook, as well as the perception of whether these improved academic performance. Bi- and multivariate statistics were performed, using generalized linear models and with a value of $p < 0.05$ as statistically significant. 173 students were surveyed, 61% (106) were women and the median age was 21 years (interquartile range: 19-22 years). 76% (131) stated that the *Smartphone* improved their academic performance. This was positively related in the bivariate analysis to the number of *Smartphones* , whether it had training applications and whether it used medical applications; and negatively with hours used the *Smartphone* per week, if you have internet on the *Smartphone* , if you use internet on the *Smartphone* , the frequency of using Facebook, the frequency in which you wrote on Facebook profiles and the number of contacts on Facebook (

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all with *p* values < 0.05). In the adjusted multivariate, the average hours spent using the *Smartphone* per week was negatively associated with the perception of improved academic performance (PRa: 0.98; 95% CI: 0.97-0.99). The more hours of *smartphone* use per week, the students perceive that this worsens their academic performance. This should be studied to quantify the real decrease in academic performance.

Keywords: smartphone; medical students, medical education; Facebook; learning.

INTRODUCTION

In recent years, technology has made tools available to students to help their academic training, such as mass communication technological devices and storage. The most common are cell phones and electronic tablets, among others. The increased frequency of use of mobile computing devices on university campuses has the potential to create new options for medical students, as well as the exploration of social media as a teaching strategy, [1,2] which It allows students to access course content and interact with teachers and classmates wherever they are. [3] These interactions are made even more accessible through the use of so-called social networks, which allow communication and improvement of learning. [4]

Some scientific reports have focused only on evaluating the effectiveness of the application of these tools for academic teaching. [5] However, it has been seen that higher education students are not immune to developing dependency and misuse of social networks through their *smartphones* . [6] This dependency is often associated with mental health problems such as depression, anxiety and self-esteem, in

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addition to insomnia problems, poor socialization and the loss of a large amount of academic time. [7-9] Added to these problems is the possibility that technology becomes a distraction, which could impact students' academic performance. Despite this, no studies have been found that explore this problem; That is why the objective of our study was to determine the association between the use of *Smartphone* and Facebook according to the self-perception of academic performance in students of a Faculty of Human Medicine in the Peruvian mountains.

METHODS

An observational, analytical, cross-sectional and prospective study was carried out. The population was made up of students enrolled in the 2015-II academic semester of the Faculty of Medicine of the Continental University, located in the city of Huancayo-Peru. The sampling was stratified random based on the data obtained in a previous research work. [10] With this, a minimum sample size of 150 students was calculated. For randomization, the Epidat program was used according to the list of those enrolled in the aforementioned semester.

Students who were eligible to complete the survey and who were enrolled in a Medicine degree during the study period were included. Students who responded with abnormal response patterns, students who did not answer the main questions, and students who did not have a *Smartphone* (less than 5% survey exclusion) were excluded.

Our dependent variable was the perception of whether the *Smartphone* improves academic performance (possible answers: Yes/No). The independent variables

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were age (taken quantitatively), sex (possible answers: male/female), *Smartphone* use variables (number of *Smartphone* owned, average hours spent using the *Smartphone* per week, whether it has applications for academic training, if it stores academic information, if it has medical applications, if it uses said medical applications, years that it has been using the *Smartphone* , if it has internet on the *Smartphone* and if it regularly uses the *Smartphone* 's internet) and the variables about the use of Facebook (if you have more than one Facebook account, the frequency of use, if you use Facebook for academic purposes, the frequency with which you write on other profiles and the number of contacts you have).

According to these variables, a self-administered survey was created. After proceeding with the formal authorizations for data collection, the surveys were carried out during in-person class time in the classrooms of the Faculty of Human Medicine of the Continental University. A researcher was present during its completion, to be able to answer any questions. The data obtained were tabulated in the Microsoft Excel 2010 ® program, and then processed in the statistical program Stata version 11.1®.

For the descriptive analysis, the absolute and relative frequencies of the categorical variables were determined. In addition, the medians and interquartile ranges were obtained, since they all had a non-normal distribution according to the evaluation of the normality of the numerical data with the Shapiro Wilk statistical test.

For the inferential analysis, a confidence level of 95% was used. *In the bivariate statistics, p* values and crude prevalence ratios—PRc (with their respective 95% confidence interval -95% CI)—were obtained using generalized linear models. *In*

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the multivariate statistics, the p values and the adjusted prevalence ratios were obtained —PRa (with its respective 95% confidence interval -95% CI); In both cases it was performed with the Poisson family plus the log link function. *A p* value < 0.05 was considered statistically significant.

Ethical parameters were respected at all times. The surveys were anonymous, the respective permission was requested and approval was obtained from the university's Research Methodology chair, since the study was presented as a practical result of the course in question.

RESULTS

After applying the selection criteria, 173 students were surveyed. Of these, 61.3% (106) were women; the median age was 21 years (interquartile range: 19-22 years). The vast majority (71.7%) only had a *Smartphone*. Almost all of the respondents (92.5%) stated that they used their *Smartphone* several times a day and only 36.4% had applications for medical training. The characteristics of *Smartphone* use are detailed in Table 1 .

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Tabla 1. Características del uso de *Smartphone* de los estudiantes de Medicina encuestados en la serranía peruana

Variable	n	%
Cuántos *Smartphone* tiene		
Uno	124	71,7
Dos	49	28,3
Frecuencia de uso		
Varias veces al día	160	92,5
Una o dos veces al día	6	3,4
Dos a tres veces a la semana	7	4,1
Horas promedio que usa el *Smartphone* por semana*	15	5-35
Cuenta con aplicaciones para capacitación académica		
Sí	63	36,4
No	110	63,6
Almacena información académica en el *Smartphone*		
Sí	13	7,5
No	160	92,5
Tiene aplicaciones médicas en su *Smartphone*		
Sí	98	56,7
No	75	43,3
Usa aplicaciones académicas en su *Smartphone*		
Sí	69	39,9
No	104	60,1
Años que lleva usando el *Smartphone*		
Uno	48	27,7
Dos	35	20,2
Tres	48	27,7
Cuatro	28	16,2
Cinco	7	4,1
Seis	7	4,1
Tiene internet permanente en el *Smartphone*		
Sí	126	72,8
No	47	27,2
Usa regularmente internet en el *Smartphone*		
Sí	153	88,5
No	20	11,6

*Mediana y rango intercuartílico.

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All of the students surveyed who had a *Smartphone* also had a Facebook account. Most used Facebook once (43.9%) or more than once (40.4%) per day; and only 27.8% used it for academic purposes. The main characteristics of the use of Facebook are seen in table 2 .

Tabla 2. Características del uso del Facebook de los estudiantes de Medicina encuestados en la serranía peruana

Variable	n	%
Más de una cuenta Facebook		
Sí	27	15,6
No	146	84,4
Frecuencia de uso Facebook		
Más de una vez al día	70	40,4
Una vez al día	76	43,9
Más de una vez a la semana	20	11,6
Una vez a la semana	7	4,1
Usa el Facebook con fines académicos		
Sí	48	27,8
No	125	72,2
Frecuencia en la que se escribe en perfiles Facebook		
Más de una vez al día	21	12,1
Una vez al día	34	19,7
Más de una vez a la semana	21	12,1
Una vez a la semana	21	12,1
Menos de una vez por semana	76	44
Número aproximado de contactos en Facebook*	500	200-750

*Mediana y rango intercuartílico.

75.7% had the perception of improved academic performance thanks to the use of the *Smartphone* (table 3). When carrying out a bivariate analysis, it was found that the perception of good academic performance was positively associated with the number of *Smartphones* you have, whether you have applications for academic training and whether you use medical applications on your *Smartphone* ; On the

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other hand, it was negatively associated with the average hours that you use the *Smartphone* per week, if you have permanent internet on the *Smartphone* , if you regularly use the Internet on the *Smartphone* , the frequency of using Facebook, the frequency in which you write on Facebook profiles and the approximate number of Facebook contacts. In the multivariate analysis that was carried out with the factors statistically associated in the bivariate analysis, the average hours spent using the *Smartphone* per week was negatively associated with the perception of improved academic performance (aPR: 0.98; 95% CI: 0 .97-0.99).

DISCUSSION

The present research explores the overall impact of technology on the academic performance and development of students in general, and it is found that it can affect both positively and negatively. In this study we have found that three out of four students perceived that the use of their *Smartphones* improved their academic performance, which contradicts a study in which it was reported that the use of social networks brought difficulties in academic development, mainly due to the time they dedicated to it. [11] This may respond to the fact that the populations and questions of interest were different (ours was focused on the general use of the *Smartphone*), so in general this technological tool can offer the perception of benefit, but when only the The use of social networks focuses on part of the range of options that come with the use of these smartphones.

Likewise, in this study we have found that there is a negative association between the number of hours the Smartphone is used and the perception of improvement in

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academic performance. These data agree with a study carried out on 173 medical students in Ecuador, in which a direct relationship was found between the time spent using cell phones and having worse academic performance; [12] Likewise, another study from the same country, carried out on adolescents, also found a relationship between the number of hours of smartphone use and the number of academic problems. [13] In the United States, high school students were surveyed, and a higher prevalence of mental health problems was found according to the use of smartphones. [14] This relationship has been explained by *Lei* and *Zhao* , who report that the use of technology can be harmful if it is not oriented towards a greater objective, such as improving the academic condition of the user, so the quality of the technology is more important. content compared to the amount of time you use the technology. [15] For example, in a study carried out on Psychology students at a university in the United States, the researchers noticed that when using cell phones as a means of academic information, students who had ringtones had better note-taking and retention performance. much less information than students who had their phones on silent. [16]

According to the frequency with which they wrote on Facebook profiles and the number of contacts they had on it, they had a negative relationship with the improvement of academic performance; However, these associations lost their statistical significance when adjusted for other variables (in the multivariate analysis). This coincides with the study carried out by *Kolek* and *Saunders* , who found a null association between the use of Facebook and the content of the profiles of this social network with the perception of good academic performance; [17] Likewise, a study conducted by *Pasek* , with a large sample of

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North American students, did not find a relationship between Facebook use and academic performance. [18] This should be studied with more varied populations and other variables (these and other variables had results close to the cut-off point for statistical significance, so studies should be carried out in larger populations and from different origins), since there are some reports that do They find that the use of Facebook is associated with poor academic performance. [19]

Likewise, it has been found that three out of ten of the students surveyed use Facebook for academic purposes; that is, a minority. This agrees with a study on university students where the content of their Facebook accounts was analyzed, in which there was a much smaller percentage of student accounts in which academic and university information was found, and the majority of the content was of the type recreational and personal information. [18] This must be evaluated and improved from academic areas and in courses related to the topic of information in health sciences, since currently social networks, technology and communications are important pieces for teaching and training, [20, 21] as long as there are adequately trained teachers [22] and who have adequate knowledge of the use of information sources. [23]

One of the limitations of this study is that the perception of academic performance was not compared with the final grades of the courses; However, a measurement of academic performance based on the student's own perception is a method that encompasses the many determinants involved in academic performance, which include emotional aspects and strategies considered appropriate. [24] This measure has been used in many other studies. [25.26]

We conclude that the number of hours spent using the *Smartphone* is negatively associated with the perception of good academic performance among Medical students studying at a university in the Peruvian mountains. We recommend that more studies be carried out, multicenter, and that they measure a greater number of variables related to this topic.

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Author contributions

All authors participated equally in the design of the study, analysis and interpretation of data, writing and revising the manuscript, and approving the final version.

Conflict of interests

Christian R. Mejia and Salder D. Flores belong to the institution where the work was carried out, but this did not influence the results or other part of the article. The other authors declare that there is no conflict of interest in this article.

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