University students and online social networks: Effects and typology

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ABSTRACT

Immersed, educated, and raised amid technology, the new student generation is formed by digital natives. The use of online social networks (OSNs) has soared in recent years, and students are among those who have adopted them more enthusiastically. Therefore, it is necessary to analyze how students' academic life is shaped by the use of such networks. After providing a review of the literature on OSNs and their influence on students, this study presents the results of a survey that proved helpful to assess students' opinions in this regard. A typology of students based on their perceptions of OSNs is provided. The findings suggest that students value the positive aspects of OSNs to a much greater extent than they value the negative aspects of OSNs.

1. Introduction

Skills related to collaboration and teamwork undoubtedly stand out for their relevance in current as well as future organizations. Both the firms and the academic institutions which deal with students' competences stress that learners should be increasingly able to work not only inside teams but also collaboratively, and in an autonomous way (Helm, 2017). Online social networks (OSNs) actually serve such purposes.

Teachers are responsible for transforming a technology usually seen as a distraction into a learning tool that can: promote problem solving; make the use of information sources easier; improve collaboration; permit the interaction of students with one another as well as with teachers and experts; and help improve students' integration into education centers, thus improving their academic performance too (Evans, McFarland, Rios-Aguilar, & Deil-Amen, 2016; Siegle, 2011).

However, a number of recent reports have revealed that the obsession with OSNs, which reaches levels above other common addictions such as tobacco (Aladwani & Almarzouq, 2016), may mean a waste of time by the multiple distractions involved. Furthermore, despite all the existing research on the use of Information Technologies as a teaching tool, a better understanding still needs to be acquired about how to exploit them for the creation of collaborative spaces meant to promote deep, long-lasting learning (Magen-Nagar & Shonfeld, 2018). This shows the importance of examining not only the possible problems but also the potential benefits that using OSNs brings to university students. For that purpose, the present research work took advantage of students' opinions to try to identify the strengths and weaknesses of OSNs as well as their impact on academic performance. With this aim in mind, the literature review is followed by the presentation of the results obtained during a survey carried out among undergraduate students enrolled in subjects related to Human Resource Management. It was additionally being sought to establish a typology of students according to their attitude toward OSNs, and the influence that the latter may have on their studies. Establishing a typology will prove useful for lecturers; if they understand that not all students behave in the same way when it comes to OSNs, that will help develop a variety of action patterns aimed at different student profiles.

2. Literature review

Social networks are communities of people who share some type of interest. The Internet as well as Web 2.0 and 3.0 technologies do nothing but amplify social networks. According to Gneiser, Heidemann, Klier, Landherr, and Probst (2012), OSNs allow individuals: (a) to build a public or semi-public profile within a well-defined system, (a) to articulate a list of users with whom they have a connection and, finally, (c) to see and cross their connections list with others made by different individuals belonging to the same system.

Albeit extensive, the literature on OSNs and their influence on students is actually recent. A short review of these publications along with their main conclusions can be found in Table 1. As shown therein, numerous works suggest that using OSNs positively influences students' performance. Nevertheless, other research studies warn about potential negative effects. The review of the works listed in Table 1, and especially those authored by Gonzalez, Gasco, and Llopis (2015, 2016), shows the main specific strengths and weaknesses of these networks in the context of university studies, namely: *time, addiction, attention*

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Table 1
Literature review: students and OSNs.

Author	Contribution
Aladwani and Almarzouq (2016)	Universities must obtain advantages derived from using OSNs in the academic context but, at the same time, they should be vigilant about their possible negative effects on students, associated with their excessive and compulsive use. Students with a lower self-esteem level are the most prone to using these networks compulsively, which in turn usually leads to poor academic results.
Alloway, Horton, Alloway, and Dawson (2013)	OSN use generates a social climate from which students can benefit. It improves their cognitive skills, along with aspects related to academic achievement, such as verbal skills.
Al-Rahmi et al. (2014)	OSNs facilitate academic experience and collaborative learning with most participants. Those students who interact with their classmates and teachers, and are committed to their lessons, achieve a collaborative learning, which in turn allows them to improve their degree of satisfaction as well as their academic performance thanks to OSN use.
Aubry (2013)	Using Facebook as a tool for students to communicate with their teachers may replace other interaction forms, and implies a greater intrinsic motivation for students.
Chang and Lee (2013)	Trust is a facilitator which affects the results of students belonging to a Facebook community.
Duncan and Barczyk (2013)	Students perceive that OSN use improves their sense of social learning, together with their sense of connectivity. Students have the impression that Facebook makes it easier to create a community of practice, since it facilitates knowledge sharing.
Evans et al. (2016)	Students can academically benefit from connections through OSNs with their partners who outperform them. This is why an effort must be made by academic managers to forge friendship ties between students. To which must be added that social networks, increasingly focused on socio-economic integration, have the capacity to become a cheap means through which academic managers will be able to help their students, and to improve their academic level.
George, Dellasega, Whitehead, and Bordon (2013)	Facebook can prove useful as a tool to provide support between students, and it has the potential to contain resources thanks to which freshmen (first-year students) will find it easier to handle stress.
Gonzalez et al. (2015)	It follows from the results obtained in a survey among university students that Facebook is likely to have a positive impact on students' performance. Students are satisfied with the use of Facebook for academic purposes. The students who show a more negative attitude toward Facebook are the ones who have never used this social network.
Gonzalez et al. (2016)	Analyzing the literature on Facebook and its impact on academic performance leads to conclude that Facebook's positive influence on academic results overshadows its negative influence.
Goodband, Solomon, Samuels, Lawson, and Bhakta (2012)	Facebook helps students not only to communicate with one another but also to reinforce their pre-existing friendship ties.
Haylett (2016)	Examining the literature about the use of OSNs for online teaching, its advantages and drawbacks, leads to draw the conclusion that irrefutable evidence exists suggesting that the use of social media for online teaching positively correlates with students' commitment. Instead, a negative correlation exists with students' achievement.
Hew (2011)	There are multiple reasons to use Facebook, but the most important one among students is the chance to maintain relationships with people they know. Even though students using Facebook spend fewer hours studying than those who do not have that network, one cannot infer a direct link between Facebook use and academic performance. Students see Facebook as a tool to have fun, not to be used for serious matters.
Huang and Hung (2013)	Using online forums related to languages may serve to strengthen relationships between study partners, and it improves the opportunities to carry out written as well as oral practice, cultivating the skills associated with speaking in public.
Jaffar (2014)	The use of Facebook as a teaching instrument not only favors students' commitment and motivation but also enhances collaboration and peer assessment. It is an innovative way to bring teaching materials closer to students.
Judd (2014)	Regardless of whether using Facebook on a regular basis constitutes a cause or a symptom of multitasking, Facebook use seems to be associated with high multitasking levels, which reduces students' work effectiveness.
Junco (2012a)	The time used on Facebook negatively correlates with students' results. Nevertheless, a distinction should be drawn: when OSNs are utilized to share or collect information, that use is directly related to students' commitment. If networks are used to socialize or for non-communicative activities (e.g. playing or watching what others have done), such uses negatively correlate with commitment.
Junco (2012b)	Those students who want to do several tasks at a time, such as using OSNs and studying simultaneously, have worse academic results in the long term.
Kalpidou et al. (2011)	Spending plenty of time on Facebook relates to students' low self-esteem. The number of Facebook friends negatively correlates with emotional and academic adjustment among first-year students. Instead, it is positively associated with social adjustment and the affection for the institution among students enrolled in the last years of university.
Kirschner and Karpinski (2010)	On average, Facebook users show lower academic performances than non-users. Such users are usually more involved in non-academic activities, which suggests a higher degree of social extroversion. However, Facebook users said that its use did not influence their academic results, and added that academic activities constituted a priority for them. Those admitting that it could have a somewhat negative impact mentioned procrastination—linked to bad time management.
Lateh (2014)	Even though using Facebook as a teaching tool makes student interaction increase, no significant differences in results exist between students who use Facebook and those who do not use that network.
Manca and Ranieri (2013)	Despite the claims that the new generations of students badly need technological change, and that they have great expectations about the use of technology as a teaching means, students not always feel at ease with technologies such as Facebook. Furthermore, they are apparently not willing to use informal instruments (e.g. OSNs) as their only learning tool.
Morley (2014)	OSNs such as Facebook reinforce collaborative work and learning. A great risk is assumed by those educational institutions which obviate the use of OSNs as an essential part of the methods to facilitate communication between students.
Paul et al. (2012)	A negative relationship exists between OSN use and academic performance. Academic institutions must improve students' ability to efficiently manage their time, since a positive relationship exists between attention deficit and the time spent on social networks.
Rouis (2012)	The time used on Facebook does not significantly affect academic results, which is why no restrictions need to be imposed on students. Much more attention must be paid to students' interest in their studies—and to the ability to perform various tasks, as well as to manage their concentration skills and priorities—when analyzing such results.
Rouis et al. (2011)	An extensive use of Facebook by students with extrovert personalities leads to worse academic performances. Instead, students with a higher self-regulation can better control their presence on these platforms.
Taylor et al. (2012)	Students are reluctant to utilize OSNs for academic purposes, mainly due to problems linked to the boundaries between the private and the public sphere, and to the privacy issue. Teachers should not be discouraged from using OSNs, though; they simply need to be aware of matters referring to limits and students' privacy.
Tower, Latimer, and Hewitt (2014)	OSNs represent an innovative method with which academics can involve and attract students in their learning. They promote academic interaction between students, and constitute an environment and support which makes peer-to-peer learning and teaching easier. This encourages students to work together, developing their capacity for critical reflection.

Table 1 (*continued*)

Author	Contribution
Wang (2013)	Students use Facebook in a way that may turn out to be positive or negative for their academic results, and for their commitment to the studies they are enrolled in. By way of example, students can obtain advantages from its communication-related characteristics. It can prove motivating because participants express their emotions, and shy students dare to ask and intervene to a greater extent than they do in face-to-face classes. The possibility also exists to create a commitment and a sense of belonging, both within the group and within the institution.
Wohn and LaRose (2014)	Despite all the bad "press" about Facebook's negative impact on academic performance, its effects are negligible.
Zaremohzzabieh et al. (2014)	Students may develop an addiction to OSNs such as Facebook, and three potential problems arise: the compulsive use of networks; the high frequency of use; and their use to avoid other types of activities and responsibilities.

deficit, *anxiety*, *privacy*, and *multitasking*; as for strengths, *collaboration*, *friendship*, *trust*, *motivation*, and *commitment* stand out.

2.1. OSN weaknesses

2.1.1. Time, addiction and attention deficit

One of the most important problems generated by social networks is the time spent on them, together with the fact that they can eventually create an addiction. Students become dependent on them, with a possible reduction in the level of attention devoted to studies (Berger, Wyss, & Knoch, 2018). Some students are unable to impose strict limits on themselves in terms of time consumption (Paul, Baker, & Cochran, 2012). Because networks are so easy to use, and since one can upload posts or videos—among other things—so quickly and easily, an evident risk exists of saturating both the system and the students themselves with information, which forces them to manage this information overload (Duncan & Barczyk, 2013). In addition to information that may prove useful to students, these networks contain a whole series of distractions which are true "time thieves"—e.g. advertisements, suggestions, and games, to quote but a few—and can ultimately trigger an addiction (Zaremohzzabieh, Samah, Omar, Bolong, & Kamarudin, 2014). The time spent on OSNs is closely linked to addiction and attention deficit, which results in a growing inability to concentrate among students, who consequently have more difficulties to continue their studies normally (Paul et al., 2012).

2.1.2. Anxiety

A more frequent use of OSNs significantly correlates with students' anxiety (Lee, 2014). Nevertheless, it is necessary to analyze in more depth whether more anxious students use OSNs to a greater extent or whether it is actually OSN use that increases their anxiety. In any case, it does seem clear that many students obsessed with networks show signs of anxiety when they cannot consult their networks and check the information from their contacts for a long period of time. This state of anxiety becomes very visible, for instance, when a student is unable to use the mobile phone with which he/she usually accesses their social network accounts. As highlighted by Mendoza, Pody, Lee, Kim, and McDonough (2018), being unable to communicate with others, losing the connection or being prevented from access to information fills youngsters with anxiety—aggravated if they cannot log on to the Internet for about 10 min. Curiously enough, 10 min is the time after which attention begins to decline when studying.

2.1.3. Privacy

Sharing ideas or information on OSNs is impossible unless you previously achieve other people's contacts or "befriend" them. However, students may be distrustful about teachers asking them for contact on OSNs (Lampe, Wohn, Vitak, Ellison, & Wash, 2011; Taylor, Mulligan, & Ishida, 2012). Due to reasons associated with privacy, many teachers and students choose to keep separate OSN accounts for personal and academic issues. Other students are simply reluctant, and thus refuse to use OSNs seeking to preserve their privacy (Hew, 2011).

2.1.4. Multitasking

Students like doing several tasks at the same time, e.g. studying and checking their networks. Young people seem able to simultaneously perform different tasks without losing efficiency and effectiveness, as if an evolution had taken place in their brain with respect to previous generations (Lee, 2014). However, numerous studies suggest that multitasking is impossible: the brain cannot perform two tasks at the same time (Kirschner & Karpinski, 2010). Trying to do several things simultaneously has negative effects on academic results (Judd, 2014; Junco, 2012b) because it implies an information overload for students which prevents them from accomplishing a calm, deep learning.

2.2. OSN strengths

2.2.1. Collaboration

If OSNs can prove useful in one area, that is undoubtedly information exchange, which in turn constitutes the basic type of collaboration (Wang, 2013). Networks allow learners to organize themselves during an academic year, reducing the costs of communication with other students (Lampe et al., 2011). This informal nature fits in very well with the interaction habits of students, who have found a channel to reach their friends in these networks and adopt them as a tool for collaborative work (Suwannatthachote & Tantrarungroj, 2012).

2.2.2. Friendship, trust

Students utilize social networks as a means to maintain and reinforce friendship ties with people outside their studies or with their own classmates (Kalpidou, Costin, & Morris, 2011). Trust between students increases mutual collaboration. Students who trust their classmates to a greater extent are more likely to learn from them than when trust levels are low (Chang & Lee, 2013; Rouis, Limayem, & Salehi-Sangari, 2011).

2.2.3. Motivation and commitment

From an academic point of view, using OSNs improves not only the motivation to learn but also the learning climate inside classrooms, since it creates new relationships between students and teachers, or between students themselves (Wang, 2013). Cain and Policastri (2011) highlighted that subjects become more interesting or motivating because social networks allow students to see the direct testimony of experts, in posts or videos, which ultimately improves the appeal of subjects. "Commitment" is understood here as the amount of physical and mental energy that students dedicate to their academic experience. In this sense, a variety of works concluded that using OSNs as a teaching—or learning—tool is likely to improve students' commitment level (Al-Rahmi, Othman, & Musa, 2014; Jaffar, 2014; Kaur, Ganapathy, & Sidhu, 2012).

3. Methodology

The survey prepared included not only the interviewee's profile data but also some reflections on the possible strengths and weaknesses of social networks for teaching and learning.

The students to which this survey was addressed where those

Table 2
Measures for constructs and reliability.

Construct	Source	Measure	Reliability (Cronbach's α)
OSN weaknesses	Literature review, especially Gonzalez et al. (2015)	12 items, 1–5 Likert scale	0.797 acceptable/good
OSN strengths	Literature review, especially Gonzalez et al. (2015)	11 items, 1–5 Likert scale	0.803 good

enrolled in the subject Human Resource Management—taught at the degrees of Business and Labor Relations at the University of Alicante (Spain)—during the 2016/17 academic year.

As for the study technical specifications, 84 (56.3%) out of the 149 students enrolled in the two aforementioned subjects gave valid answers (population: 149 students, sample size: 84 answers—55 students failed to answer the survey questionnaire because they did not attend class on the day when it was administered). These results revealed a low sampling error considered acceptable for their significance (7.09%). The interview was carried out in paper format during the last weeks of the academic year (May 2017).

The two variables concerning the strengths and weaknesses of OSNs as well as their impact on students, on learning, and on teaching in general, came from a thorough review of the literature about this topic, and especially from Gonzalez et al. (2015). The construct about OSN Weaknesses had 12 items, and its reliability was acceptable/good (Cronbach's equals 0.797), whereas that about OSN Strengths had 11 items, its reliability being good (Cronbach's equals 0.803). These constructs were measured using a 1-to-5 Likert-type scale (Table 2). A set of statements was proposed in the construct related to the Strengths and Weaknesses of online social networks in relation to students' performance, and students had to assess the extent to which they disagreed or agreed with them using scores from 1 and 5. These statements will be subsequently assessed in the results section—and collected in Table 4.

4. Results

4.1. Descriptive analysis

The profile of the interviewed students, along with the networks that they use, can be found in Table 3. It becomes visible that female sex prevails; and also that interviewees are 22.9 years old on average, to which must be added that any student uses an average of 3.6 social networks. They were asked to specify their social networks, Facebook, followed by YouTube and Instagram, standing out as their favorites.

As for Table 4, it shows the score given to the items referring to OSN weaknesses and strengths in connection with academic performance. Special emphasis needs to be placed on some problems generated by OSNs, including the reduction of students' capacity to concentrate (mean 4.243) and the negative impact on the time and attention dedicated to studies (mean 3.825 and 3.456). The least valued items have to do with (a) anxiety problems derived from being unable to use

Table 3
Interviewed students' profile, and networks that they use.

	N.	%
Gender	Female 51	60.7
	Male 33	39.3
Age	22.9 (mean)	
No. of OSNs used	3.6 (mean)	
OSN used	Facebook 64	76.2
	YouTube 62	73.8
	Instagram 52	61.9
	Twitter 24	28.6
	LinkedIn 11	13.1
	Pinterest 7	8.3
	Snapchat 4	4.8
	Blog 2	2.4

Table 4
OSN weaknesses and strengths.

Items	Mean	Median	Mode
Weaknesses			
Using OSNs reduces my concentration	4.243	5	5
Using OSNs takes time away from me	3.825	4	5
Using OSNs decreases my attention	3.456	4	5
I need to control my use of OSNs so as not to waste time	3.378	4	4
Work and study are incompatible with OSNs	3.123	3	3
The more I use OSNs, the more I become addicted to them	3.062	3	5
I do not like to disclose private information on OSNs	3.060	3	3
I must control myself in OSNs	2.951	3	1
I cannot concentrate because of OSNs	2.493	2	2
I prefer not to be on OSNs for privacy issues	2.271	2	1
Not checking OSNs for a long time makes me anxious	1.831	2	1
Being unaware of information from my OSNs makes me anxious	1.662	1	1
Strengths			
Teamwork is easier with OSNs	4.095	4	5
I like my classmates to communicate with me via OSNs	3.928	4	5
Using OSNs with partners and teachers improves my satisfaction with studies	3.702	4	4
Using OSNs helps me share study contents	3.702	4	4
I have reinforced my friendship ties with partners thanks to OSNs	3.583	4	4
Exchanging comments with classmates through OSNs encourages me to study	3.253	3	4
Communicating with my classmates through OSNs provides me with motivation to study	3.097	3	3
Communicating with my partners via OSNs has improved my integration into the classroom	3.097	3	4
I trust more partners with whom I keep in touch through OSNs	3.051	3	4
Using OSNs improves collaboration	3.047	3	3
Using OSNs with peers reminds me that I must study	2.839	3	4

social networks (mean 1.662), and from being unaware of all the information uploaded to those networks (mean 1.831); and with (b) privacy-related problems (mean 2.271).

Similarly, Table 4 shows the items associated with OSNs strengths and their connection with students. It follows from the analysis of this table: that networks turn out to be especially helpful in teamwork contexts (4.095); that students like their partners to communicate with them by means of OSNs (3.928); that network use can improve the degree of satisfaction with studies (3.702); and, finally, that networks largely help students in terms of content sharing (3.702). The least valued item, well below the mean, refers to the use of OSNs with classmates as a means to help remind them of the need to go back to study (2.839).

The comparison of scores given to OSN weaknesses and strengths with their mean, median and mode values leads to state that, on the whole, students value items related to strengths to a greater extent than they value items related to weaknesses.

4.2. Typology: factor analysis

A factor analysis from items related to OSN strengths and weaknesses was carried out next. Its aim consisted in reducing those items to a lower number of variables—known as factors—which gathered all the common characteristics underlying several items (Hu, 2006). With this aim in mind, the pertinence of such an analysis was firstly checked. It

Table 5

Factor analysis. Total variance explained and rotated factor matrix.

Item	Initial eigenvalues			Rotation sum of squared loadings			Rotated factor matrix	Time, addiction, attention deficit	Collaboration	Friendship, trust	Motivation, commitment	Anxiety	Privacy	Multitasking
	Total	% variance	% cumulative	Total	% variance	% cumulative								
1	4.948	21.511	21.511	4.400	19.130	19.130	It improves collaboration	−0.340	**0.399**	0.395	0.078	0.081	−0.066	0.119
2	4.015	17.456	38.967	2.530	11.001	30.130	Teamwork	−0.195	**0.755**	0.257	0.188	−0.101	−0.022	−0.115
3	2.139	9.300	48.268	2.313	10.058	40.188	Sharing contents	0.049	**0.621**	0.013	0.200	0.073	−0.310	−0.177
4	1.613	7.013	55.281	2.274	9.887	50.075	It improves satisfaction	0.130	**0.823**	−0.135	−0.023	0.081	0.048	0.001
5	1.449	6.298	61.579	1.898	8.250	58.325	Partners communicate	0.113	0.202	**0.663**	0.066	0.129	−0.094	−0.134
6	1.229	5.342	66.921	1.648	7.166	65.491	It reduces concentration	0.447	−0.247	0.114	0.108	0.091	0.352	**0.542**
7	1.075	4.675	71.596	1.404	6.104	71.596	Work/study incompatibility	0.035	−0.043	−0.151	−0.037	−0.056	−0.062	**0.873**
8	0.978	4.254	75.850				It takes away time	0.722	−0.132	0.099	0.011	0.076	0.130	0.410
9	0.792	3.445	79.295				It is a waste of time	**0.769**	0.037	−0.258	0.070	0.123	−0.139	0.133
10	0.725	3.154	82.448				It motivates me to study	0.020	0.430	0.167	**0.559**	0.280	−0.116	0.042
11	0.586	2.550	84.998				It reminds me to study	0.018	−0.061	0.073	**0.893**	0.038	0.008	−0.032
12	0.561	2.438	87.436				It encourages me to study	−0.002	0.415	0.108	**0.761**	0.046	−0.126	0.019
13	0.506	2.198	89.634				It strengthens friendship	0.089	0.354	**0.602**	0.358	−0.256	0.005	0.039
14	0.419	1.823	91.457				It increases Integration	0.048	−0.014	**0.688**	0.350	−0.372	0.164	−0.067
15	0.372	1.616	93.073				I trust my peers	−0.003	−0.205	**0.774**	−0.087	0.111	−0.071	−0.002
16	0.341	1.483	94.556				I need to control myself	**0.861**	0.102	0.050	−0.013	0.145	−0.148	−0.025
17	0.293	1.275	95.831				I become addicted to them	**0.781**	0.121	0.161	−0.265	0.189	−0.085	0.062
18	0.258	1.121	96.952				It reduces my attention	**0.848**	0.049	0.011	0.216	0.055	0.093	−0.039
19	0.235	1.024	97.976				I cannot concentrate	**0.773**	−0.189	0.085	−0.003	0.179	−0.004	−0.071
20	0.174	0.755	98.730				Being unaware of information makes me anxious	0.355	0.020	0.017	0.081	**0.806**	0.188	−0.070
21	0.135	0.588	99.318				Not consulting them makes me anxious	0.277	0.081	−0.003	0.103	**0.879**	−0.028	0.028
22	0.091	0.395	99.713				I am not on them for privacy reasons	−0.138	−0.138	−0.038	−0.286	0.012	**0.693**	0.204
23	0.066	0.287	100.000				I do not like to disclose private information	−0.001	−0.022	−0.061	0.085	0.080	**0.870**	−0.135

seemed advisable to undertake a factor analysis, insofar as the correlation matrix determinant was close to zero, the Kaiser-Meyer-Olkin index lay between 0 and 1 and above 0.5, and Bartlett's Sphericity Test was significant (Bartlett, 1950) (Kaiser-Meyer-Olkin Index: 0.595, Bartlett's Sphericity test: 659.639, significance: 0.000).

The implementation of Principal Components Analysis revealed 7 Eigenvalues above 1, which suggested, according to Kaiser's criterion, the convenience of extracting seven factors which explain 71.5% of the information supplied by the original variables (a satisfactory ratio, since it exceeds 50%). Seeking to better interpret these factors, a Varimax rotation was performed. Table 5 shows the resulting factors together with the original items involved in their formation.

The first factor, termed as *Time, addiction,* and *attention deficit,* brings together several items linked to negative influences of OSNs on studies, such as taking time away from study and, therefore, causing students to waste their time. In short, students need to control themselves to avoid overusing these networks, which can turn them into addicts, and accordingly reduce the degree of concentration and attention in their studies. This first factor stands out as the most important one, accounting for 19% of the variance explained in this analysis. It is followed by three factors which reflect positive features or strengths of OSNs, though.

The second factor, which explains 11% of the information contained in this analysis, was labelled as *Collaboration* because it refers to the capacity for OSNs to improve inter-student collaboration, to support group work, and to share contents, all of which favors greater satisfaction levels in studies, helped by the possibility to socialize with both classmates and teachers.

The third factor—*Friendship* and *trust*—explains 10% of the information generated in this factor analysis. The items shaping it refer to students' preference for their classmates or teachers to communicate with them using OSNs, to how these networks help them strengthen their friendship, and to feel more integrated into the group of partners belonging to that network, and even to the greater trust placed on those classmates with whom they most often interact on OSNs.

The fourth factor has to do with *Motivation* and *commitment,* and it explains 9.8% of total variance in this analysis. This factor comprises items showing that, when partners use OSNs to talk to one another about their studies, this circumstance not only encourages them but also reminds them that they should be studying, which in turn increases their motivation as well as the degree of commitment to their studies.

The three remaining factors are all linked to OSN weaknesses concerning studies. The variance explained by them is not too high: 8%, 7%, and 6% respectively. The fifth factor is called *Anxiety*, because it stresses how anxious students may feel if they cannot check their OSNs for a long time. The existence of information on those networks that they do not know about has the same effect on them.

The sixth factor was labelled as *Privacy*, since it contained items such as: "I prefer not to be on OSNs for privacy issues", and "I don't like to disclose private information on OSNs".

Finally, the seventh factor—*Multitasking*—contained two items as well: "Using OSNs while studying reduces my concentration"; and "work and study are incompatible with OSNs".

4.3. Typology: cluster analysis

All seven factors obtained in the preceding analysis subsequently served to carry out a classification based on the cluster analysis method, which permitted to obtain a typology of students according to their views about OSNs in general and, more specifically, about how they influenced students' academic performance. Following previous studies devoted to cluster formulation (Malhotra, Gosain, & El Sawy, 2005), this cluster analysis developed in two steps: the hierarchical cluster method was firstly applied to determine the number of clusters which had to be extracted, after which the non-hierarchical cluster made it possible to define the characteristics of those clusters.

A hierarchical conglomerate analysis performed with the seven factors mentioned above using Ward's method showed that obtaining three conglomerates seemed pertinent, since the biggest difference between coefficient changes in percentage terms appeared with three groups. This was followed by a non-hierarchical conglomerate analysis where the K-means method was applied to the aforesaid factors, validating the results obtained by means of an ANOVA analysis, and confirming that the latter is appropriate because all the variables included are significant.[1]

The three resulting clusters had 12 students interviewed in the first group, 14 in the second one, and 33 in the third. Each one of these groups was interpreted to identify the differences existing between them. Table 6 offers the equality of means test for groups with respect to the factors comprised in them.

The first cluster was termed as *Worried and anxious*, since Table 6 unmistakably shows it as being made up of two negative factors related to the time that social networks take away from students, and to the addiction that such networks generate in them, as well as to the attention deficit and anxiety that students suffer from when they cannot check their OSNs.

The second cluster—*Balanced*—included 14 students and gathered both negative and positive factors regarding OSNs. Examples of positive factors are collaboration, friendship, and trust; privacy and multitasking stand out among the negative ones. Students belonging to this cluster would thus score higher in the aforementioned positive factors and in the negative ones alike. Caution once again becomes a must in this second cluster when assessing the factor related to friendship and trust, which shows a low significance level.

As for the third cluster—the most numerous one with 33 students—it was called *Motivated and committed,* since it brought together the students with higher scores in this respect.

Last but not least, a Chi-square analysis helped verify the potential identification of the clusters obtained with the characteristics linked to the profile of the students interviewed. The only relationship found was with the number of networks used by students. Whereas those using fewer networks did not identify with any specific cluster, those who used more than three networks simultaneously usually belonged to the third cluster of students, formed by those most highly motivated and committed in their studies thanks to OSN use (Chi-square 6.909, signification 0.032). No significant relationship emerged between students' membership in a specific cluster and their age or gender, though (see Table 7).

5. Discussion and conclusions

Digital education is becoming increasingly influential both in distance teaching and in the classroom, which definitely paves the way for new learning and teaching models (Sousa, Carmo, Gonçalves, Cruz, & Martins, 2018). The impact of technology on students' results is a study area that needs to be addressed not only by researchers in Information Systems but also by those working in Management, since these instruments commonly appear as a teaching tool in the subjects related to this

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[1] Except for the factor referring to friendship and trust, which is not significant.

Variable (factor)	F	Sign.
Time, addition, attention deficit	5.024	0.010
Collaboration	7.910	0.001
Friendship and trust	1.272	0.288
Motivation and commitment	2.605	0.083
Anxiety	13.021	0.000
Privacy	4.440	0.016
Multitasking	5.529	0.006

Table 6
Equality of means test of weaknesses and strengths, according to cluster membership.

Variable (factor)		Mean	Levene			
			F	Sign.	Statistic	Sign.
Time, addiction, attention deficit	Cluster 1 (n = 12)	0.465	0.963	0.388	5.024 (1)	0.010
	Cluster 2 (n = 14)	−0.647				
	Cluster 3 (n = 33)	0.105				
Collaboration	Cluster 1 (n = 12)	−0.799	3.345	0.042	11.092 (2)	0.004
	Cluster 2 (n = 14)	0.601				
	Cluster 3 (n = 33)	0.035				
Friendship, trust	Cluster 1 (n = 12)	0.171	0.802	0.454	1.272 (1)	0.288
	Cluster 2 (n = 14)	0.279				
	Cluster 3 (n = 33)	−0.180				
Motivation, commitment	Cluster 1 (n = 12)	−0.369	0.738	0.482	2.605 (1)	0.083
	Cluster 2 (n = 14)	−0.285				
	Cluster 3 (n = 33)	0.255				
Anxiety	Cluster 1 (n = 12)	1.051	9.909	0.000	12.664 (2)	0.002
	Cluster 2 (n = 14)	0.027				
	Cluster 3 (n = 33)	−0.393				
Privacy	Cluster 1 (n = 12)	0.105	3.409	0.040	6.749 (2)	0.034
	Cluster 2 (n = 14)	0.597				
	Cluster 3 (n = 33)	−0.291				
Multitasking	Cluster 1 (n = 12)	0.043	2.719	0.075	8.642 (2)	0.013
	Cluster 2 (n = 14)	0.680				
	Cluster 3 (n = 33)	−0.304				

(1) ANOVA F statistic, since Levene's test shows that there is homoscedasticity.
(2) Kruskal-Wallis test, since Levene's test shows that there is no homoscedasticity.

Table 7
Chi-square to test independence.

		Cluster 1	Cluster 2	Cluster 3	Chi-square	Sign.
Number of OSNs	Up to 3	8 (38.1%)	5 (23.8%)	8 (38.1%)	6.909	0.032
	More than 3	4 (10.5%)	9 (23.7%)	25 (65.8%)		
Gender					0.142	0.932
Age					1.884	0.390

field (Hwang, 2018). Therefore, this work is clearly relevant.

The literature review permitted to identify the strengths and weaknesses of OSNs when it comes to the extent to which they determine academic performance. An initial analysis led to conclude that students assign more importance to strengths than to weaknesses, i.e. the positive influences of OSNs outnumber the negative ones in their opinion.

Carrying out a factor analysis resulted in obtaining seven factors associated with the aforementioned strengths and weaknesses. It follows from those factors that students are above all concerned because OSNs might cause them problems related to time waste and attention deficit, and even make them eventually develop different degrees of addiction. This had already been confirmed by previous studies (Kirschner & Karpinski, 2010; Mendoza et al., 2018; Paul et al., 2012; Zaremohzzabieh et al., 2014). Positive factors related to such networks, including improved collaboration (highlighted in the study of Jaffar (2014)), the strengthening of friendship- and trust-based ties with classmates (stressed in the papers written by Evans et al. (2016) and Chang and Lee (2013)), as well as motivation and commitment to studies (previously analyzed by Aubry (2013), Haylett (2016), Jaffar (2014) and Junco (2012a)), are all highly valued. Therefore, in tune with the findings of previous research works (Gonzalez et al., 2016), a positive result in favor of OSNs and their relationship with academic performance comes out of this study.

A cluster analysis helped obtain three groups of students according to their views about OSNs and about their impact on academic performance. The smallest group, referred to as *worried and anxious*, brought together the students with mostly negative opinions about OSNs. As for the group of *balanced* students, who assessed both the strengths and the weaknesses of OSNs, it was neither the most numerous nor the smallest one. Finally, the group with the largest number of students had a favorable opinion about the effects derived from using these networks. For this reason, they were labelled as *motivated and committed* students. This result once again confirms that most students show positive attitudes toward OSNs, prioritizing positive impacts over negative ones. Nevertheless, lecturers should warn this large group of learners that, in addition to the advantages that social networks can bring for their academic results, these networks also entail significant risks. Students will definitely need to be reminded of the need to keep control over technology at all times to fend off such risks (Berger et al., 2018).

Lecturers should know this typology, since the diverse groups of students require different orientation patterns regarding OSN use. Finally, the examination of student profiles along with their membership in the three groups derived from the cluster analysis performed led to the conclusion that the most motivated and committed students, or expressed differently, those more in favor of using OSNs, are also the ones who use a higher number of networks. Researchers should continue analyzing the typology proposed. By way of example, future research works might as well check whether using a larger number of networks makes students develop a more favorable attitude toward them, or conversely, if it is their positive opinion about using networks that encourages them to use a wider range of networks.

As for limitations, it must be highlighted that this paper is based on students' opinions, and not on objective data about their performance which could result from their marks, for example. Other studies dedicated to the same topic (Aladwani & Almarzouq, 2016) also took students' opinions as their reference, though—not surprisingly, since these opinions are extremely important. After all, students will be the main users of these technologies, not only in their current role as students but also in their future as professionals or executives. Understanding their perspective thus becomes essential to establish patterns able to improve the integration of these technologies into teaching and learning methodologies, as well as into work routines.

Despite the representativeness of the response rate obtained, note that the students under study are enrolled in a specific subject taught at a specific university, which means that extrapolating the conclusions of this study to all university students, in different types of degrees and a

variety of countries, would entail some risks.

In any case, all these findings should provide food for thought, especially to teachers. The advantages that these technologies bring to teaching and learning can hardly be denied, especially in the light of their widespread acceptance among students.

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