Artículos Científicos

Diferencias en el uso del dispositivo móvil entre estudiantes de secundaria y universidad en México

Differences in the use of Mobile Devices between junior high and college students in Mexico

Diferenças no uso do dispositivo móvel entre alunos do ensino médio e universitários no México

Pedro Sánchez Escobedo
Universidad Autónoma de Yucatán, México
psanchez@correo.uady.mx
https://orcid.org/0000-0002-0564-3502

Gloria Yaneth Calderón Loeza
Universidad Autónoma de Yucatán, México
e.gloriacalderon@correo.uady.mx
https://orcid.org/0000-0002-3320-5606

Resumen

Este es un estudio comparativo sobre el uso del dispositivo móvil entre estudiantes de dos niveles educativos (secundaria y universidad) en México. En concreto, se explora el impacto del nivel de uso del DM en la vida personal, las actividades escolares y la salud física y mental en estudiantes del estado de Yucatán, México. A través de un cuestionario de auto informe a lápiz y papel, se colectó información anónima y voluntaria de 1686 estudiantes (858 de secundaria y 828 universitarios). Los resultados muestran un mayor uso del DM por los universitarios y mayores afectaciones en estos, a excepción de la vida social (que se ve más afectada en el nivel de secundaria). En cuanto a salud, las afectaciones más frecuentes fueron cansancio, ansiedad y dolor de cabeza. En el futuro se deberá explorar si se ha incrementado el uso del DM durante el confinamiento y si las afectaciones reportadas en este trabajo cambiaron y en qué dirección lo hicieron.

Palabras clave: aprendizaje, educación en salud, estudiantes universitarios, uso del dispositivo móvil.

Abstract

This is a comparative study on the impact of the use of mobile devices between junior high and college students in Yucatán, Mexico. Its impact on school activities, personal and social life, and aspects of both mental and physical health. A total of 1,686 students, 858 in junior high and y 828 at a college level responded to paper and pencil instruments administered in the school just before the confinement due to COVID-19. College student reported higher use of mobile devices and more problems due to its use, except in their social life which was more affected in junior high students. Regarding health, tiredness, anxiety, and headache were most frequently reported. Future studies should explore changes during and after the pandemic in the use of mobile devices and their influence in the various dimensions hereby reported before confinement.

Keywords: learning, health education, college students, junior high students, use of mobile devices.

Resumo

Este é um estudo comparativo sobre o uso do dispositivo móvel entre alunos de dois níveis de ensino (ensino médio e superior) no México. Especificamente, o impacto do nível de uso do DM na vida pessoal, atividades escolares e saúde física e mental em alunos do estado de Yucatán, México, é explorado. Por meio de um questionário de autorrelato em papel e lápis, informações anônimas e voluntárias foram coletadas de 1.686 alunos (858 do ensino médio e 828 da universidade). Os resultados mostram maior utilização do DM pelos universitários e maiores repercussões sobre eles, com exceção da vida social (que é mais afetada no ensino médio). Em relação à saúde, as afetações mais frequentes foram fadiga, ansiedade e dor de cabeça. Futuramente, deve-se explorar se o uso de DM aumentou durante o confinamento e se os efeitos relatados neste trabalho mudaram e em que direção.

Palavras-chave: aprendizagem, educação em saúde, estudantes universitários, uso do dispositivo móvel.

Introduction

Mobile Devices (DM) have opened the doors for students to access universal knowledge for free and instantaneously. However, the less supervision of its use by parents, the little use in school environments, the greater independence acquired by the adolescent and the digital divide between parents and children, teachers and students mean that they are used inappropriately, for what can represent risks to physical and mental health (Chávez Arcega, 2015; Peralta, 2018; Villani et al., 2018).

In the Mexican case, most of the students use at least one smartphone, which has become part of their lifestyle because it is considered a practical and accessible tool for socializing, entertaining, informing and learning (Gutiérrez-Renteria, Santana-Villegas and Pérez-Ayala, 2017; Pérez Gómez, 2013).

For this reason, the educational policies of Mexico contemplate the gradual increase in internet access in schools of all levels and promote distance education through the Web (National Development Plan 2019-2024, 2019), an initiative that is has been favored by the pandemic generated by covid-19 (Reimers and Schleicher, 2020).

In this sense, the National Survey on the Availability and Use of Information Technologies (National Institute of Statistics and Geography, 2019) reported that 95% of Mexicans connect to the internet through a smart phone and 33% from a laptop. Of those who access the internet, 79% do so for entertainment purposes and less than 50% for work and school activities. In fact, the average hours of smartphone use in a typical day in high school adolescents is 3 hours (Díaz-Vicario, Mercader and Gairín Sallán, 2019) and 6 hours in university students (Gutiérrez-Renteria et al. , 2017), the most frequent combination being the computer and the smartphone (Román Carrión, 2017). This really becomes worrying because it can affect personal, family and social life (Labrador, Requesens and Helguera, 2015), as well as the physical and mental health of individuals.

Many studies have been published on the use of DM that report that these can cause both positive effects (Sánchez-Escobedo, 2020; Sánchez Escobedo and Calderón Loeza, 2020; Swist, Collin, McCormack and Third, 2015) and negative (Carbonell, Fúster, Chamarro and Oberst, 2012; Díaz-Vicario et al., 2019). For this reason, it is important to investigate how and how much students of different educational levels in Yucatán, Mexico use their DMs, and how they influence their daily lives from a comprehensive perspective.

Use of DM in high school

Relatively little use is made of DM by high school youth between the ages of 12 and 18 in terms of education. In fact, the mobile phone, video game consoles and computers are usually used mainly for entertainment, and in the case of women to communicate through messaging and social networks (Simón, Aibar, García-González and Sevil, 2019) . For their part, Sohn, Rees, Wildridge, Kalk and Carter (2019) in a meta-analysis reported that communication is the most frequent use of smartphones.

Use of DM at university

In general, DMs are perceived mainly in a positive way and are appreciated because they offer the possibility of staying in contact and informed (De-Sola, Talledo, Rodríguez de Fonseca & Rubio, 2017). Among the negative aspects reported are that of feeling obliged to be connected. In addition, lack of sleep, worry and anxiety are reported, as well as rejection of advertising. (Gutiérrez-Rentería *et al*., 2017).

Effects of DM use on students

As in research reports in general use, the results of many of the existing inquiries about the use of DM are ambivalent, as some report benefits and advantages, while others point out disadvantages and disadvantages.

This study addresses the following student dimensions influenced by the use of DM: learning in school, personal life, social life, physical health and mental health.

Learning at school

Sánchez Escobedo and Calderón Loeza (2020) point out that secondary school teachers mention the risks of using the internet (eg, cyberbullying) and report some negative effects on students, such as missing classes for using DM or being penalized for manipulating them in the classroom .

In universities, DMs are used in corridors, library, cafeteria, classrooms, etc., for both academic and social purposes (Vázquez-Cano and García, 2015). Likewise, regional differences in its use have been reported; For example, Latin American teachers attach less importance to them for educational purposes than Spanish teachers (Basrantes, Naranjo, Gallegos and Benítez, 2017). At this level, there are reported advantages for taking notes, accessing documents and work materials, and disadvantages such as distraction (Cuba Alvarado, 2016), lack of concern for spelling (Alonso Mosquera,

Gonzálvez Vallés and Muñoz de Luna, 2016) and a decrease in time dedicated to the study (Díaz-Vicario et al., 2019).

Sohn et al. (2019), after a meta-analysis, reported a relationship between problematic smartphone use with a low educational level. In this sense, it can be thought that the excessive use of DM could facilitate the appearance of maladaptive behaviors due to its ability to generate artificial feelings of security, freedom, independence and power (Hernández-Romero, Arellano-Quintanar, Cordova-Palomeque and Cuahonte - Badillo, 2016), as well as risks associated with the loss of personal data and privacy as a result of interaction on social networks (Domínguez-Castillo, Cisneros Cohernour y Quiñonez-Pech, 2019).

Personal life

Among the effects of the excessive use of DM, family conflicts have been reported in women, and estrangement from the partner and infidelity in the case of men (Peñuela et al., 2014). Elhai, et al. (2017) conducted a review of 23 studies on the link between the use of DM and chronic stress and low self-esteem. For their part, Moral Jiménez and Domínguez (2019) reported a relationship between problematic internet use in students aged 15 to 22 years with low self-esteem and impulsivity; These authors argue that adolescents use the internet to avoid problems.

Social life

Regarding the use of DM and socialization, De-Sola et al. (2019) explain that the number of friends on social networks is an indicator of mobile dependency. Díaz-Vicario et al. (2019) reported as undesirable effects of the use of DM the decrease in going out from home and the reduction of living with friends, while Cuba Alvarado (2016) reported that DM is the preferred medium for issues that generate negative or uncomfortable responses.

Physical Health

Simón *et al*. (2019) and Sánchez and Calderón (2020) reported that adolescents spend more than six hours a day using DM, which causes a sedentary lifestyle and, consequently, physical disorders such as being overweight. Mexico has been one of the countries with the highest obesity, and 36% of adolescents suffer from it (National Institute of Public Health, 2018). Other physical conditions have been reported in university students, such as those associated with the musculoskeletal system (discomfort

in the shoulders and back) (Aquino López, 2016) and cervical osteoarthritis and tendinitis caused by static and repetitive movements (Yu, James, Edwards and Snodgrass, 2018). Among the most frequent alterations reported by Namwongsa, Puntumetakul, Neubert and Boucaut (2018) are neck pain and back pain.

Mental health

Investigating the effects of DM on mental health is a strategic task, since it is an official transversal axis of the national school curriculum supported by vital learning in Mexico (Martínez-Lobato, 2020).

Aznar Díaz, Kopecký, Romero Rodríguez, Cáceres Reche and Trujillo (2020) shared that the use of DM can cause insomnia, alcohol abuse, stress and eating disorders. Also Carbonell et al., (2012) linked the use of DM with insomnia, anxiety, depression and dependence on substances such as alcohol and tobacco.

Purpose

This article reports the findings of an exploratory, comparative and quantitative study that sought to identify the differences between high school and university students regarding the implications of the use of DM for school activities, social and personal life, and physical and health. mental.

Method

Participants

Table 1 offers the main characteristics of the participants:

Tabla 1. Participantes por nivel escolar.

Nivel de escolaridad	Rango de edad	Hombres	Mujeres	Total	%
Secundaria	10-17	418	440	858	51
Licenciatura	19-36	386	442	828	49
Total		804	882	1686	100

Fuente: Elaboración propia

Table 1 shows proportionality by educational levels (51% in secondary school) and in terms of sex (52% women).

Instruments

A preliminary card collected demographic data: sex, age, average of the last school year, weight, height, as well as the type of DM and hours in which he used the cell phone. In this research, three instruments to collect data were designed, developed and specifically validated, which are described below.

Perception of personal impact of the use of DM. The scale considered four dimensions of negative impact: socialization, personal life, school life and health. Each of these dimensions consisted of four items (16 in total). Items were presented on a differential semantic scale, which is used to measure meaning and emotional reactions on a rating scale with opposing concepts or adjectives at each end. Negative statements were taken for the analysis. Content validity was granted through validation by judges, who granted validity in relation to relevance, sufficiency and quality. The alpha reliability coefficient calculated was .782.

Perception of impact of DM on school activities. The questionnaire was made up of 12 questions focused on the negative implications of the use of DMs at school. The answer options were yes, no and sometimes. Likewise, both positive statements were offered (eg, My teacher explains the risks of using the internet to me) and negative (eg, I am distracted from my school activities by my use of my DM).

Perception of the impact of DM on physical and mental health. The relationship between the use of DM and some common physical and psychological problems, such as headaches, vision problems and stress, was established. It consisted of 10 items on a pictogram scale from 0 to 6 points (6 represents the highest intensity or frequency and 0 the absence of intensity). Likewise, a graph of the human body in anatomical position was included for the respondent to mark the parts of the body where they felt discomfort or pain.

Procedures

To collect information, classrooms of state high schools and a state public university were accessed during the months of January and February 2020 (before the confinement by covid-19). The students were approached in the classroom. It was explained to them that the instrument intended to explore the uses of mobile devices and that their participation was voluntary, without any compensation and anonymously. All questionnaires were coded and analyzed with the SPSS-25 program.

Results

Using the DM

All participants reported having at least one mobile device to access the internet and use it for around six hours a day. Likewise, it was determined that they were more used in the university (X = 7, DS = 3.32) than in secondary school (X = 5.56, DS = 3.8); (t = 8.67, p = .001). Also university students (X = 763, DS = 661) reported more friends on social networks than high school students (X = 663, DS = 824). No differences were found by sex in the number of hours of use.

Negative impact

The relationships between the level of cell phone use and the level of global impairment were explored, and a positive correlation was found between use and the degree of global impairment, as illustrated in Figure 1.

Figura 1. Grado de afectación por horas de uso
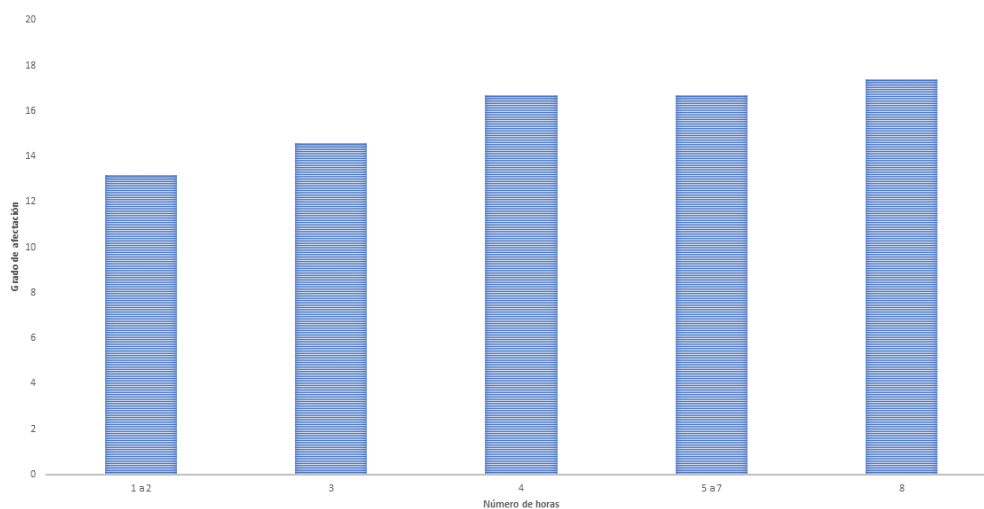
Fuente: Elaboración propia

The previous figure shows a plateau when it is used between 4 and 7 hours, and a relative impact when it is used less than two hours a day.

In general, a greater negative impact on university students can be observed when compared to high school students. Table 2 summarizes the comparisons globally and by dimension.

Tabla 2. Diferencias en impacto global y por dimensiones según el nivel escolar

Dimensión	Escala	Secundaria	Licenciatura	t	P
Social	1-10	4.13 (3.10)	3.64 (2.65)	3.44	0.001
Personal	1-10	2.50 (2.46)	3.46 (2.11)	-8.54	0.001
Salud general	1-10	3.02 (2.71)	4.60 (2.47)	-12.43	0.001
Aprendizaje escolar	1-10	4.51 (3.06)	7.09 (2.76)	-17.98	0.001
Global	1-40	14.18 (7.08)	18.81 (5.96)	14.22	0.001

Fuente: Elaboración propia

If the scales are considered, the impact is relatively low and there are differences by educational level. Secondary school students report a greater impact on their social life, while university students in the rest of the dimensions.

Regarding the school environment, 65% of the students acknowledged that the teachers have taught them to formally use the DM to do homework, 51% stated that they have recommended some educational game and 62% have received guidance on the risks of the internet in the college. Only 31% of the participants said that the teachers had spoken to them about legal aspects associated with DM and 18% pointed out that they received guidance from the teacher on how to use social networks and the internet. On the other hand, 40% said they had received a call for attention from their teachers for using DM on campus and 25% mentioned that they had been sanctioned for using DM in class. Likewise, 19% of the students acknowledged having missed classes for using the DMs. Finally, 69% stated that DM is a distraction from their school activities.

Regarding the impact on physical and mental health, differences were detected. Table 3 summarizes the findings:

Tabla 3. Afectación en la salud por nivel educativo

	Síntoma	Secundaria	Universidad	t	p
Salud mental	Cansancio	2.1	3.41	2.73	.023
	Ansiedad	1.47	2.59	11.9	.001
	Depresión	1.13	1.63	6.3	.001
	Insomnio	1.53	2.53	10.82	.001
	Irritabilidad	1.2	2.3	13.41	.001
Salud física	Dolor de cabeza	1.69	2.79	10.8	.001
	Dolor abdominal	1.28	1.79	6.1	.001
	Problemas de visión	1.6	2.9	13.1	.001
	Falta de apetito	1.22	1.44	2.7	.007
	Calambres	1.32	1.58	3.2	.001

Fuente: Elaboración propia

According to the data in the previous table, there is evidence of a minimal impact on health problems, all evaluated on a scale of 1 to 5. In physical health, headache and abdominal pain stand out, while in mental health, fatigue and the anxiety.

Discussion

Average hours of DM use continues to rise compared to previous studies. In this sample, it was around 7 hours a day for university students and 6 hours for high school students.

Regarding personal life, the impact does not appear to be significant, as the scores indicate few adverse effects. In fact, relatively few negative health effects were found, although with some discomfort generated by fatigue and anxiety, which has also been reported in other studies (Aquino López, 2016; Aznar Díaz et al., 2020; Kim and Kim, 2015).

Despite the increase in the use of DMs in Mexican universities, the effects on students deserve greater attention. The results of this work invite future research with comparative causal approaches that first identify students with physical or mental health problems and then delve into the type, extent, and content of DM use. The findings, in summary, suggest considering the idiosyncratic and personal factors that explain the level of use of DM in university students.

Conclusions

There is a greater use of DM in university students and, evidently, higher levels of affectation (with the exception of social life, which is more affected in high school). Considering the range on the scales, the negative impact of the use of DM is relatively low, but a trend towards greater affectation can be noted as DM is used more and some referred health problems such as fatigue, headache and anxiety.

Future lines of research

The data presented in this work were collected before the start of confinement by covid-19. Therefore, future research should explore whether the use of DM increased, particularly for school activities, and what the consequences could be added to the effects of isolation and change of life in this period. Perhaps the results of the instruments used can be used as a baseline to assess these changes and continue to examine the positive and negative effects of these devices. It should also be explored whether these findings in the state of Yucatán, Mexico, are related to the uses of secondary school and university students in other latitudes. Likewise, future research should include high school students to analyze the transition of use patterns in a more gradual way.

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Rol de Contribución	Autor (es)
Conceptualización	Pedro Sánchez Escobedo
Metodología	Pedro Sánchez Escobedo
Software	Pedro Sánchez Escobedo
Validación	Pedro Sánchez Escobedo (principal) y Gloria Yaneth Calderón Loeza (que apoya)
Análisis Formal	Pedro Sánchez Escobedo (principal) y Gloria Yaneth Calderón Loeza (que apoya)
Investigación	Pedro Sánchez Escobedo y Gloria Yaneth Calderón Loeza (igual)
Recursos	Pedro Sánchez Escobedo y Gloria Yaneth Calderón Loeza (igual)
Curación de datos	Gloria Yaneth Calderón Loeza
Escritura - Preparación del borrador original	Gloria Yaneth Calderón Loeza
Escritura - Revisión y edición	Pedro Sánchez Escobedo
Visualización	Pedro Sánchez Escobedo (principal) y Gloria Yaneth Calderón Loeza (que apoya)
Supervisión	Pedro Sánchez Escobedo
Administración de Proyectos	Pedro Sánchez Escobedo
Adquisición de fondos	Pedro Sánchez Escobedo y Gloria Yaneth Calderón Loeza (igual)