Addiction to Social Networks and Its Influence on the Academic Performance of the Students: An Analysis from the Bayesian Approach

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Abstract

Social networks are websites and applications that favor the teaching-learning process because you can communicate, share information and establish relationships between students and teachers. In this research, an estimation of the relationship between the addition to social networks and the academic performance of university students is carried out. For this, the Bayesian factor is used, in whose analysis technique it characterizes the posterior distribution and the Bayes factor is estimated, which measures the linear relationship between two variables of the scale, following a bivariate normal distribution. For this purpose, a sample of students from the Middle Zone Multidisciplinary Academic Unit of the UASLP is analyzed. The sample includes 200 students. The Social Networks The instrument is made up of three dimensions: obsession with social networks, lack of personal control in the use of social networks and excessive use of the social network. The results indicate that there is not enough evidence to say that there is a relationship between obsession with social networks, lack of personal control in the use of social networks and excessive use of social networks with academic performance, because the Bayesian Factor value is between 10 and 30.

Keywords: social networks, academic performance, factor Bayes, college students.

1. Introduction

Information technologies have achieved that some activities that were carried out in a conventional way, are now carried out in a different way. At the beginning of the year 2023, Digital (2023) reports 100.6 million Internet users in Mexico, of which 94.00 million are users of social networks, equivalent to 73.4 percent of the total population. The most widely used means of access is the mobile phone, with 123.5 million active connections. The social network with most access is Facebook with 94 million users who access it.

In this sense, the Internet Association (2023) reports in the 19th Study on the Habits of Internet Users in Mexico 2023 that 42.7 % of those surveyed in the study spend an internet connection time of 7 to more than 9 hours. Generation Z (11 and 26 years old) are the users who connect to the Internet the most (27 %), in second place, Generation X between 43 and 58 years old (25 %) Internet Association (2023). In third place are users of the Millennial Generation between 27 to 42 (22 %). The most common use is to social networks WhatsApp, Facebook and Instagram continue to be the most used social networks by those surveyed.

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Other applications where technology is immersed, as Smit (2012) refers, is the use of different instant messaging platforms in education, which have the potential to increase learning. In this idea, Bouhnik and Deshen (2014); have expressed the advantage of using social networks such as WhatsApp in the teaching-learning process because it can be used at any time and place, and it is useful in collaborative learning. Limas and Vargas (2021) mention that universities have adapted to social networks, and have managed to change the teaching process and improve the quality of education.

In the study carried out by Cetinkaya (2017), refers that the students had a positive opinion about the application of social networks in their courses, especially WhatsApp, also points out that in this modality, learning occurs more spontaneously and, if they are used images learning is more effective.On the other hand, Abraham and Fanny (2019) point out that different investigations report that Facebook, YouTube, Twitter and other social platforms are preferred by young people and conclude that students are highly dependent on social networks, affecting significant in the teaching-learning process.

Some authors (Matikiti et al., 2017; Hajarian et al., 2017 cited by Van Rhyne et al., 2019) explain that social networks are "websites and applications designed to allow people to share content in a fast, efficient and in real time". For his part, Dyer (2020) expands the explanation, pointing out that: social networks are a challenging task, since; it is an area that continuously changes. Social networks are websites and applications that favor the teaching-learning process because it is possible to communicate, share information and establish relationships between students and teachers.Torres (2011) shows that social networks in universities have facilitated communication and collaborative learning and have introduced new ways of working among the actors in the training processes. Meso (2010, cited by Torres, Alcántar, 2011) published the results of a study in Spain, 83 percent of Spanish youth use at least one network. Its use makes various processes efficient and helps to solve problems; at the same time, they are widely used to improve classroom performance.

Vasquez et al. (2022), carried out a bibliographic review in 30 articles in which they analyze the role that social networks play in the teaching-learning process of university students during the period 2016–2021. In their findings, they conclude that it has a real effect on the learning, since it moves students from passive receivers of information to active participants; it also allows updating knowledge and providing feedback. Therefore, the incorporation of these technological platforms in Higher Education is very convenient and beneficial, even with the inconveniences that they can cause, such as distraction and lack of concentration in the process.

In this time, technology has become a tool to obtain greater knowledge. Recent media such as social media, Twitter, Instagram and Facebook have made a difference in the dissemination of information and knowledge due to their effect and influence on society. Currently, people believe that these tools are useful to achieve goals, as well as to understand what is happening in society (Adegbola, Gearhart, 2019 cited by Mohamed et al., 2020).

Owusu-Boakye (2020) talks about the impact of the technological tools of the 21st century and mentions that they have come to transform the teaching-learning process. There are two causes: 1) the student has a different way of learning and 2) the teacher is forced to modify his teaching profession due to the presence of digital technology. A similar conceptualization has been referred to by Mynbayeva and Sadvakassova (Mynbayeva, Sadvakassova, 2018, cited by Owusu-Boakye, 2020) when considering this technological tool as a transformed process. In this idea, Owusu-Boakye (2020) refers that WhatsApp is a useful tool in the field of learning at any time and in any place and increases attributed collaborative learning since it increases learning. In this sense, Adamson (Adamson, 2012, cited by Wiid, 2014) indicates that social media network systems do not prevent them from be used in teaching, since information can be shared between teachers and students at any time and from any location.

However, excessive use can generate addiction, which would generate concern in the health sector, which has focused more on the issue due to the addictive characteristics and psychological consequences that social networks cause in people. There is growing evidence that social media addiction is a persistent problem among students. Dominguez-Vergara and Ibáñez-Carranza (2016) found that adolescent students from 12 to 16 years old show a moderately significant level of addiction to social networks. It also indicates that, the greater the addiction to social networks, the lower level of social skills in adolescents is demonstrated.

Koç and Turan (2020) clearly show in their results that most of the participants use Instagram as their main app. However, we did not find any significant relationship between academic performance and addiction to social networks. Nevertheless, they report a gender difference, with women spending more time on SNS than men do, while men have more online friends than women.

Amador-Ortiz (2021) reports that there is a significant association between university students failing school and social networks addiction. The associations are presented in two factors: the obsession with social networks and their excessive use. Chávez and Coaquira (2022) report three levels of addiction to social networks in university students; the most relevant is the medium level with 48 %, 27.4 % of the students have a low level and only 24.6 % have a high level. The high-level reports that 25.6 % are obsessed with social networks, 29 % lack personal control and 30.8 % use social networks excessively.

Alarcón-Allaín and Salas-Blas (2022) studied the relationship between social networks addiction and emotional intelligence in 279 students of different technical degrees from a state institute in Callao-Peru. Regarding social networks addiction, it reports that students who spend more time online (more than 6 hours) score higher in the ARS dimensions (obsession, lack of control, and excessive use). Of the three dimensions, the excessive use of social networks presents the biggest difference. The authors conclude that students who are online for longer periods obtain higher scores on the ARS.

As a follow-up to this topic, Reynoso (2022) applied Escurraand Salas (2014) social media addiction scale to students, showing that students have low levels of addiction. However, the addiction level is affected by age since the level increases with age and it differs whether or not the student has a work activity. In addition, he reports that the greater the use of social networks, the greater the increase in academic stress in higher-level students.

Weihongand Fethi (2023) studied the influence of social networks (SNS) addiction on academic performance in 251 college students from the southwestern United States. Their findings indicate that social media addiction does not have an impact on college students' grade point average (GPA). However, they report that they have a positive effect on their anxiety and stress.

On the other hand, Valencia et al. (2023) report that for students there is no risk derived from the use of social networks, nor does it create problems in any context: social, work or academic. They do not feel the "obsession" or discomfort to know what is happening in SN. Likewise, men and women do not differ in the ARS, those who spend more hours connected are more prone to show higher scores in addiction to networks.

This research is based on the Media Dependency Theory (MDT). It is used to interpret the data and propose explanations for social networks addiction causes or influences. According to the MDT, a mean would become an integral part of an individual, if he/she is too dependent on it to satisfy his/her needs. Regarding this theory, it can be said that social networks are the mean that students use in the teaching-learning process to achieve academic performance (Nul et al., 2020).

Therefore, emerge some pertinent questions: Does social networks addiction have an effect on college students' academic performance? To answer the question, the following objective is proposed: to verify the relationship that exists between social networks addiction and academic performance in college students.

2. Materials and methods

In this research, an estimation of the relationship between social networks addiction and academic performance in university students is made through the Bayesian factor, where the posterior distribution is characterized and the Bayes factor is estimated, which measures the linear relationship between two scale variables jointly following a bivariate normal distribution. For this purpose, a group of students from the Middle Zone Multidisciplinary Academic Unit of the UASLP is analyzed.

The study is carried out in the municipality of Rio Verde, SLP, in the semester between the months of August to December 2022. The sample includes 200 students of which, 38.5 % are from the civil engineering degree, 24.5 % from the nursing degree, 11 % from the public accountant degree and 26 % from the administration degree. Of the total number of students, 42 % are men and 58 % women.

3. Discussion and results

Instrument

The Social Networks Addiction questionnaire designed by Escurraand Salas (2014) was used. The instrument consists of 24 items on a 5-point Likert scale ranging from never to always (to which scores from 0 to 4 were assigned). It has 23 direct questions and 1 reverse question. Three dimensions integrate the instrument: obsession with social networks, lack of personal control in the use of social networks and excessive use of the social network.

Social media obsession is characterized by constantly thinking and worrying about not being able to access or be connected to social media. The lack of personal control in the use of social networks refers to a concern for the lack of control in the use of networks, which results in the non-compliance or neglect of certain activities, and finally, the excessive use of networks Social refers to being connected to social networks for a long time. The instrument has a reliability of .95 and the dimensions have Cronbach's alpha values of .91, .89 and .92 respectively, so they have adequate internal consistency (Escurra, Salas, 2014).

For the Bayesian analysis, the IBM SPSS Statistics 27 software is used, which includes Bayesian statistics and Pearson's correlation. In this sense, firstly a Pearson linear correlation is performed, taking into account the definitions of the following hypotheses:

– $H0_1$: There is no relationship between the obsession with social networks and the academic performance of college students.

– $H1$: There is a relationship between the obsession with social networks and the academic performance of college students.

– $H0_2$: There is no relationship between the lack of personal control in the use of social networks and the academic performance of college students.

– $H2$: There is a relationship between the lack of personal control in the use of social networks and the academic performance of college students.

– $H0_3$: There is no relationship between the lack of personal control in the use of social networks and the academic performance of college students.

– $H3$: There is a relationship between excessive use of social networks and the academic performance of college students.

Contrasting by the Bayesian method

On many occasions, only two hypotheses are formulated: one of no difference or no association, noted as H0, and another as the opposite event. However, an advantage of this model is the possibility that with the Bayesian hypothesis test it is not based on the rejection of a null hypothesis, but on being able to contrast two hypotheses: the null or no-effect (H0) against the alternative or effect one (H1). The relationship between these two hypotheses is summarized in the Bayes factor or FB factor (see Figure 1).

Fig. 1. Bayes Factor (own)

Data analysis

The descriptive analysis of the sociodemographic variables is as follows: The greatest participation in the survey was women (n=116), versus men (n=84). The age range is between 17 and 28 years, and the highest percentage is between the ages of 20 and 22 (56 %), of which a

representative percentage studies and works. In addition, it is observed that the career where more students participated was civil engineering in the most advanced semesters (see Table 1).

In relation to the information on the use of networks shown in Table 1 we observed that, a very high percentage (98 %) connects to social networks through their cell phone and the frequency is 7 to 12 times per day that they consult or review their social networks.In addition, the students surveyed report knowing in person more than 70 % of their contacts. Finally, the use they give to social networks is both for socializing and for work and academic activities.

Table 1. Socio-demographic variables

Gender	%	Age	%	Connection	%
Male	42,0	17 to 19	24,5	Smartphones	98
Female	58,0	20 to22	56,0	Computers	2
		23 to 25	17,0		
		26 to 28	2,5		
Activity	%	Semester	%	Frequency	%
Study	55,0	First	16,5	All the time	20,5
Study and work	44,5	Third	0,5	1 to 2 times per day	24,0
Only work	0,5	Fifth	12,5	3 to 6 times per day	26,5
		Seventh	48,0	7 to 12 times per day	28,0
		Nineth	22,5	2 to 3 times per day	1,0
Carrer	%	Use	%	Frequency	%
CE	38,5	Socialization	27,5	All the time	20,5
N	24,5	Academic	9,0	1 to 2 times per day	24,0
PA	11,0	Work	8,0	3 to 6 times per day	26,5
A	26,0	All the above	55,5	7 to 12 times per day	29,0

Note: civil engineering (CE), Nursing (N), public accounting (PA), Administration (LA)
Source: own

Regarding the level of addition, Table 2 shows that the highest percentage refers to the obsession that students have about accessing social networks (94 %). Meanwhile, in the dimensions about the lack of personal control and excessive use, the level of the students corresponds to a medium level.

Table 2. Addiction to social networks level

Abuso (%)	Control (%)	Uso (%)	Puntuación
1.0	3	5	Bajo
7.0	23	35.5	Medio
92	74	59.5	Alto
100	100	100	

Source: own

To verify the research hypotheses (HO versus HA), the results described in Table 3 show the Bayesian factor for each of the constructs. We observe that the Bayes factor of the relationship between obsession, lack of control, and excessive use of social networks with the academic performance variable is greater than 10, indicating that there is a 10, 17 and 15 greater probabilitythat there is a large (strong) difference between the null hypothesis and the alternative hypothesis. This means that the null hypothesis is more in favor: there is no relationship between obsession, lack of control and use of social networks and the academic performance of college students; because the value of the Bayesian Factor is between 10 and 30.

Regarding the characterization of the posterior distribution, the credibility limits are observed at 95 %, which indicates that the true value of the *r* (Pearson) statistic is within those limits. In the case of obsession with social networks, the true value of *r* is between the ranges of -

,208 and ,062 in the case of lack of control it is between -,121 and ,148, finally with respect to the excessive use of social networks, the values are between -,172 and ,101 (Table 4).

Table 3. Inference of Bayes factor in pairwise correlations

		Obsession	Lack of control	Exccesive use	Average
X_1	Pearson correlations	1	,675	,659	-,074
	Bayes factor		,000	,000	10,431
X_2	Pearson correlations		1	,617	,018
	Bayes factor			,000	17,254
X_3	Pearson correlations			1	-,037
	Bayes factor				15,556
Average	Pearson correlations				1
	Bayes factor				

Source: own

Table 4. Posterior distribution characterization

Variable	Lower limit	Upper limit	Value r
Obsession	-.208	.062	-.074
Lack of control	-.121	.148	.018
Excessive use	-.177	.097	-.037

Source: own

4. Conclusion

Considering that the study focused on verifying the relationship between the addition to social networks and academic performance in college students, therefore the following discussion and conclusion is obtained:

According to the instrument designed by Escurra and Salas (2014) it was possible to evaluate in each of the constructs that comprise it, that there is no relationship between the obsession with social networks, the lack of personal control in the use of social networks and excessive use of social networks with academic performance. The Bayes factor that measures the relationship between the dependent variable (academic performance) and independent variables (addition to social networks) shows a value greater than 10, indicating 10, 17, and 15 times the probability of a large difference. (strong) of the null hypothesis versus the alternate hypothesis.

These results are consistent with those proposed by Koç and Turan (2020) who report that there is no significant relationship between addition to social networks and academic performance. However, other studies Owusu-Boakye (2020) report that the use of the WhatsApp social network increases collaborative learning. These results do not coincide with those reported by Amador-Ortiz (2021) who reports that there is a relationship between school failure and the addition to social networks, mainly in the constructs with the obsession with social networks and their excessive use.

Regarding the addition to social networks, this study coincides with the results presented by Chávez and Coaquira (2022). In their study, the authors indicate that a percentage of 25,6 % are obsessed with social networks, 29 % lack personal control and 30,8 % use social networks excessively. This study reports that 94 % of students abuse social networks. However, this data partially coincides with the work of Alarcón-Allaín, and Salas-Blas (2022), since they report high levels in each of the constructs; in this sense, it only coincides with the high level of abuse of social networks.

From the above, we can conclude that students feel worry too often when they cannot access social networks, however, this does not mean that it affects their academic performance. This feeling is probably because students use social networks in the learning process; therefore, it causes concern not being able to access them.

Finally, it is proposed for subsequent work to analyze the relationship between the addition to social networks in the learning process with academic performance, specifically during the semester in which the student is studying.

References

Abraham, Fanny, 2019 – *Abraham, O., Fanny, A.* (2019). Social media in teaching-learning process: investigation of the use of Whatsapp in teaching and learning in University of Port Harcourt. *European Scientific Journal, ESJ.* 15(4): 15. DOI: https://doi.org/10.19044/esj.2019.v15n4p15

Alarcón-Allaín, Salas-Blas, 2022 – *Alarcón-Allaín, G.F., Salas-Blas, E.* (2022). Adicción a Redes Sociales e Inteligencia Emocional en estudiantes de educación superior técnica [Addiction to social networks and emotional intelligence in students of higher technical education]. *Health and Addictions/Salud y Drogas.* 22(1): 152-166. DOI: 10.21134/haaj.v22i1.640 [in Spanish]

Amador-Ortíz, 2021 – *Amador-Ortíz, C.M.* (2021). Influencia de la adicción a las redes sociales en la reprobación escolar de estudiantes de nivel licenciatura [Addiction to social networks and its influence on school failure of undergraduate students] C*ienciaUAT.* 16(1): 62-72. DOI: https://doi.org/10.29059/cienciauat.v16i1.1510 [in Spanish]

Asociación de Internet MX, 2023 – Asociación de Internet MX. 19° Estudio sobre los Hábitos de Usuarios de Internet en México 2023 [19th Study on Internet User Habits in Mexico 2023]. 2023. [Electronic resource]. URL: https://www.asociaciondeinternet.mx/estudios/asociacion [in Spanish]

Bouhnik, Deshen, 2014 – *Bouhnik, D., Deshen, M.* (2014). WhatsApp goes to school: Mobile instant messaging between teachers and students. *Journal of Information Technology Education. Research.* 13: 217-231.

Cetinkaya, 2017 – *Cetinkaya, L.* (2017).The Impact of Whatsapp use on success in education process. *The International Review of Research in Open and Distributed Learning.* 18(7): DOI: https://doi.org/10.19173/irrodl.v18i7.3279

Chávez Arizala, Coaquira Tuco, 2022 – *Chávez Arizala, J.F., Coaquira Tuco, C.M.* (2022). Adicción a redes sociales y estrés académico en estudiantes ecuatorianos de nivel tecnológico. [Addiction to social networks and academic stress in Ecuadorian students of technological level]. *Apuntes Universitarios.* 12(3): 17-37. DOI: https://doi.org/10.17162/au.v12i3.1101

Digital, 2023 - Digital. The state of digital in Mexico in 2023. 2023. [Electronic resource]. URL: https://datareportal.com/reports/digital-2023-mexico

Domínguez, Ybañez, 2016 – *Domínguez, J., Ybañez, J.* (2016). Addiction to social networks and social skills in students from a private educational institution. *Propósitos y Representaciones.* 4(2): 181-230. DOI: https://doi.org/10.20511/pyr2016.v4n2.122

Dyer, 2020 – *Dyer, H.T.* (2020). Defining Social Media… It's Complicated. In: *Designing the Social. Cultural Studies and Transdisciplinarity in Education.* 11. Springer, Singapore. DOI: https://doi.org/10.1007/978-981-15-5716-3_2

Escurra Mayaute, Salas Blas, 2014 – *Escurra Mayaute, M., Salas Blas, E.*(2014). Construcción y validación del cuestionario de Adicción a Redes Sociales (ARS). [Design and validation of the Addiction to Social Networks questionnaire (SNAS)]. *Liberabit. Revista Peruana de Psicología.* 20(1): 73-91. [in Spanish]

Koç, Turan, 2020 – *Koç, T., Turan, A.H.* (2020). Examining the relationships between gender-specific social network sites (SNSs) addiction patterns and student academic performance. *Addicta*: *The Turkish Journal on Addictions.* 7(1): 10-20.

Limas, Vargas, 2020 – *Limas, S.J., Vargas, G.* (2020). Redes sociales como estrategia académica en educación superior: ventajas y desventajas [Social networks as an academic strategy in higher education: advantages and disadvantages]. *Educación y Educadores.* 23(4): 559-574. DOI: https://doi.org/10.5294/edu.2020.23.4.1 [in Spain]

Malak et al., 2022 – *Malak, M.Z., Shuhaiber, A.H., Al-amer, Rasmieh M., Abuadas, Mohammad H., Aburoomi, Reham J.* (2022). Correlation between psychological factors, academic performance and social media addiction: model-based testing. *Behaviour & Information Technology.* 41(8): 1583-1595. DOI: 10.1080/0144929X.2021.1891460

Matikiti et al., 2017 – *Matikiti, R., Mpinganjira, M., Roberts-Lombard, M.* (2017). Social media in tourism: Establishing factors influencing attitudes towards the usage of social networking sites for trip organisation. *Acta Commercii.* 17(1): 1-13. DOI: https://dx.doi.org/10.4102/ac.v17i1.396

Nul et al., 2020 – *Nul Widaya Mohamed Nawi, Syed Agil Alsagoff, Mohd Nizam Osman, Zulhamri Abdullah* (2020). New media use among youth in Malaysia: a media dependency theory perspective. *PalArch's Journal of Archaeology of Egypt/Egyptology.* 17(9): 3097-3112.

Ortiz et al., 2023 – *Ortiz, R.V., Garay Ruiz, U., Cabero-Almenara, J.* (2023). Percepción del alumnado y profesorado sobre los niveles de adicción que presentan los estudiantes mexicanos a las

redes sociales [Perception of students and teachers on the levels of addiction of Mexican students to social networks]. *Health and Addictions/ Salud Y Drogas*. 23(1): 6-20. DOI: https://doi.org/10.21134/haaj.v23i1.601 [in Spanish]

Owusu-Boakye, 2020 – *Owusu-Boakye, F.* (2020). Perception of the usage of Whatsapp for instruction in schools: a case study of teachers in senior high schools in the tema metropolis. Ph.D. Dis. University of Cape Coast. [Electronic resource]. URL: http://hdl.handle.net/123456789/7365

Reynoso, 2022 – *Reynoso, O.U.* (2022). Adicción a redes sociales en estudiantes de Educación Media Superior en el contexto de emergencia por COVID-19 en México. *Dilemas Contemporáneos: Educación, Política y Valores*. 62(1): 1-15. [Electronic resource]. URL: http://www.dilemascon temporaneoseducacionpoliticayvalores.com [in Spanish]

Smit, 2012 – *Smit, I.* (2012). WhatsApp with BlackBerry; Can Messengers (BBM) be MXit? En *Proceedings at 14th Annual Conference on World Wide Web Applications*. Cape Peninsula University of Technology. Cape Town, Sudáfrica.

Torres, Alcántar, 2011 – *Torres, C.I., Alcántar, M.D.R.C.* (2011). Uso de las redes sociales como estrategias de aprendizaje. ¿Transformacióneducativa? [Use of Social network as learning strategic. Educational transformation?]. *Apertura*. 3(2): 1-20. [in Spanish]

Van Rhyne et al., 2019 – *Van Rhyne, Z., Chinyamurindi, W., Cilliers,* L. (2019). Social network addiction and advertising on social networks: A case study of rural students in South Africa. *South African Journal of Information Management*. 21(1): a1081. DOI: https://doi.org/10.4102/sajim.v21i1.108

Vásquez et al., 2022 – *Vásquez, W.D.C.C., Vásquez, W.N.J.C., Delgado, J.C.A.* (2022). Redes sociales en el proceso enseñanza aprendizaje en estudiantes universitarios. *Sinergias Educativas*. 1-28.

Weihong, Fethi, 2023 – *Weihong, N., Fethi, A. Inan* (2023). Impact of social media addiction on college students' academic performance: an interdisciplinary perspective. *Journal of Research on Technology in Education*. DOI: 10.1080/15391523.2023.2196456

Wiid et al., 2014 – *Wiid, J.A., Cant, M.C., Nell, C.E.* (2014).Perceptions and uses of social media networking systems by South African students. *International Business & Economics Research Journal (IBER)*. 13(4): 715-726.