Review Article

The Influence of Social Media Networks on Learning Performance and Students' Perceptions of Their Use in Education: A Literature Review

Abdullah S. Alshalawi ¹*

0000-0003-0781-2004

¹ Department of Curriculum and Instruction, College of Education, University of Jeddah, Jeddah, SAUDI ARABIA
* Corresponding author: aalshalwey@uj.edu.sa

ARTICLE INFO	ABSTRACT
	The purpose of the current study is to provide a synthesis review of previous social media networks studies and to elaborate on the influence of social media networks on learning performance. The study analyzed 130 articles on social media networks that were published by five major journals in the field of educational technology in the last decade. It summarizes demographic, methodological, and theoretical trends, including educational level, learning domain, country context, research methods, data collection tools, data analysis techniques, and research purpose, followed by a summary of the influence of social media networks on student learning performance and students' perceptions toward the use of social media networks in learning. The findings show that more than two thirds of the reviewed articles studies were conducted in higher education institutes, college students were the most common participants in these studies, and most of the learning performance focus articles reported a positive influence of social media networks on learning performance. Students recognize and value the learning benefits of social media networks on the majority of the reviewed articles. Patterns in these articles are discussed in order to better understand the research and identify gaps that need to be filled by future studies. **Keywords:** social media networks, learning performance, teaching/learning strategies, mobile learning, literature review

INTRODUCTION

Web 1.0 refers to the first generation of worldwide web services, where users were passive and limited to only viewing the content of a website without any interaction. The second generation of worldwide web, web 2.0, centered on the idea that making these websites more dynamic enabled more users to interact (Ellison et al., 2007). One of the Web 2.0 innovations was social media networks (hereinafter SMNs). Ellison et al. (2007) defined social media networks as "web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system; (2) articulate a list of other users with whom they share a connection; and (3) view and traverse their list of connections and those made by others within the system" (p. 211). Social media networks, social media applications, social media sites, social software, and social media are terms that were being used by many and reflect the same concept. These different names for the same concept are because there are different ways to access these online services. For example, if you are accessing Facebook through a laptop using a browser you might call it a social media site, but if you access it through a smartphone App you might call it a social media application.

Emerging technologies often play an important role in developing and supporting teaching and learning environments. As stated by Prensky (2005), the current generation of students, *digital natives,* learn in a unique way that is different from previous generations' experience. Web pages are no longer the primary source of

learning and information for students. Instead, they have shifted to Web 2.0 technologies, in order to be more creative and interactive (Ajjan & Hartshorne, 2008). Tess (2013) stated three interrelated concepts that encourage the adoption of SMNs in higher education:

> "the apparently changing nature of the student who comes to the university highly connected, collective, and creative; the changing relationship that today's university learner has with knowledge consumption, knowledge construction, and formal education; the de-emphasis of institutionally provided learning and emergence of 'user-driven' education" (p. 1).

The influence of SMNs on education and their pedagogical benefits cannot be underestimated. According to the report by Hootsuite (2020), the number of social media users has increased since January 2019 by 9% (321 million) to be more than 3.7 billion active social media users worldwide in January of 2020. Children and adults between the ages of 13 and 34 represent 66% of Facebook users, which is one of the most famous SMNs. On average, these users spent more than 2 hours daily on SMNs in 2020. These statistics clearly demonstrate the explosion the 21st century is experiencing in the use of communication technology, leaded by SMNs.

With this rapid growth of SMN use, especially by students, SMNs are becoming increasingly popular as research topics in the field of education. LeNoue et al. (2011) stated that an SMN

> "offers educators more ways to engage learners than any preceding educational technology. Social software also empowers curriculum designers to more effectively accommodate many of the core principles of adult learning than was possible with earlier e-learning technologies" (p. 4).

However, one of the most obvious disadvantages that have been identified is that SMNs can waste a lot of students' time (Haddad, 2012).

In the past two decades, researchers began investigating the impact of SMNs on the educational system. Some of these studies concentrate on the adoption and uses of SMNs by teachers and students (Keles, 2018; Lai & Chen, 2011; Manca & Ranieri, 2016; Prescott et al., 2013; Rap & Blonder, 2017; Smith, 2016). Other studies focus on the influence of SMNs on students' performance (Bowman & Akcaoglu, 2014; Cheng & Jiang, 2015; Cuesta et al., 2016; Junco & Cotten, 2011; Laru et al., 2012; So, 2016). Likewise, studies on SMNs have focused on both K-12 education (Ahn et al., 2016; Asterhan & Bouton, 2017; Chu et al., 2017; Lantz-Andersson et al., 2016; Liu et al., 2017; Rap & Blonder, 2017) and higher education as well (Chu et al., 2017; Lackovic et al., 2017; Lantz-Andersson et al., 2013; Molinillo et al., 2018).

In this sense, and due to the variety of studies on the use of SMNs, it seems relevant to evaluate the information published in this regard and reflect on the results of previous studies and the educational potential of SMNs in education. In this article, over 130 studies that were published in five major journals on educational technology from January, 2011 to December, 2020, were identified and analyzed to provide the current synthesis of SMNs research and understand demographic, methodological and theoretical trends, prior to the COVID-19 pandemic influence.

Previous Reviews of SMNs in an Education Context

In the past decade, several studies have discussed the literature concerning the use of SMNs in education. Some of these studies focused on a specific SMN, such as Facebook or Twitter (Alias et al., 2013; Aydin, 2012; Gao et al., 2012; Pander et al., 2014; Tang & Hew, 2017), while the rest explored SMNs in general (Cheston et al., 2013; Huang, 2018; Liu et al., 2018; Tess, 2013). Moreover, some of these review studies have involved specific learning domains, like medical education (Cheston et al., 2013; Pander et al., 2014).

Alias et al. (2013) reviewed studies published in seven journals from 2007 to 2012. They analyzed articles that investigated the use of Twitter in education, reporting research trends and content analyses. On their part, Tang and Hew (2017) examined 51 articles published from 2006 to 2015, examining the use and the impact of Twitter on students. They found that using Twitter improves interactions among learners and teachers and could improve the learning outcomes as well.

Cheston et al. (2013) conducted a meta-analysis to examine the relationship between the use of SMNs and academic achievement in the medical disciplines. They found that correlation between SMNs use and

academic achievement was low. Another meta-analysis was conducted by Liu et al. (2018) to explore the relationship between SMNs use and social support. They analyzed 31 studies and reported that older and female students were better able to acquire social support from SMNs.

The literature reviews mentioned above either examine a specific SMN or explore SMNs in a specific educational level or learning domain. None of the previous review studies provide a big picture about the trends on previous SMNs research. Therefore, the present study was designed to fill this gap in the literature by providing a comprehensive and more precise overview of the different trends found in SMNs studies, examine the influence of SMNs on learning performance, and explore students' perceptions regarding the use of SMNs for learning during the decade that preceded the influence of the COVID-19 pandemic that has since affected most education systems in the world. This review includes studies that investigated a specific SMN or SMNs on a variety of education levels and learning domains. Thus, the first purpose of the current review is to provide a synthesis of demographic, methodological, and theoretical trends in previous SMNs studies. The second objective is to explore the impact of SMNs on student learning performance and students' perceptions toward the use of SMNs for learning, as revealed in the literature. Six research questions, classified into three categories (i.e., demographic trends, methodological and theoretical trends, and performance and perceptions), guided this review:

- Demographic trends:
    1. What is the educational level, type of participants, learning domain, country context, and type of SMNs in studies involving SMNs?
    2. How has the number of SMN studies changed over the past decade?
- Methodological and theoretical trends:
    3. What research methods, study purpose, data collection methods, and analysis techniques are used in SMN studies?
    4. What theories are used to frame studies involving SMNs?
- Students' performance and perceptions:
    5. What is the influence of SMNs on student learning performance?
    6. What are the students' perceptions toward using SMNs for learning?

METHOD

The current study is a systemic literature review about SMNs to provide a comprehensive picture of the different trends in SMNs studies and examine the influence of SMNs on learning performance. This review was conducted based on PRISMA principles (Page et al., 2021). PRISMA consists of a four-phase flow diagram, as shown in **Figure 1**. These phases map out the number of articles identified, included, and excluded.
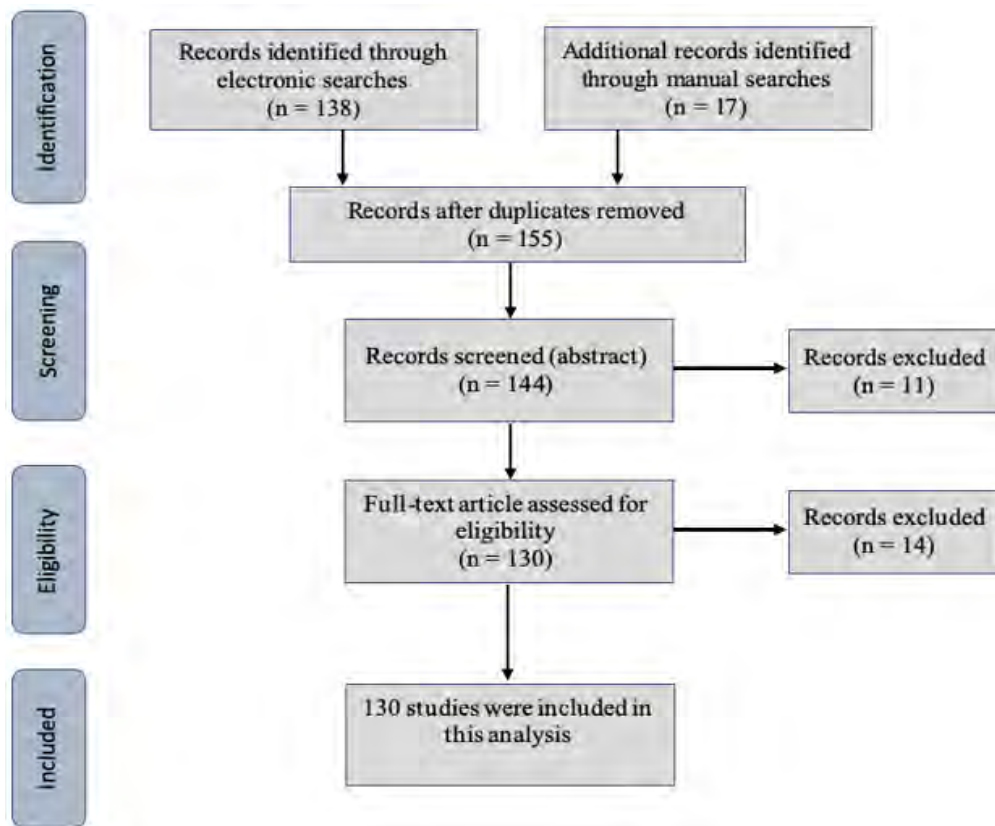
Figure 1. Flowchart describing the data collection process

Table 1. Journals included in this literature review

Academic journal	Impact factor ISI (2017)	H5-index Google Scholar (2013-2017)
The Internet and Higher Education	5.847	45
Computers & Education	4.538	91
International Journal of Computer-Supported Collaborative Learning	3.273	25
Learning media and technology	3.175	30
British Journal of Educational Technology	2.72	56

Data Collection

The researcher reviewed articles that were published in five major journals in the field of educational technology research. The 2017 *Journal Citation Report* by the Institute for Scientific Information (ISI) for education and educational research was used to identify the top five technology-oriented journals in the educational technology field. Out of the 265 ISI journals, the following ones were identified and used in the current investigation: *The Internet and Higher Education, Computers & Education, International Journal of Computer-Supported Collaborative Learning, Learning Media and Technology,* and *British Journal of Educational Technology.* **Table 1** presents these journals along with the impact factors in 2017.

The focus of the review was to gather full-text articles presenting empirical studies on SMNs in educational settings. Guided by the research questions, the following inclusion and exclusion criteria were applied:

1. The article must be published between January 2011 and December 2020. The period 2011-2020 was chosen because several review studies have been conducted in the previous periods (Alias et al., 2013; Tang & Hew, 2017; Tess, 2013).

2. The article must investigate either SMNs in general or a specific SMN, such as Facebook, Twitter, WhatsApp, Instagram, Wikis, or Blogs, among others.

3. Research studies that present literature reviews were excluded.

4. The article must be developed within an educational context.

Manuscript selection

Both electronic and manual searches (i.e., browsing the title for each article in these journals) were conducted. Articles were searched by using the following terms for the title, abstract and keywords sections: ("social media networks" OR "social media software" OR "social media" OR "social networking" OR "social media applications" OR "social media sites" OR "Facebook" OR "Twitter" OR "Blogs" OR "WhatsApp" OR "Instagram" OR "Instant Messaging" OR "Snapchat" OR "YouTube" OR "Wiki"). These terms were chosen based on an initial search to identify the relevant terms.

This method of search resulted in 138 articles. Moreover, the researcher conducted a secondary search, examining the title for each article in these journals to collect studies that investigated a specific SMN not gathered by the automatic search (i.e., because the automatic search included only the terms for most popular SMNs). This screening review resulted in 17 additional articles.

An initial screening of the abstracts was conducted to determine eligibility, based on inclusion and exclusion criteria. Eleven articles were eliminated as they were not relevant to the scope of the current review (i.e., all were review studies). Later, a full-text assessment was conducted on each article to determine its eligibility. Fourteen articles were excluded as not being within the focused educational context. This analysis resulted in 130 articles that were deemed relevant for this new review study. Those detailed study selection processes are presented in the PRISMA diagram in **Figure 1**.

Data Analysis and Coding

The relevant information in each of the 130 articles was extracted. To address the research questions, articles were coded and divided based on the categories described in **Table 2** and **Table 3**. To confirm the reliability of the coding process, 30% of the manuscripts were coded by another researcher. A Cohen's kappa of .88 was achieved, which indicated an excellent agreement. SPSS version 27 and Microsoft Excel were used to organize and analyze the data in this study.

**Table 2.** Education level, participant type, and type of SMNs

Category	Code	Description
Education level	K-12	Elementary, middle, and high school
	Higher education	Community college, university, and graduate studies
Participants type	K-12 students	Elementary, middle, and high school students
	Higher education students	University and college students (Pre-service teachers are excluded)
	Pre-service teachers	College students who are prepared to be teachers
	K-12 teachers	K-12 teachers
	College instructors	College and university instructors
Type of SMN	SMN	Studied SMNs in general without specifying a particular network
	Specific SMN	Studied a specific network (one or two networks)

Table 3. Data analysis and study focus

Category	Code	Description
Descriptive statistics	Descriptive	Used descriptive statistics independent of other statistics
Inferential statistics	T-test	-
	Correlation	Pearson correlation coefficient
	ANOVA	Analysis of variance (including ANCOVA and MANCOVE)
	Regression	Including different type of multiple regression
	SEM	Structural equation modeling
	PLS	Partial least squares
	Non-parameter test	e.g., Chi-square, Kruskal-Wallis, Mann-Whitney, and Spearman Rank Correlation
Qualitative analysis	Content analysis	-
	Thematic analysis	-
	Other	Used other interpretive and descriptive qualitative analysis.
Study focus	Adoption	Studies that investigate the factors influencing the adoption of SMN
	Engagement	Studies that investigate influence on engagement
	Learning performance	Studies that investigate the learning outcomes
	Perceptions	Studies that investigate students' and teachers' perceptions
	Uses	Studies that explore the uses of SMNs
	Other	Other purposes that did not appear more than five times

Table 4. Articles about SMNs studies by the five journals (2011-2019)

Academic journal	Issues per year	Number of articles	Percent (%)
Computers & Education	12	64	49.2
The Internet and Higher Education	4	26	20.2
British Journal of Educational Technology	6	19	14.6
Learning Media and Technology	4	18	13.8
International Journal of Computer-Supported Collaborative Learning	4	3	2.3
Total	30	130	100
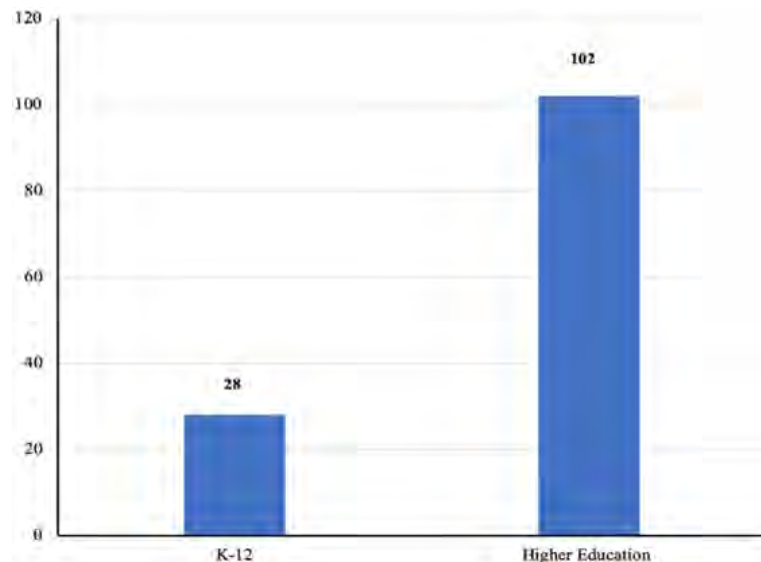
Figure 2. SMNs studies divided by education level

RESULTS AND DISCUSSION

Data Description

The present systemic literature review included 130 studies, which were published in five journals as described above. **Table 4** illustrates the distribution of these studies. Most articles were published in *Computers & Education* (n=64; 49.2%), which is the only monthly journal among these five journals. This was followed by *The Internet and Higher Education*, which published 26 studies (20.2%). Understanding the trends in this growing body of research can help to identify gaps in the existing body of knowledge. What follows is a detailed analysis of the outcomes of this review, organized into three main sections that correspond to the research questions that guided this study.

Demographic Trends

The following sections addressed Research Question 1 (What is the educational level, type of participants, learning domain, country context, and type of SMNs in studies involving SMNs?) and Research Question 2 (How has the number of SMN studies changed over the past decade?).

As presented in **Figure 2**, the majority of SMNs studies, 78% (n=102), were conducted in institutions of higher education. Twenty-one percent of the studies (n=28) were conducted in K-12 schools. Exploring the participant type in SMNs studies was one of the goals of this study. Participants in SMN studies were categorized into five types (**Table 2**). As presented in **Figure 3**, slightly more than half of SMNs studies were conducted with higher education students (n=77; 59%). K-12 students were the participants in 12% (n=16) of SMNs studies, followed by pre-service teachers 10% (n=13), K-12 teachers 9% (n=12), and college instructors 9% (n=12).
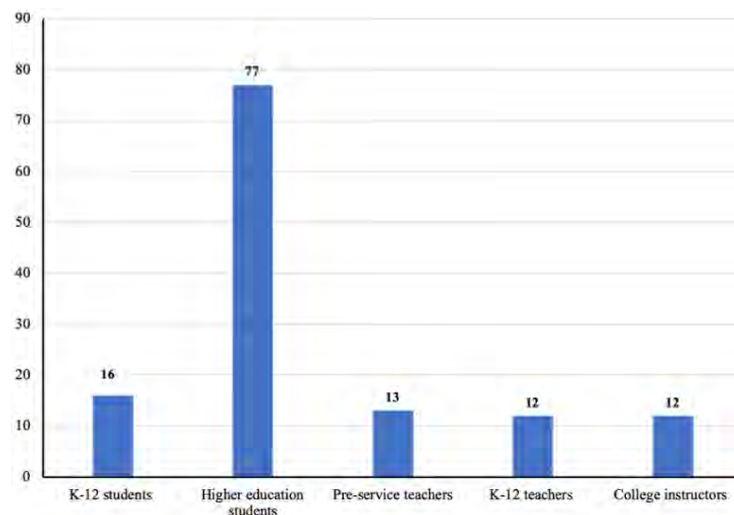
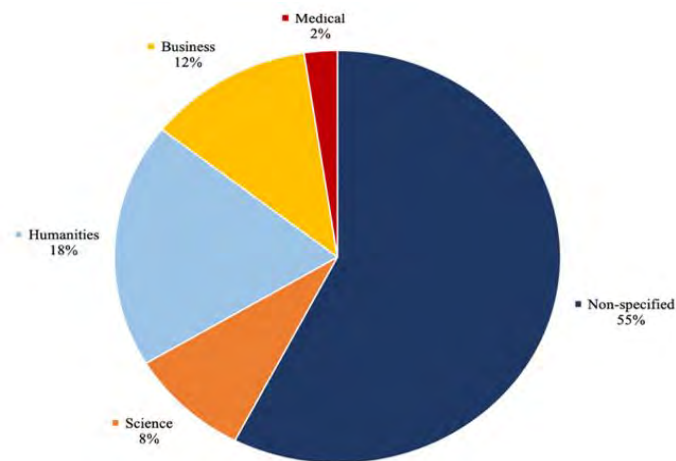**Figure 3.** SMNs studies divided by participant type

Figure 4. Classifications of articles by learning domain

Among the 130 SMNs studies, only 21% were conducted at the K-12 level. This small number can be attributed to the fact that *The Internet and Higher Education*, one of the selected journals in this study, publishes only studies that were conducted in higher education contexts. However, the number of higher education studies published in the other four journals was almost double of K-12 studies.

Learning domain was also analyzed in this review. These domains were extracted from the articles as either the subject that the study targeted or the academic major of the participants in the study. Most of the SMNs studies (55%) did not target a specific domain; they either collected the data from multiple learning domains or did not mention a particular domain. For example, some of these studies focused on either high school students, freshman students, or high school teachers without attention to their specific domains or majors. In addition, as illustrated in **Figure 4**, some of the SMNs studies were conducted on some specific learning domains: humanities (n=24; 18%), business (n=15; 12%), and science (n=11; 8%).

The location of data collection and where the studies took place were also analyzed. Only three of these studies did not provide information about the country or the location of the data collection. Therefore, the affiliations of the authors were used to determine the location of these studies. As presented in **Figure 5**, the sample of this review included participants from over 27 countries. It was found that 22% percent of these studies were conducted in the USA (n=28), 9% in the UK (n=12), 9% in China (n=11), and 8% in Taiwan (n=9). It should be noted that three of these studies took place in multiple countries and were therefore counted more than once in the data. These studies are Lantz-Andersson et al. (2013), Prestridge (2019), and Whelan et al. (2020).
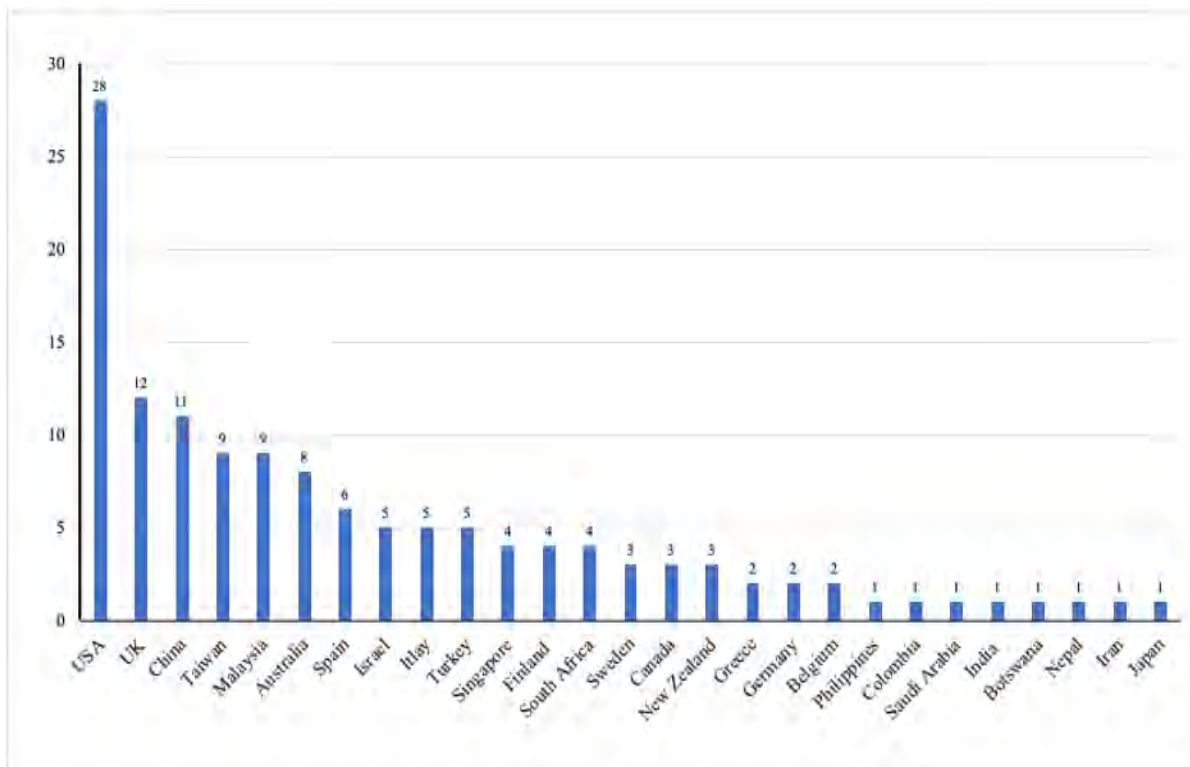
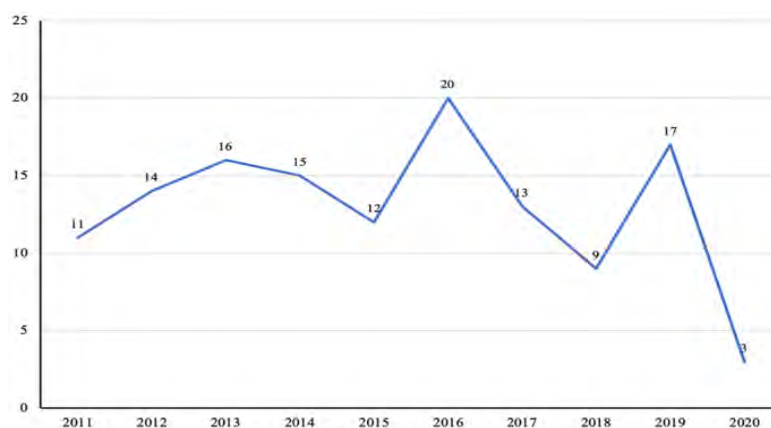**Figure 5.** Geographical distribution of SMN studies

Figure 6. Number of SMN studies divided by year

Figure 6 shows the number of articles about SMNs published in the selected journals. Eleven articles were published in 2011 and other 14 articles in 2012. Noticeably, studies of SMNs have increased since 2011, to reach 20 articles in 2016. This increase can be attributed to that fact that, in 2016, the journal *Learning Media and Technology* had a special issue devoted to SMNs, entitled "Social media and education: Now the dust has settled." In this issue they published seven studies, all of which were included in this analysis. However, in 2017 and 2018 the number of studies involving SMNs declined to 9 studies, which was the lowest number in the past decade. Then, the number raised again in 2019 to 17 articles.

Several different types of SMNs have been investigated in previous research. Summarizing the type of SMNs that have been involved in the 130 studies involved two categories. As presented in **Figure 7**, a total of 97 (75%) of the studies investigated a specific SMN, and 33 (25%) of the studies investigated SMNs in general without assessing a particular network. As shown in **Figure 8**, Facebook was the most frequent SMN examined in the 97 studies (n=45; 46.4%), followed by wikis (n=11; 11.3%), blogs (n=8; 8.2%), instant messaging (n=8; 8.2%), and Twitter (n=6; 6%). Nineteen of the 97 studies (19.6%) considered different types of uncommon SMNs (e.g., ScienceKits and Samex). This is consistent with the report by Hootsuite (2020), which stated that
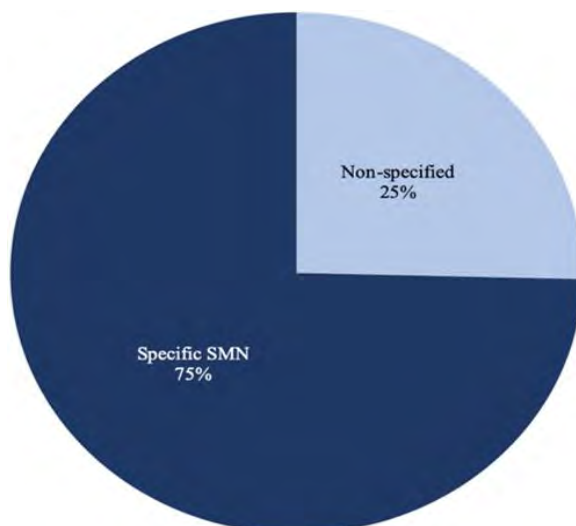
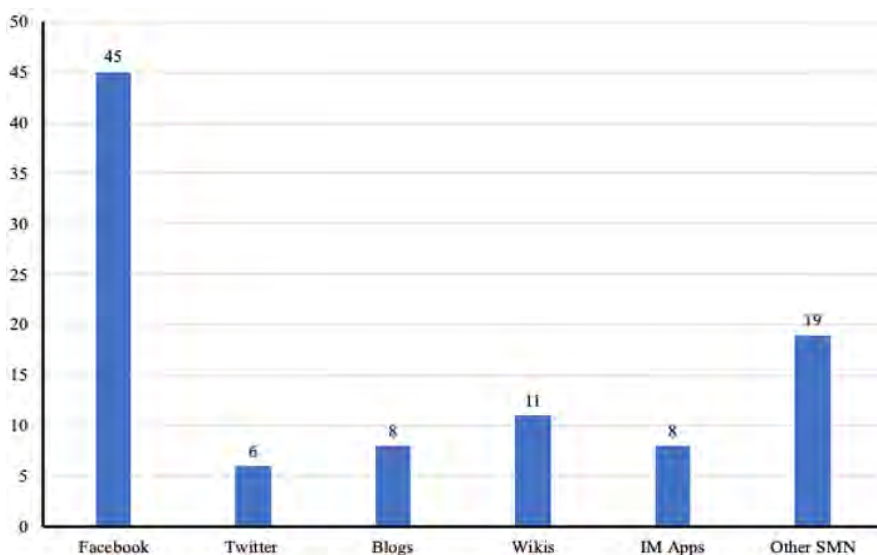**Figure 7.** Studies divided by type of SMN

Figure 8. SMNs used in the reviewed studies

Facebook has the largest number of active users among social platforms worldwide. Even though this research focus can be justified by the popularity of Facebook, more attention should be given to other types of SMNs, such as Twitter, WhatsApp and Snapchat, for the following reasons. First, the world of SMNs is changing very rapidly. Second, there are a variety of popular SMNs that are being used by students and teachers as the result of this study shows. Finally, even though Facebook has the largest number of active users worldwide, it is not the most common SMN used in many of European and Asian countries (Hootsuite, 2020).

Methodological and Theoretical Trends

The following sections addressed Research Question 3 (What research methods, study purpose, data collection methods, and analysis techniques are used in SMN studies?) and Research Question 4 (What theories are used to frame studies involving SMNs?). Research methods were divided into three types: qualitative, quantitative, and mixed method. As shown in **Figure 9**, most of the studies adopted quantitative methods (59%), followed by qualitative methods (26%). Mixed methods was the least frequently used approach (16%). Among the studies using a quantitative approach, 23% employed a quasi-experimental design, and 31% of the studies that used a qualitative approach used a case study design.
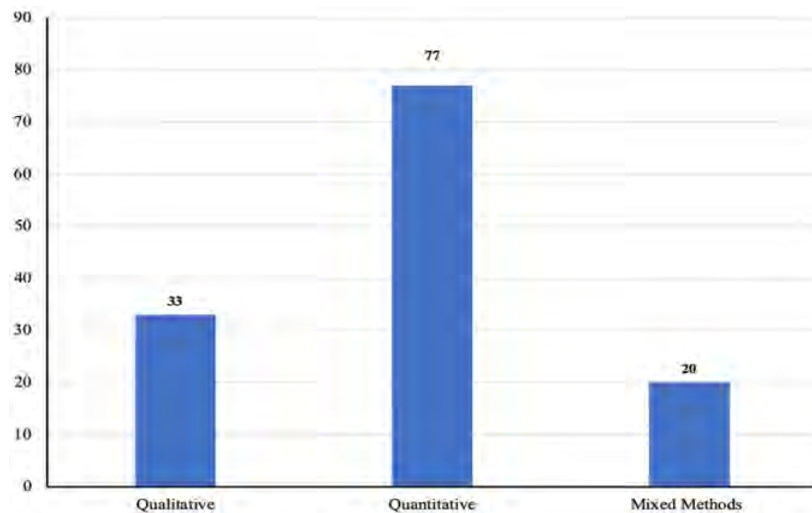
Figure 9. Research methods employed in SMN studies

Table 5. Research purposes distributed by educational level

Research purpose	K-12		Higher education		Total	
	Student	Teacher	Student	Teacher	n	%
Performance	4	0	24	0	28	25.92
Uses	3	5	16	2	26	24.07
Perceptions	2	0	12	6	20	18.51
Adoption	2	2	12	4	20	18.51
Engagement	2	0	12	0	14	12.96
Total	13	7	76	9	108	100

After extracting the purpose of each article, the articles were categorized into six categories based on their focus (i.e., learning performance, uses, engagement, perceptions, adoption and other). Those purposes that did not appear more than five times were coded as "other". For those articles that involved more than one purpose (i.e., explore students' perceptions and uses), each purpose was counted. Learning performance was the most frequent purpose in the reviewed articles; twenty-eight articles (26%) were coded in that category (**Table 5**). These articles investigated the influence of SMN on student learning performance. As shown in **Table 5**, most of these studies were conducted on undergraduate students (n=18; 82%). For example, Guler (2015) conducted a quasi-experimental study to investigate the impact of Facebook on learning performance for 75 fourth-year graphic design students in Turkey. The use of Facebook with the treatment group, the group who was taught with Facebook, had a positive influence on learning performance. Only a few studies concerning learning performance have been conducted with K-12 students (n=4; 18%). Li et al. (2014) studied the influence of wikis on writing ability and writing attitudes among 109 elementary school students in China. More details about the influence of SMN on learning performance will be discussed in the answer for Research Question 5.

Uses was the second most common purpose of the reviewed articles (n=26; 24%). These articles explored the uses of SMNs by students and teachers. For example, Thompson et al. (2014) interviewed 20 undergraduate students to explore their collective and individual learning experiences using SMNs.

Twenty (19%) of the reviewed articles focused on the perceptions of both teachers and students toward the use of SMN (**Table 5**). Most of these studies (n=12; 60%) investigated the perceptions of undergraduate students. Only six studies investigated the perceptions of college instructors and two studies investigated the perceptions of K-12 students. Interestingly, none of these articles studied the perceptions of K-12 teachers (**Table 5**). More details about the students' perceptions will be discussed in answer for Research Question 6.

Studying the adoption of SMN was another common purpose for the reviewed articles (n=20; 19%). Most of these articles investigated factors that influence the adoption of SMN by undergraduate students (n=10; 63%). For example, Balakrishnan et al. (2015) used the Technology Acceptance Model (TAM) to explore the factors influencing the use of a SMN called Edooware by undergraduate students in Malaysia. Moreover, 14
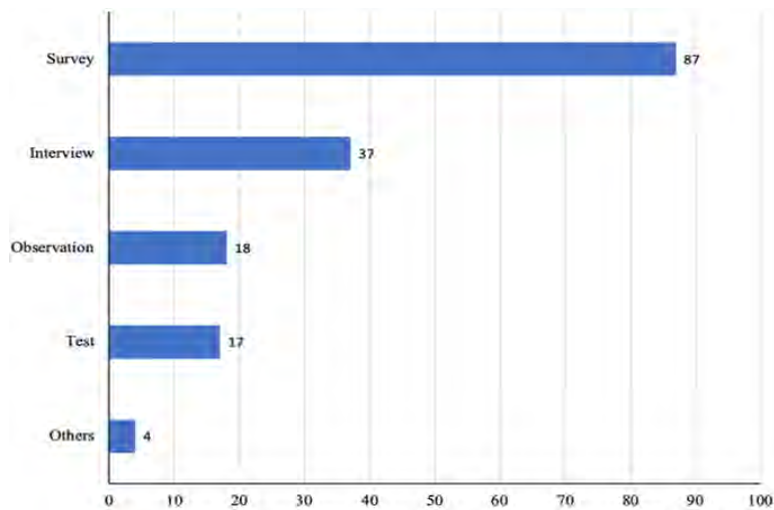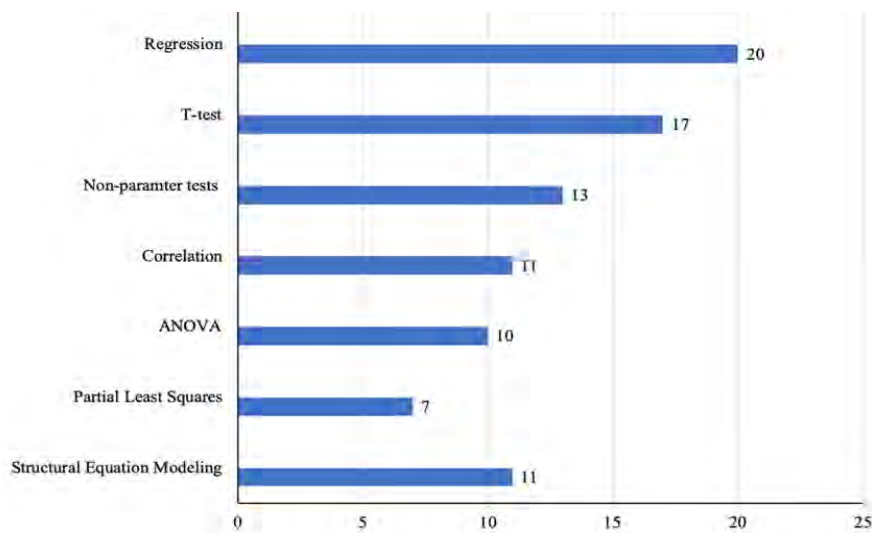
Figure 10. Data collection methods

Figure 11. Inferential statistics used in SMN studies

articles (11%) focused on the influence of SMN on students' engagement. Twelve of these articles involved undergraduate students.

The number of data collection tools and the type of the tool that was used in the SMN studies were also analyzed. The majority of the reviewed articles used only one data collection tool (n=94; 72%), whereas 28% of the studies used two or more data collection tools (n=36). In addition, among these data collection tools, surveys were used most frequently (n=87; 67%), followed by interviews (n=37; 29%), and observations (n=18; 15%; **Figure 10**).

As presented earlier in **Table 3**, the data analysis techniques that were used in SMN studies were categorized into three types: descriptive statistics, inferential statistics, and qualitative analysis. Most of the reviewed articles used inferential statistics (n=96; 73.8%). Furthermore, multiple regression was the most frequently used techniques in the studies that applied inferential statistics (n=20; 20%), followed by a t-test (n=17; 17%), non-parametric tests (n=13; 14%), correlation (n=11; 12%), and ANOVA (n=10; 11%; **Figure 11**). The second most common approach was qualitative analysis, which was found in fifty-eight of the articles (44.6%). Thematic analysis was the most common technique in those studies that used qualitative analysis (n=18; 31%), followed by content analysis (n=8; 13%). Descriptive analysis was the least common approach; 13% of the studies analyzed (n=14) reported only descriptive analysis.

The analysis of methodological trends demonstrated that there was a strong preference for quantitative methods in SMNs studies published in the past decade. Moreover, the survey was preferred over other data
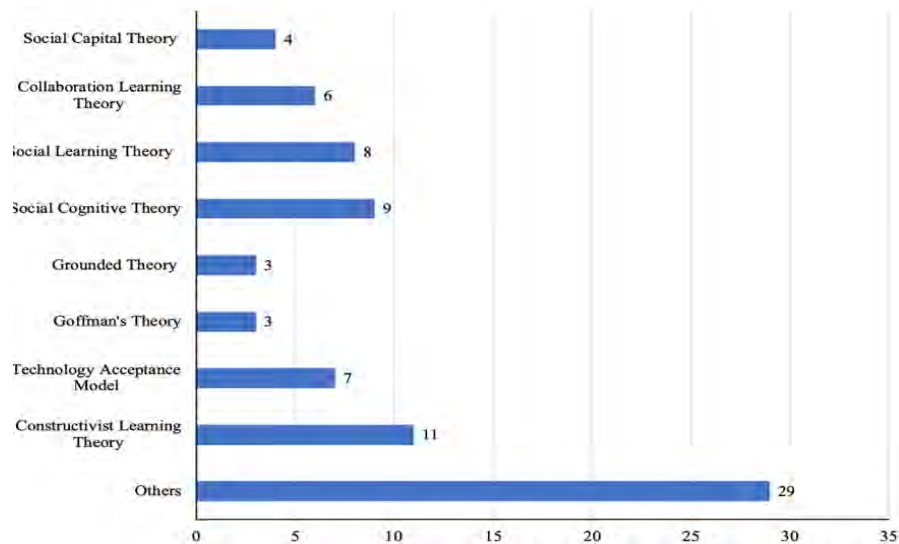
Figure 12. Theories used in SMN studies

collection tools. The dominance by quantitative methods and surveys may result in limiting the development of this technology in education.

The aim of the fourth research question was to highlight the most frequent theories and theoretical frameworks that have been used to shape these studies that were published in the selected journals. Approximately, sixty-two percent (n=80) of the reviewed articles used a theory or theoretical framework for their research. However, thirty-eight percent (n=50) of the reviewed articles did not mention any information about the theoretical framework that was used. Most of these articles were building on prior studies. Constructivist Learning Theory was the most frequent used theory (n=11; 14%), employed to understand students' and teachers' perceptions, engagement and other purposes. Mohamad et al. (2013), for example, used the Constructivist Learning Theory to identify student's perceptions regarding the use of blogging.

Social Cognitive Theory was the second most commonly used theory in the reviewed articles (n=9; 11%;). Most of these articles used the Social Cognitive Theory to explore the uses and influence of SMNs on student learning performance. Eid and Al-Jabri (2016) used Social Cognitive Theory to examine the various categories of SMN uses and to investigate the impact of these categories on learning performance. Most of the adoption studies of SMNs used the framework of TAM (n=7; 9%) to identify the factors that influence the use of SMNs by both teachers and students. **Figure 12** presents the most commonly used theories found in the reviewed articles.

Students' Performance and Perceptions

The following sections addressed Research Question 5 (What is the influence of SMNs on student learning performance?) and Research Question 6 (What are the students' perceptions toward using SMNs for learning?).

As mentioned above, 28 articles among the reviewed articles investigated the impact of SMNs on learning performance. These studies were conducted in 15 different countries, and Facebook was the most common SMN investigated in them (n=11; **Table 6**). Four of these studies (18%) were conducted with K-12 students, and the rest (n=24; 86%;) were conducted with undergraduate students. Most of the reviewed studies on the influence of SMNs upon academic performance used undergraduate students as participants while very few of them examined this relationship among K-12 students.

Table 6. Impact of SMNs on student learning performance

No	Study	Country	Participants	N	Research design*	SMN	SMN used for	Learning domain	Impact on learning
1	Junco and Cotten (2011)	USA	UG	4,491	QN	IM App	General	Multiple	Negative
2	Papastergiou et al. (2011)	Greece	UG	70	QN	Blog	Academic	Physical Education	Neutral
3	Chu et al. (2012)	China	UG	81	MX	Blog	Academic	Multiple	Positive
4	Junco et al. (2012)	USA	UG	260	QNQ	Twitter	Academic	Multiple	Positive
5	Li et al. (2014)	China	K-12	109	QNQ	Wiki	Academic	Language	Neutral
6	De-Marcos et al. (2014)	Spain	UG	371	QNQ	SMN	Academic	Information Technology	Positive
7	Bowman and Akcaoglu, (2014)	USA	UG	321	QN	Facebook	Academic	Multiple	Positive
8	Yang et al. (2014)	UK	K-12	7	QU	Ning Site	Academic	Language	Positive
9	Wohn and LaRose (2014)	USA	UG	380	QN	Facebook	General	Multiple	Negative
10	Ainin et al. (2015)	Malaysia	UG	1,161	QN	Facebook	General	Multiple	Positive
11	Boticki et al. (2015)	Singapore	K-12	305	QN	SamEx	Academic	Multiple	Positive
12	Guler (2015)	Turkey	UG	75	QNQ	Facebook	Academic	Graphic design	Positive
13	Cheng and Jiang (2015)	China	UG	456	QNQ	IM App	Academic	Art and design	Negative
14	Magogwe et al. (2015)	Botswana	UG	49	MX	Facebook	Academic	Communication	Positive
15	So (2016)	China	UG	61	QNQ	WhatsApp	Academic	Computer	Positive
16	De-Marcos et al. (2016)	Spain	UG	379	QNQ	SMN	Academic	Computer Science	Positive
17	Orús et al. (2016)	Spain	UG	125	QN	YouTube	Academic	Marketing	Positive
18	Eid and Al-Jabri (2016)	Saudi Arabia	UG	308	QN	SMN	General	Multiple	Positive
19	Chu et al. (2017)	China	K-12	219	MX	Wiki	Academic	Multiple	Positive
20	Al-Rahmi et al. (2018)	Malaysia	UG	723	QN	SMN	Academic	Multiple	Positive
21	Saini and Abraham (2019)	India	UG	68	QNQ	Facebook	Academic	Teacher training	Positive
22	Hong and Gardner (2019)	New Zealand	UG	258	QN	Facebook	Academic	Multiple	Positive
23	Awidi et al. (2019)	Australia	UG	60	QN	Facebook	Academic	Architecture	Positive
24	Feng et al. (2019)	China	UG	92	QN	Facebook	General	Multiple	Negative
25	Chang et al. (2019)	Turkey	UG	489	QN	SMN	Academic	Multiple	Positive
26	Busalim et al. (2019)	Malaysia	UG	240	QN	Facebook	General	Multiple	Negative
27	Whelan et al. (2020)	Ireland, USA, and Finland	UG	182	QN	SMN	General	Business	Negative
28	Wakefield and Frawley (2020)	Australia	UG	505	QN	Facebook	General	Accounting	Negative

QN: Quantitative; QU: Qualitative; MX: Mixed; QNQ: QN-Quasi; UG: Undergraduate

As presented on **Figure 13**, the majority (64%) of the 28 articles reported positive influence on learning performance, including three studies that were conducted with K-12 students.

Correspondingly, So (2016) used a quasi-experimental design to explore the influence of using WhatsApp to support learning. A total of 61 undergraduate students in Hong Kong participated in the study. WhatsApp was used with the treatment group to share multimedia materials and for teacher-student interaction. The results showed that the participants in the experimental group performed better than those in the control group.

Out of the 28 studies, seven studies (25%) reported a negative impact of SMNs on learning performance (**Figure 13**). Four of these studies used perceived academic performance (Busalim et al., 2019; Junco & Cotton, 2011; Whelan et al., 2020; Wohn & LaRose, 2014), and three studies used the actual academic performance (Cheng & Jiang, 2015; Feng et al., 2019; Wakefield & Frawley, 2020). Wohn and LaRose (2014) surveyed 380
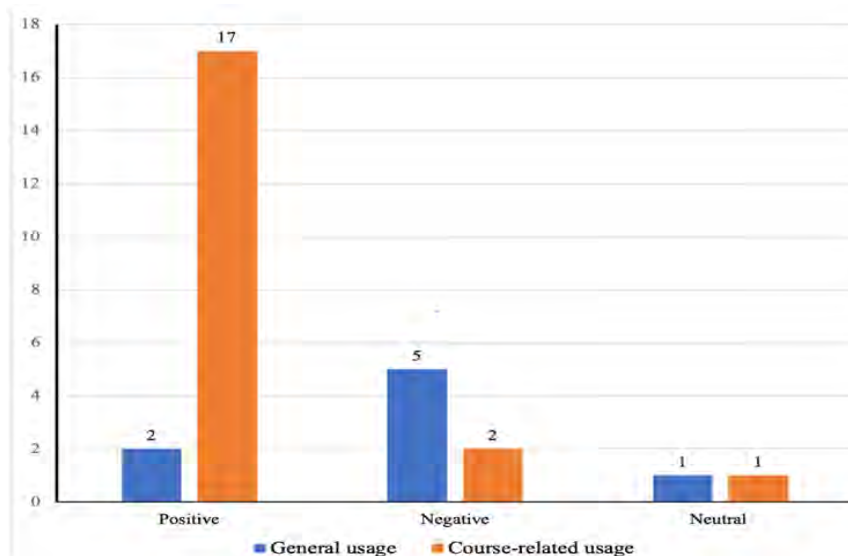
Figure 13. SMNs' influence on learning performance

students from a large USA university to understand the influence of Facebook use and college adjustment among first-year students. They found that compulsive use of Facebook was not associated with perceived academic performance. However, the time spent on Facebook was negatively associated with perceived academic performance. Cheng and Jiang's (2015) article was the only study that reported a negative influence of SMN on the actual academic performance. They conducted a quasi-experimental study to examine the influence of IM-based online discourse on student learning performance. The study involved 456 students from the Art and Design College, Hubei University of Technology, in China. They concluded that students in the experimental group who used Instant messaging (hereinafter IM) for discourse scored lower on learning performance than those who used the traditional face-to-face discourse.

Out of the 28 studies, only two studies (8%) reported no impact of SMNs on learning performance (Li et al., 2014; Papastergiou et al., 2011). However, these two studies did report a positive influence of using blogging on student's self-efficacy and a positive influence of using wikis on students' writing attitudes.

To dig deeper into the influence of SMNs on learning performance, further analysis was conducted. The 28 articles were divided into two categories. One consisted of the articles that examined the impact of the general usage (non-course related) of SMNs on students' learning performance. The second category was made up of the articles that examined the influence of course-related usage of SMNs on students' learning performance. Nine articles examined the influence of general usage of SMNs on learning performance. Five of these articles reported a negative impact on students' learning performance (Busalim et al., 2019; Feng et al., 2019; Junco & Cotten, 2011; Whelan et al., 2020; Wohn & LaRose, 2014). In addition, Wakefield and Frawley (2020) examined to what extent the general use of Facebook impacts students, taking into account their general academic achievement. They found that only low achieving students who were negatively impacted by using Facebook.

On their part, Ainin et al. (2015) and Eid and Al-Jabri (2016) reported a positive impact of general usage of SMN on learning performance. In the same line, Ainin et al. (2015) found positive correlation between students who use Facebook and learning performance.

Out of the 28 studies, 19 articles (68%) examined the influence of course-related usage of SMN on students' learning performance. As shown on **Table 6**, most of these articles (n=16; 84.2%) reported a positive influence on learning performance. Out of the eight studies that targeted the influence of Facebook, seven studies (87.5%) reported a positive influence on learning performance. Two studies reported no influence, and one study reported negative influence on learning performance. It seems that when SMNs were utilized for academic purposes, it might help the students to improve their learning. Interestingly, the two studies that examined the influence of the Instant messaging IM app reported a negative impact on learning performance.

Table 7. Studies of students' perceptions toward SMNs for learning

No	Study	Country	Participants	N	Research design*	SMN	Learning domain	Perception
1	Prescott et al. (2013)	UK	UG	595	QN	Facebook	Health	Negative
2	Bowman and Akcaoglu (2014)	USA	UG	321	QN	Facebook	Multiple	Positive
3	Hamid et al. (2015)	Australia/ Malaysia	UG	46	QU	SMN	Multiple	Positive
4	Smith (2016)	Greece	UG	679	MX	SMN	Multiple	Neutral
5	So (2016)	China	UG	61	QNQ	WhatsApp	Computer	Positive
6	Lim and Richardson (2016)	USA	UG	82	QN	SMN	Education	Positive
7	Westerman et al. (2016)	USA	UG	545	QNQ	SMN	Multiple	Positive
8	Lackovic et al. (2017)	UK	UG	43	MX	Twitter	Physiotherapy	Positive
9	Chu et al., (2017)	Hong Kong	UG	71	MX	Wiki	Multiple	Positive
10	Rap and Blonder (2017)	Israel	K-12	707	QN	Facebook	Chemistry	Positive
11	Chu et al. (2017)	China	K-12	219	MX	Wiki	Multiple	Positive
12	Liu et al. (2017)	Spain	UG	371	QNQ	SMN	Information Technology	Positive
13	Moorthy et al., (2019)	Malaysia	UG	298	QN	Facebook	Multiple	Negative
14	Hong and Gardner (2019)	New Zealand	UG	258	QN	Facebook	Multiple	Positive

QN: Quantitative; QU: Qualitative; MX: Mixed; QNQ: QN-Quasi; UG: Undergraduate

Research Question 6 address students' perceptions toward the use of SMNs for learning. As mentioned in **Table 7**, 14 articles (10.8%) among the reviewed articles investigated students' perceptions. Twelve of these studies (85.7%) were conducted with undergraduate students, and two studies (14.3%) were conducted with K-12 students. Eleven studies (78.6%) reported that students hold positive perceptions toward the use of SMNs for learning, two studies (14.3%) reported negative perceptions, and one study (7%) reported neutral perceptions. These findings suggest that students recognize and value the learning benefits of SMNs. SMNs increased collaboration activities among students anytime and anywhere and enhance students and teachers' interactions (Chu et al., 2017).

Hamid et al. (2015) stated that:

> "students appeared to enjoy OSN use, resulting in the creation of a more interactive and appealing learning environment — hence, increasing their learning motivation. The benefits that students described can be mapped to three forms of interaction that OSN fosters: 1) student–student interactions, 2) student–teacher interactions, and 3) student–content interactions" (p. 7)

The findings propose a positive expectation that students may be ready to adopt SMNs for learning purposes.

In the studies that reported negative and neutral perceptions, results show that students have some concerns accepting SMNs as a tool for learning. These concerns include: lack of credibility, privacy, time-consuming, complexity of some SMNs etc. Smith (2016) found that students hold neutral perceptions about the use SMNs for learning based on these several assumptions about the reality of SMNs (i.e., lack of credibility, privacy, time-consuming etc.). They perceive SMNs as a double-edged sword that can do both support and obstruct learning. These concerns about privacy and credibility was also reported as concerns for some students who hold positive perceptions in other studies (e.g., Hamid et al., 2015). Moreover, Prescott et al. (2013) stated that students are cautious about using Facebook as a tool for formal learning. They perceive Facebook as a tool for social communication and not for formal learning, and they feel uncomfortable to interact with teachers on SMNs. In contrast, the student-teacher interactions on SMNs is perceived by other students as a key benefit of using SMNs for learning (Hamid et al., 2015; Lim & Richardson, 2016). This can be attributed to cultural differences.

Chu et al. (2017) investigated students' perceptions and the factors that influence their perceptions toward the use of SMNs for leaning. They found that students hold positive perceptions toward the use of wikis for

learning. The gender of the participants was not a significant factor influencing their perceptions. The disciplinary difference was found as a key factor in affecting students' perceptions with wikis in learning. Moreover, Lim and Richardson (2016) found that students were positive toward using SMNs for educational purposes but those who have more experience with using SMNs, the intensity of using SMNs, have a more positive attitude using SMNs for learning. These results show that major and experiences with using SMNs are likely to be important factors in shaping students' perceptions of using SMNs for learning.

CONCLUSIONS

The purpose of the current review was to provide a synthesis review of previous SMNs' studies, elaborate on the influence of SMNs on learning performance, and explore students' perceptions. The results of this review show that: (1) more than two thirds of the review studies were conducted in higher education institutes, (2) college students were the most common participants in these studies, (3) most of the reviewed studies assess the use of SMNs without giving attention to a specific learning domain, (4) scholars in the USA made the largest contribution country to the research published in these selected journals, (5) two thirds of this study sample assessed specific SMNs such as Facebook, (6) Constructivist Learning Theory and Social Cognitive Theory were the most frequently used theories in these articles, (7) uses, perceptions, performance and adoption were the most frequent purposes of the reviewed articles, (8) most of the learning performance focus articles reported a positive influence of SMNs whenever they were used for course-related purposes, and (9) students recognize and value the learning benefits of SMNs on the majority of the reviewed articles.

This literature review has several limitations. First, this study reviewed only articles published in selected journals in the field of educational technology. Therefore, generalizing the findings of this study to other publications in the field should be made with caution. Second, the reviewed articles in this study were from the limited period of time. Moreover, new trends in SMN studies might have emerged; therefore, the results of the trends analysis in this study represents only the trends observed during that period of time. Finally, the sample used in this study was limited to publications written in English.

Despite these limitations, this literature review offers a recommendation for future research to integrate SMNs into the learning and teaching process. Based on the research gaps that were identified in this study, there is a need for research on the integration of SMNs in the K-12 schools, focusing on both students and teachers. Remarkably, none of the reviewed articles explored the perceptions of K-12 teachers. Finally, a replication of this study with different journals and different time frames is recommended.

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