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Using Social Media for Learning in High Schools: A Systematic Literature Review

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Abstract: In the last decade, learning from computer-supported collaborative technologies has been combined with social media (SM) and this has gotten a lot of attention. Also, there is a growing body of literature that suggests that SM is gaining a lot of attention because it has the perceived pedagogical affordances that could be used as a potential tool for teaching and learning. These perceived pedagogical affordances allow people to interact, communicate, collaborate and share resources among others. Most of the studies published on SM in education have focused on higher education (colleges and universities) with a relatively small body of literature on secondary education. Despite the wide use of SM in education, its benefits are still not clear across studies. We conducted a systematic literature review using the EBSCOhost database. Screening of abstracts and full texts resulted in the selection of 10 papers for the review. Seven approaches to using SM in learning in high schools have been identified: (1) interaction, (2) information dissemination, (3) communication, (4) collaboration, (5) teaching, learning, and resource sharing, (6) socialization, and (7) entertainment. Most of the articles claimed that the educational use of SM has a strong positive effect on social skills, but the evidence presented was rather weak. Subject-specific outcomes were not in focus in using SM in education. All studies followed a constructivist philosophical perspective. Based on this we provide a theory-based scenario for using SM in learning social skills and subject-specific outcomes.

Keywords: *Social media, learning approach, systematic literature review, learning scenario.*

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Introduction

Learning from media has been of researchers' interest for a long time (see for reviews Clark, 1983; Kozma, 1991). The Web 2.0 technologies have opened a completely new set of possibilities to enhance computer-supported collaborative learning; for example, by using wikis (see Cress & Kimmerle, 2008) but also by using subject-specific online simulations (see e.g. de Jong et al., 2018) or blended learning environments (see e.g. Pedaste et al., 2013) or technologies that support reflection (see e.g. Kori et al., 2014; Leijen et al., 2014; Leijen et al., 2012).

However, in the last decade learning from media and wide use of computer-supported collaborative technologies have been combined in social media (SM) usage that has gotten a lot of attention. For example, recent data on Facebook (FB) recorded over 2.3 billion users and Twitter had over 321 million users (Statista, 2018). Duggan (2015) has reported that 72% of American adults use FB. This growth in SM use has come about as a result of its affordances which potentially allow people to interact, communicate, collaborate and share resources among others (Magogwe et al., 2015). Subsequently, there is a growing body of literature that suggests that SM has the perceived pedagogical affordances that could be used as a potential tool for teaching and learning (Judd et al., 2010; Rodriguez-Hoyos et al., 2015) besides socialization and entertainment (Ndaku, 2013). For example, a teacher using SM app like YouTube to select, edit and present a relatively short video during a Physics lesson on the Solar system. Then followed by comments, questions, tasks, and feedback. This makes the lesson more interactive and authentic, which could potentially motivate the students.

SM use in education is still of interest because in spite of its perceived pedagogical potentials, several stakeholders are still skeptical about its integration into teaching and learning (Collin & Street, 2014; Street, 2013). Though many researchers and stakeholders argue that SM is a potential learning tool (Manca & Ranieri, 2013; Rodriguez-Hoyos et al.,

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2015; Sarac, 2018), others see it as merely an entertainment and socializing platform (Ndaku, 2013). In contrast, according to Yeboah and Ewur (2014), SM has a distracting effect since it diverts students' attention from studies, leading to poor academic output (Kirschner & Karpinski, 2010). The possibility of SM addiction and other anti-social behaviors among the youth who spend a lot of time in SM environments like Facebook and YouTube (Tunc-Aksan, 2019) cannot be underestimated. These developments have resulted in the use of Web filters in some high schools especially in the U.S. to block SM sites which potentially contribute to some undesirable behaviors like cyberbullying, sexting, peer pressure, etc. among some students (Peterson et al., 2017). On the other hand, some related studies on SM for learning have identified the benefits of how teachers engage students through interactions and information dissemination in online and group discussions (Manca & Ranieri, 2013). This shows that there is no consensus among stakeholders and researchers on SM adoption into teaching and learning. Besides, most of the studies published on SM in education have focused on higher education (colleges and universities) with relatively small body of literature on secondary education. In terms of reviews, one can cite for instance, reviews on SM in education as a generic topic (Fox & Bird, 2017; Manca & Whitworth, 2018; Rodriguez-Hoyos et al., 2015; Stewart, 2015; Tess, 2013), reviews on educational affordances of FB (Aydin, 2012; Barrot, 2018; Chugh, 2018; Hew, 2011; Manca & Ranieri, 2013, 2016; Manca & Whitworth, 2018; Nui, 2017; Voivonta & Avraamidou, 2018; Yang et al., 2011) and reviews on Twitter as a potential pedagogical tool (Gao et al., 2012; Tang & Hew, 2017). However, these considerable amounts of published reviews also focused on colleges and universities. Furthermore, there is a vast difference between colleges and high schools in terms of context, curricula, teaching approaches and learning styles. Therefore, findings from such reviews cannot be conveniently implemented in high schools. So, it is important to review SM use in the high school level education. Essentially, reviews of previous studies of SM for learning in high schools will help to establish the current situation and to specify effective approaches of using SM in learning. Additionally, in theory, SM has many affordances, but it is rarely used in the practical work of teachers in learning and teaching activities. Hence, we hope this study will help to bridge this gap between theory and practice.

Theoretical Background

Social Media in Education

The term SM is relatively new as it deals with different online communication platforms. However, Robbins and Singer (2014), refer to SM as "any technology that facilitates the dissemination and sharing of information over the internet" and this includes FB, YouTube, Instagram, WhatsApp, LinkedIn, among several others. However, a number of empirical studies (e.g., Bleakley et al., 2014; Ndaku, 2013) show that most students in high schools frequently use SM to connect to friends in chat rooms, watch movies and music videos and play online games. A study by Eurostat (2017), showed that 83% of 16–24-year-old EU people used SM in 2016. In a similar study by Pew Research Centre, 71% of adolescents between 13 and 17 years of age use FB, followed by Instagram (52%), Snapchat (41%), Twitter (33%), Google+ (33%), Vine (24%), and Tumblr (14%) (Lenhart, 2015).

This level of acceptance of SM by the youth is due largely to the increasingly ubiquitous access, suitability, functionality, and ease of use of the technology (Al Alwan et al., 2017; Dwivedi et al., 2016). This has motivated many scholars to propose and outline its potential pedagogical advantages (Greenhow & Lewin, 2015; Halverson, 2011). Meanwhile, stakeholders and researchers have approached SM use in the classroom from different concepts and programs including the study of radiology and business in higher education (Magrino & Sorrell, 2014), to middle school literacy (see Ranker, 2008), and to learning English in high school (O'Byrne & Murrell, 2014).

In contrast, a study conducted by Yeboah and Ewur (2014) indicates that SM has a distracting effect such that it takes away students' time, leading to procrastination. A related study by Rithika and Selvaraj (2013) claims that students who spend more time on SM will have difficulties in drawing a parallel between their academic work and online engagements. However, these studies are only focusing on the distracting effect of SM, and a similar effect might be true for any other activity that takes learners' attention away from learning. The benefits of using SM in education according to specific approaches are not at all clear.

This is exemplified in the work undertaken by Manca and Ranieri (2013) who found SM to be an effective pedagogical resource because of its interactive and collaborative affordances, which are key to effective teaching and learning through collaboration, engagement, critical thinking, interaction, and information dissemination. FB has been cited in the literature often as a tool that allows people to connect, sharing of information, building of relationships, and interaction (Coklar, 2012; Makri & Schlegelmilch, 2017; Nadkarni & Hofmann, 2012); for collaboration and community building (Novak et al., 2012); for academic engagement of students (LaRue, 2012); and for informal learning (Cain & Policastri, 2011).

One more potential benefit of using SM is for distance students because they depend on SM to link with peers and faculty. It has been found in a study by Roblyer and colleagues (2010) that FB is effective in building links between students and faculties. Additionally, Twitter, just like FB, has also been used widely in educational institutions, but mainly in social communication, recruitment of students and marketing (Palmer, 2013). Twitter also has great potential as a tool for teaching and learning which goes beyond formal lessons (Ebner et al., 2010; Evans, 2014; Tur & Marin,

2015), and teachers using SM for self-regulated learning as in the case of continuous professional development (Aaen, 2015; Goodyear et al., 2014; Rutherford, 2013). Furthermore, SM is largely free on the internet or may require little investment, which eliminates a potential barrier of adoption (Brown, 2010).

Although several studies have indicated that these approaches are used for teaching and learning with SM, there is a lack of understanding of how it could be effective. So, studies on SM in learning at high school level have not identified how SM could be structured and guided to maximize benefits and minimize risks. Therefore, our literature review is needed to find out how SM could be effectively used as a pedagogical resource in the classroom.

Affordances of Social Media: A constructivist perspective

Learning as a social activity is conceptualized in the constructivist school of thought. Indeed, the most widespread learning model in use today stems from a socio-constructivist view of learning and teaching (Hall, 2007). The study therefore sees learning with SM through the lens of social constructivism. This is because humans are active learners, and in line with the social constructivist theory, human development is socially structured, and knowledge is created through interaction with others either by communication or collaboration or both (Schunk & Zimmerman, 2003). This supports Vygotsky's (1978) views on teaching. That teaching is more effective when it is interactive, student-centered, and models are used as teaching resources. Therefore, SM, on one hand, becomes the tool which potentially helps to transform teaching activities from previously teacher-centered concepts into a student-centered realistic, practical and more interactive approach. On the other hand, it provides the affordances that could facilitate activity-based learning thus encouraging more student's participation and engagement. In the perspectives of Vygotsky about teaching and using models to promote interactivity among learners, he used the term *scaffold* as a metaphor to describe that teacher, or an experienced peer who guides the learner to attain his/her optimum potential within a zone of proximal development (ZPD). A zone that Vygotsky developed to explain the developmental stages in any learning process. According to Vygotsky environment should serve as the point from where learning begins, where the student-centered learning approach and process should evolve within the ZPD. That said, metaphorically, SM could then become a scaffold that teachers could use to scaffold the learner to make meaning of the learning process.

Prior systematic reviews on SM use in education

The prior systematic reviews on SM use in education have been usually about the generic use of SM in education. However, the majority of previous research on educational potentials of SM has focused on colleges and universities with little attention to its use in secondary schools (Greenhow & Askari, 2017). Yet, a greater number of the world's school enrolment in terms of population is in the secondary schools but not colleges and universities (OECD, 2018). So, it is equally important for stakeholders and researchers to give a bit more attention to high schools since they constitute a potential human capital to the world. Hence, this review has a unique stance in context and focus which makes it very critical especially in expanding the debate on SM use in secondary schools. For instance, in a related study, Hew (2011) whose review was mainly on self-report data focused on three thematic areas: FB usage profile, the effect of using FB, and attitudes towards FB. Hew concluded that FB has little educational benefits and students mainly use it to keep in touch and while doing so, they tend to disclose more personal information which raises a lot of privacy concerns. Again, Hew realized that there was no empirical studies on high school students' use of FB since all studies focused on colleges and university students. A similar study by Gao and colleagues (2012) reviewed the phenomenon of microblogging in education (MIE) with Twitter. Twenty-one articles on MIE were used to address the concerns raised including (a) type of studies on MIE, (b) pedagogical use of microblogging, (c) pedagogical advantages of microblogging, and (d) implications for future research. Analysis from their work highlights microblogging potentials in education especially in collaborative learning, participatory learning, and reflective thinking among others.

In related reviews, Aydin (2012) and Manca and Ranieri (2013), focus on perceptions and experiences college students have with FB use. Aydin looked at FB as a learning environment with an emphasis on FB users and reasons for use, harmful effects, its effect on culture and language among others. In their review of the 23 selected articles, Manca and Ranieri mainly focused on FB as a learning environment. Their study identified five main pedagogical uses of FB including(a) supporting discussion and interaction, (b) developing multimedia content, (c) sharing of resources, (d) delivering content, and (e) supporting self-directed learning. They concluded that little was achieved in pedagogical affordances of FB and there are still many obstacles towards its adoption as a learning environment. Hence, they recommended that one must be cautious when using FB in terms of educational value. In their second review, Manca and Ranieri (2016) extended the study to focus on three areas of educational use of FB: formal, informal, and non-formal learning settings and how these are interrelated especially in influencing formal learning with FB. Regarding the context, most of the studies focused on higher education (66.7%) with a few studies on secondary education (8.8%) among others. Certainly, studies conducted by Manca and Ranieri (2013; 2016) provide a comprehensive theoretical outline for evaluation of SM use in education. Both reviews focused on empirical studies of FB as a learning environment and as well examined the scope of using three FB affordances such as in widening learning context, mixing information and learning, and hybridization of expertise.

Recently, Barrot (2018) conducted a review on FB as a learning environment for general language learning focusing specifically on using FB as a learning management system, use of specific FB features, writing, speaking, knowledge of language, among others. For example, teachers could hold online discussions with their students in a closed FB platform, submit assignment, receive feedback, etc. The live stream tool of FB is an affordance that teachers could use to stream lessons to students across different locations. Teachers could also post feedback and links of lessons in videos, texts, audios on Facebook for students to access.

In the 41 papers reviewed, most of the papers centered on exploring FB as a tool for teaching and learning of language (N=18), while the rest looked at students' perception of FB as a learning environment (N=13) and its efficacy for language teaching and learning (N=10). With regards to context, primary education (2.4%), secondary education (9.8%), and higher education (87.8%).

One more recent review was embarked by Paraskevopoulou-Kollia and colleagues (2018) on SM in higher education. Their review aimed at offering some clarity into SM influences in areas like (a) the learning processes, (b) the users' personality profile and learning style, (c) the social networks as online learning management system, and (d) their use in higher education. Conclusions provided show positive impacts in all the listed categories, which means that there is a potential future for SM use in higher education, but teachers have not yet taken full advantage of this opportunity.

Although there have been a lot of reviews on SM in education, most of these were centered on colleges and universities. Again, aside from language learning, none of these reviews specifically describe how teachers could use SM to teach specific subjects in class. This makes it important for a timely review of this kind on SM in high schools to establish the current state in terms of scope, and focus.

Methodology

Research Goal

Several studies have shown that SM tools can be used to enhance teaching and learning. The lack of guidance on students' use of SM either for entertainment or learning has resulted in the current situation where SM is much more used in other contexts than learning. Hence, the goal of this study is to review studies on SM as a pedagogical resource in teaching and learning at high school level and then to provide a discussion on scenarios for using SM in learning in the context of different subjects.

More specifically, two research questions were formulated:

(1) What are the approaches of using social media in learning at the secondary education level?

(2) What is the potential impact of different types of social media use in learning on learning outcomes at the secondary education level?

Systematic Literature Search

The search was conducted on May 2, 2018, using an EBSCOhost Web service to access several databases: ERIC, PsycINFO, Academic Search Complete, and Teacher Reference Centre. These databases contain the journals indexed in databases covering smaller amount of publications as Web of Science for example. The keywords used for the search were the following: *social media OR web 2.0 OR Facebook AND high school OR secondary school AND learning OR scaffolding*. The search was done, and full-texts related words were allowed. While this search resulted in a very large number of articles (3,809,930), we limited the results with the time frame of the last five years (2013–2017) to review the most recent studies, and with the age groups of adolescents (13–17-year-olds). This resulted in 203 articles (see Figure 1) that were assessed against inclusion and exclusion criteria based on their titles and abstracts. For the keywords for the search, we included FB because it is the most popular and widely used SM application (Statista, 2018).

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria for selecting the studies for our analysis were established preceding the systematic review to guarantee that articles retrieved were relevant and focused on our stated research questions.

The inclusion criteria considered if the study were (1) focusing on learning using SM; (2) introducing some approaches of using SM; (3) focused on an age group of high school students or their teachers, (4) published in English language, (5) published in an academic journal, and (6) presenting information about the impact of SM use in learning. Several studies were excluded from the analysis for not being primarily learning-oriented. The often-presented topics were the following: 1) health and behavioral development, 2) educational psychology, 3) developmental psychology, 4) social processes and issues, 5) behavior disorders and antisocial behaviors, and 6) health and mental health prevention and treatment.

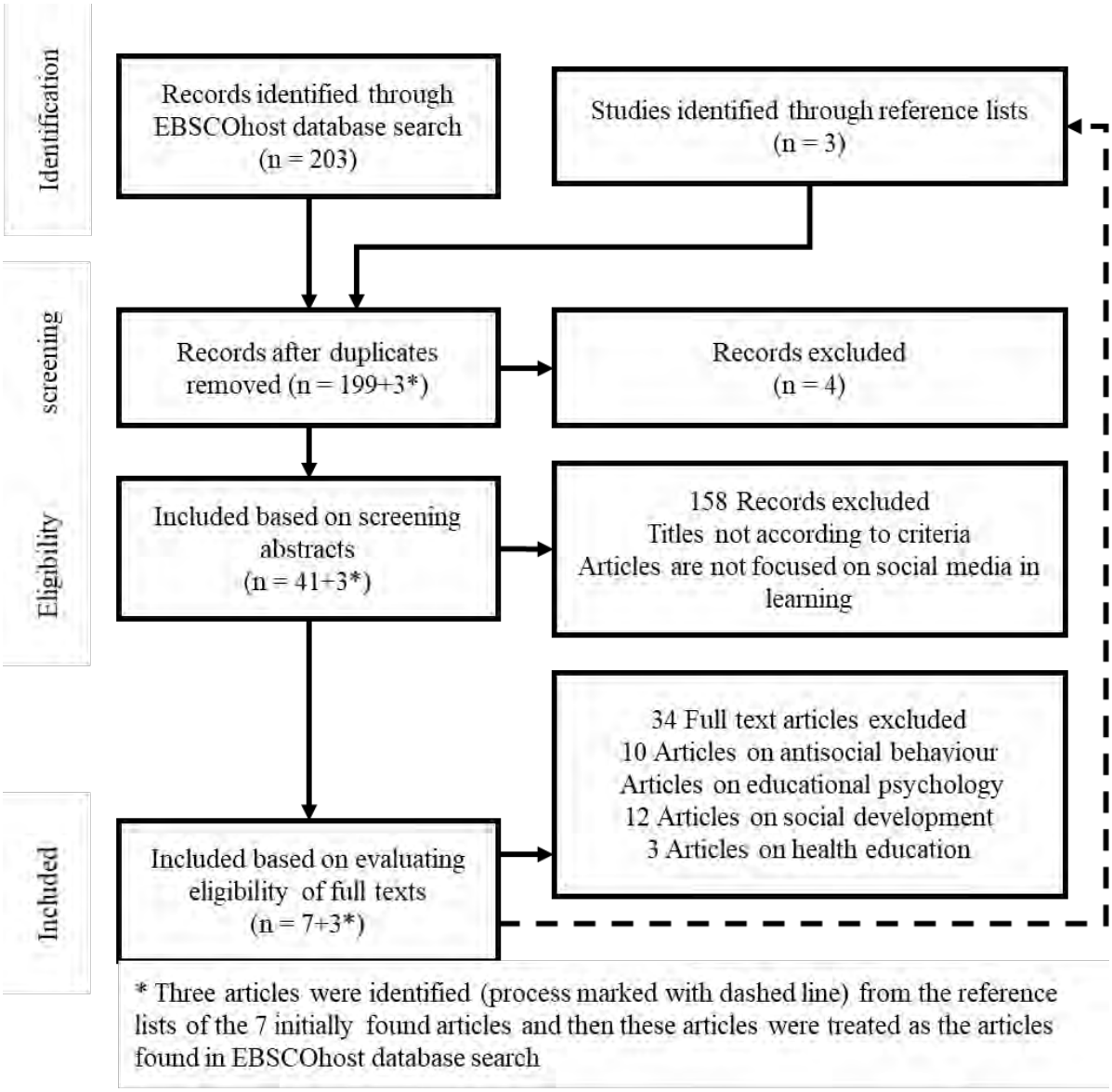

Figure 1. Flowchart of search and screening process

The screening of titles and abstracts was done by two researchers. They separately evaluated every inclusion criterion on the following scale: -1 = *the criterion is not met*, 0 = *there is not enough evidence to decide*, and 1 = *the criterion is met*. If all criteria were evaluated with 1 then the article was included in analysis. If at least one criterion was -1 then the article was excluded. In case of 0, the article was further assessed based on full text in order to make the final decision about inclusion/exclusion. Weighted kappa for inter-rater agreement of the final decisions on the inclusion of the articles was moderate ($k = .47$ (95% CI, .297 to .595), $p < .001$). The differences in decisions were discussed until an agreement was reached. In case of doubt by at least one researcher the article was inspected on the level of full text. Screening of titles and abstracts resulted in 41 articles that were further assessed based on full texts. However, one article from a chapter in a book was available neither in the electronic databases nor in the accessible libraries. It was excluded from further analysis. This resulted in 40 articles taken for full-text analysis. The same previously listed exclusion and inclusion criteria were used on the level of the full-text analysis, but a few exclusion criteria were added, including (1) internet addiction disorder and gaming disorder, and (2) non-suicidal inquiry.

Finally, 7 articles were selected for the analysis to answer the research questions of the current study. Next, the references of these articles were analyzed, and 3 articles were added to search results. These were screened against inclusion criteria and finally added to bring the final total number of articles for the analysis to 10. These were analyzed according to the analytical framework to answer the research questions.

Coding of the articles

In reviewing the 14 articles, the authors, after a series of discussions, came to a consensus by inductively coding the results in a way that would give information for answering the research questions and understanding the context of the findings to make the conclusions applicable. The final list consisted of 10 variables:

(1) type of study: an empirical study, non-systematic review, systematic review;

(2) design of the study: quantitative method, qualitative method, mixed method;

(3) the approach of using SM: the categories were inductively developed by the authors based on the articles;

(4) subjects in the focus of the research with SM: general (i.e. for general learning), arts, and writing;

(5) instruments or methods used to capture learning outcomes: questionnaires, interviews, tests, categorization, observation;

(6) reliability of the instruments or methods;

(7) effect:

(a) on social skills – this includes communication, collaboration, interaction, socialization, information, resource sharing, etc.;

(b) on subject knowledge and skills – this includes learning concepts, principles, and information about a particular subject through books, media, academic institutions, academic skills, etc.;

(8) impact: strongly positive (the authors indicate a clear positive effect of SM and have proved it in their study), positive (the authors indicate a conditional positive effect of using SM; this effect might depend on the characteristics of the learners and learning scenarios), or neutral (the authors show no effect or state that there could be only a minor positive effect in some conditions or a minor negative effect could be avoided with specific teaching activities);

(9) the sample size of the study;

(10) country of data collection.

Findings

The overview of the articles (N=10) used in the current literature review is presented in Table 1. There were no systematic literature reviews found in our search. One non-systematic review and 9 empirical studies were identified which are often not suitable for global generalizations. Again, most of the studies were exploratory and surveys which showed that the field of studies was still in its infancy. The studies covered a wide range of countries in Europe, North America, Asia, Australia, and South America. An exception seemed to be Africa although SM is widely used there as well.

Our main focus was on understanding the variety of approaches to using SM in learning. Inductive coding by the two authors revealed seven approaches that were defined in our study based on the analyzed articles as follows:

(1) collaboration – a situation which involves two or more humans working towards a specific task with a common aim of achieving a result;

(2) communication – a specific form of interaction that involves the exchange of information; two-directional information flow is specific for communication. It could be between humans, between humans and computers, or between computers;

(3) interaction – physical or virtual reciprocal actions or influence without a specific task; this includes verbal/ non-verbal forms, e.g., human-human or human-computer;

information dissemination – knowledge in whatever format (e.g. text, images, videos) is transmitted from one person or computer to another person or computer, but there is no two-directional flow;

(5) entertainment – physical or virtual actions or influence with or without a task that capture one's interest;

(6) teaching, learning, and resource sharing – acquisition of knowledge through teaching, sharing of learning resources like books, maps, videos, photos, posters, and trending news; and

(7) socialization – the process of building social networks for different purposes while mixing socially with others by learning the norms, values, and behavior.

Table 1. Characteristics of Articles Analyzed

Source	Type	Design	Approach	Subject	Instrument	R (α)	Effect	Impact	N	Country
Brom et al., 2016	ES	QT	com, int, inf, ent	General	Q, T	α=.85	SS	SP	335	Czech Rep
Castro, 2014	ES	QL	com, int, inf, TLR	Arts	O	N/A	SK	SP	15	Canada
Kurtenbach, 2016	ES	MM	coll, inf, com, int	General	Q, I, O, S	N/A	SS	SP	200	Peru
Lalonde et al., 2016	ES	QL	coll, int, inf, com, TLR	Arts	I, O	N/A	SK	SP	20	Canada
Leung, 2015	ES	QT	coll, inf, com, int	General	Q	α=79	SS	SP	718	Hong Kong
Padilla-Walker et al., 2016	ES	QT	coll, inf, com, int, soc	General	Q	α=.84	SS	N	681	U.S.A
Peppler, 2013	NSR	QL	int, coll, soc, inf	General	N/A	N/A	SS	SP	N/A	Intern.
Sadauskas et al., 2013	ES	QL	com, int, inf, TLR	Writing	Q, I, FG	N/A	SK	SP	N/A	U.S.A
Sadauskas, 2014	ES	MM	com, int, inf, soc	Writing	I, FG	N/A	SK	SP	269	U.S.A
Smith et al., 2015	ES	MM	TLR, inf, com, int	General	I, Q	N/A	SS	P	7031	Australia

Note

Type – Type of research: ES = Empirical study, NSR = Non-systematic review,

Design – Research design: QL= Qualitative method, QT= Quantitative method, MM= Mixed method;

Approach – Approach of using SM: Coll = Collaboration, Com = Communication, Int = Interaction, Inf = Information dissemination, Ent = Entertainment, TLR = Teaching, learning, and resource sharing, Soc = Socialization;

Instrument: Q = Questionnaire, I = Interview, T = Test score, C = Categorization, O = Observation, S= Survey; N/A = Not available;

R = Reliability;

Effect: SS = Social Skills, SK = Subject knowledge and skills;

Impact: SP = Strongly positive, P = Positive, N = Neutral.

Information dissemination and interaction were mentioned in all the articles (N=10), while communication was discovered in 9, collaboration in 5, socialization in 3, teaching, learning, and resource sharing in 4, and entertainment in 1 article. Interestingly, most of the articles mentioned simultaneously at least three approaches and two of them listed even five approaches. Thus, it seems that SM could be used for learning in various ways that could be combined in different scenarios.

It also appeared that SM has been mainly used to achieve general skills like social skills. There were only a few subject-specific exceptions focusing on arts and writing. Although social skills are considered very important in the 21st century (see European Commission, 2017), it seems that the subject-specific potential of using SM has been underused and this might be a reason why there is a wide gap between usage of SM in learning and everyday life. A solution to support effective use of SM in learning might be to provide scenarios that combine the development of social skills with acquiring subject-specific outcomes.

Another possible reason why SM is not often used for learning is lack of evidence of its effect on learning outcomes and in particular about the impact. Therefore, we searched for evidence of SM impact on social skills or subject knowledge that were the only two effects mentioned in the reviewed articles. The results showed that only one study used a test to capture changes. All the other studies relied on questionnaires or interviews or perceptions of observers in observations. These are useful for understanding how the learners and teachers perceive the impact of SM, but it might not be strongly correlated with the learning outcomes. However, there was one more issue with many of the data collection instruments – the validity was rarely discussed in the articles and only reliability was calculated in five studies. In this situation it was not possible to calculate effect sizes of the studies using SM but only mentioned qualitatively, the impact the authors of the studies claimed to have. Of the 10 papers, the following is the analysis of their impact on learning outcomes: *strongly positive* 8, *positive* 1, and *neutral* 1. However, this finding should be taken with reservations because of the issues with the data collection quality in the studies reviewed. Therefore, it seems that there is an urgent need for further studies to assess the impact of SM scenarios in either experimental or practical settings using psychometrically tested valid instruments. Notwithstanding the issues with the reviewed studies on quantitative level, this provided many qualitative ideas on how learning scenarios with SM could be developed.

Discussion

As mentioned in the literature, the growing level of interest in SM among the youth (Al Alwan et al., 2017; 2016; Bleakley et al., 2014; Dwivedi et al., 2016; Eurostat, 2017) and its potential pedagogical affordances (Greenhow & Lewin, 2015; Halverson, 2011; Manca & Ranieri, 2013) resulted in this review which we tried to find out the current situation in terms of how teachers and students use SM. The current review identified seven approaches by which teachers and students use SM in learning: collaboration; communication; interaction; information dissemination; entertainment; teaching, learning, and resource sharing; and socialization. Another important finding was that interaction, information dissemination, and communication are the three SM approaches consistently used by teachers and students in teaching and learning. This supports previous studies that identified these approaches by which teachers and students use SM in teaching and learning (Coklar, 2012; LaRue, 2012; Makri & Schlegelmilch, 2017; Rodriguez-Hoyos et al., 2015). Indeed, SM facilitates teaching and learning through information dissemination and group discussions (Rodriguez-Hoyos et al., 2015). Essentially, interaction is one of the key approaches to effective teaching and learning (Manca & Ranieri, 2013; Vygotsky, 1978). This supports Vygotsky's perspectives about teaching with models to promote interactivity among learners and the ZPD concept. That teaching is more effective when it is interactive, student-centered, and models are used as teaching resources. Although the ZPD concept was developed through the observation of children, it provides a socio-cultural framework which contributes to the constructivist theory and development of the curricula for social learning for high school students. Hence, the most widely used learning approaches e.g. student-centered online courses are designed based on a socio-constructivist concept of teaching and learning. However, it also appeared that SM promotes bilateral and multilateral interactions. These affordances could help teachers to be effective during their lessons and students to create a virtual 24-hour group discussion platform that also supports the differentiation of learning (Miyaji, 2018). This affords students to discuss assignments, share knowledge on subject topics being treated in school, and have access to all learning materials online which facilitates their interest in learning. In terms of SM, its affordances are partially implemented (Manca & Ranieri, 2016), and findings from this review show that there were only a few studies (N=2) in art education involving identity construction (Castro, 2014), and in-classroom writing tasks with Sparkfolio (Sadauskas et al., 2013; Sadauskas, 2014). It is possible that both teachers and students might have some operational challenges, thus preventing them to understand and use the technology contextually. This could perhaps be because either most teachers and students are unable to contextualize SM affordances pedagogically or it was not the focus of many researchers and little attention is given on this at the research level.

Subsequently, however, TLR, which focuses on subject knowledge development regarding classroom lessons, is among the least used approaches to SM use. Although students and teachers might have social or operational skills for using SM, they lack competencies for its contextual use (e.g., editing of texts, pictures, and videos), and this could affect their confidence and motivation to use it as a pedagogical tool in teaching and learning. For example, selecting, editing, and presenting a YouTube video in a Biology lesson on Photosynthesis for grade 8 students. Subsequently asking them to

group and perform a task on the topic. So, the inability to contextualize these SM tools could be one of the reasons we identified affecting use. This could also be the cause of a drop in learning outcomes (Kirschner & Karpinski, 2010), as SM use has been more focused on operational use which targets the development of social skills as opposed to using it contextually in subject knowledge competencies. This could be because stakeholders perceive SM from the perspectives of its generic socialization affordances (Ndaku, 2013) without zooming into its specifics. Also, the mindset of using SM for online chatting and making friends among others which is how it was designed has compelled some teachers and educational stakeholders to see it as a tool for social skills development as opposed to its use as a pedagogical resource. Hence the inability or reluctance by teachers to establish a strong relationship with SM to understand it better and be able to contextualize it pedagogically. This might be also one of the reasons why SM use has been blocked in some schools. However, there might be also other reasons, e.g. in the U.S. the use of SM in schools have been often limited due to the prevalence of cyberbullying and other anti-social behaviors that it affords (Peterson et al., 2017). This could be another reason why the search produced a few articles. It could also be a reason why many teachers do not appreciate the need to use SM to teach subject lessons. We, therefore, think a paradigm shift from this mindset could pave the way for appropriate integration of SM into teaching and learning in schools. Ultimately, there is a good reason for social skills development (Manca & Ranieri, 2013), but not at the expense of subject knowledge, which is equally fundamental to key competencies (see European Commission, 2017). The study, however, brings into focus the issue of how SM is used in teaching and learning. Thus, the findings of the study extend contemporary studies by identifying and highlighting the dominant approaches of SM use in learning by teachers and students.

All the articles identified the prevailing factors in SM in learning from a wide range of different theoretical perspectives. However, the study observed that even though a wide range of different models and theories emerged from the review, almost all theories followed the constructive approach. This is an indication that SM is an interactive learning application.

Based on the findings and discussion of our study we propose that all approaches to use SM in learning should be combined for learning both social skills and subject-specific outcomes. Thus, SM could be used as a substitute to formal learning activities adopting approaches like blended learning, flipped classroom, or ubiquitous learning. We also recommend teachers to establish a stronger relationship with SM by frequently using it more pedagogically to develop their competencies and confidence. We see that a combination of these might be the way to more extensive and effective use of SM in learning because according to our review the studies have focused only on one or other of these aspects. We illustrate the scenario building in Table 2.

In this case, we follow the phases of the learning process described by Malva, Leijen, and Pedaste (submitted). However, these could be used in different frameworks of the learning process. In the example, learning is divided into three phases: pre-interaction processes, interaction processes, and post-interaction processes. In pre-interaction processes teachers' role is mainly to prepare resources for teaching and learning to be shared with students and to disseminate information to students. At the same time, students should be involved in the planning of the learning process – specify their own purpose of learning, prepare for collaborative learning in SM as suggested according to social learning theory (see Bandura, 1977), and give feedback and make recommendations to teacher's plans so that learning will be built on their prior knowledge and skills. Later, during the interaction processes, the main phase of learning, students learn based on different resources but also share information about new resources they have found from the internet, communicate with each other, complete tasks in collaboration and interact with both their peer-students and computer-based tasks. Likewise, SM could be used for classroom management, or we can also say activity management in SM, and this is enabled through communication, collaboration and interaction. However, here we see the importance of social processes – students build communities and networks to learn from each other and give not only academic but also entertaining feedback, such as likes, or badges used in SM. Finally, the post-interaction phase of learning is also supported in SM because it could serve as a diary of all activities and students can easily reflect on their own or group-level subject-specific knowledge and skills or social skills with the guidance of the teacher or peer students. Assessment could also be made using several affordances of SM. Thus, in conclusion, the SM tools and SM as an environment could be applied through different approaches for learning both subject-specific knowledge lessons and social skills in all phases of the learning process.

Table 2. Example of a scenario to implement SM approaches through the learning processes for learning subject-specific-knowledge and skills and social skills.

Study phase	Subject-specific knowledge and skills	Social skills
Pre-interaction processes		
(1) setting purpose of education	teacher disseminates learning objectives through SM (Inf)	students elaborate the purpose of studying a particular topic in SM (Com)
(2) curricular knowledge	teacher provides in SM a plan for studies (Inf)	students discuss in SM how to follow that plan in collaborative settings (Int)
(3) educational context	teacher shares background information (articles, videos) about the topic in SM (Inf)	students update their SM profiles to indicate their characteristics that important to the teacher and peer students and learn about other students by contacting them (Soc)
(4) lesson planning	teacher plans specific learning activities and creates learning materials that could be used or share in SM (TLR)	students contribute in planning by giving feedback, asking clarifying questions and making recommendations in SM (Int)
Interaction processes		
(5) instructional strategies	students study a topic using materials in SM (TLR) in individual and collaborative settings (Com, Col, Int)	students share their own additional learning resources found from Internet (Inf, TLR) and learn together through online tasks in SM (Com, Col, Int)
(6) classroom management	teacher monitors students' activities and gives feedback and guidance where needed (Com, Col, Int) and students give feedback and guidance to their peers in academic and entertaining format (Int, Ent)	students learn how to regulate their own learning and group processes and build groups and networks to work together (Com, Soc)
Post-interaction processes		
(7) student assessment	teacher assesses students' learning outcomes presented in SM and gives feedback (Inf) and students assess their peers in academic and entertaining format (Inf, Ent)	teacher assesses students' learning process in SM and gives feedback (Inf) and students assess their peers in academic and entertaining format (Inf, Ent)
(8) reflection	teacher guides students to reflect on their subject-specific skills acquired in SM (Int)	peer students reflect on their individual and group level social skills acquired in SM and on the norms, values, and behaviour of other students (Int, Soc)

Note

Approach of using SM: Coll = Collaboration, Com = Communication, Int = Interaction, Inf = Information dissemination, Ent = Entertainment, TLR = Teaching, Learning, and Resource sharing, Soc = Socialization.

Conclusion

This systematic literature review revealed seven approaches for using SM in learning: collaboration; communication; interaction; information dissemination; entertainment; teaching, learning, and resource sharing; and socialization. However, most of them were used for learning social skills and only a few have been used to promote subject-specific outcomes. We discussed that this might be the reason why SM is not often used by teachers in formal teaching and learning processes. Another reason why SM might be rarely used in learning is the lack of evidence that show its effect on learning outcomes, even on social skills.

Our review revealed that most of the studies have not used high quality psychometrically tested assessment instruments to show the effect of SM on learning outcomes in comparison with some other tools. Therefore, we suggest that further studies should focus on using SM for developing both social skills and subject-specific skills in combination and these should also apply appropriate assessment instruments that show the effect of the learning process. In our discussion, we proposed one example of a learning scenario that integrates all seven approaches found in the literature review for learning both social skills and subject-specific knowledge and skills. This is one scenario that could be implemented in experimental studies, but several similar scenarios could be developed to test the effect of SM use in learning.

The study also had some limitations that should be taken into account in applying the findings. First, the number of articles that were in accordance with the set quality, eligibility and inclusion criteria was rather small. It means that much research has not been done in recent years on the use of SM in learning, especially in the age group of high school students, and the generalizability of the findings of the review might be somewhat limited. Therefore, the list of seven approaches to using SM could be extended using for example theories about social learning and in further studies, the researchers need to be open for emergence of new approaches. Second, the articles reviewed had sometimes limitations in presenting evidence of the quality of instruments used for assessing the effect of SM use in learning. Therefore, we can only propose the list of approaches to using SM, but we cannot make conclusions about which approaches are more or less effective. For this, there are needed additional studies even though most of the studies indicated a proposed positive effect of SM on learning outcomes. Third, this review did not focus on attitudes and structural limitations (e.g. limited connectivity) related to SM use and we hypothesize that negative attitudes towards SM use in education might be another important reason why SM is not often used in learning. The assessment of attitudes on SM use in learning is a topic that should be considered in designing further studies in learning about the process of using SM effectively for acquiring both subject-specific knowledge and skills as well as social skills in using SM.

References

Aaen, J. (2015). Making sense of Facebook: A mixed methods approach to analyzing online student groups. *International Journal of Media, Technology and Lifelong Learning*, *11*(1), 1–7.

Al Alwan, A., Rana, N. P., Dwivedi, Y. K., & Algharabat, R. (2017). Social media in marketing: A review and analysis of the existing literature. *Telematics and Informatics*, *34*(7), 1177–1190.

Aydin, S. (2012). A review of research on Facebook as an educational environment. *Education Tech Research Development*, *60*(6), 1093–1106. http:// doi.org/10.1007/s11423-012-9260-7

Bandura, A. (1977). *Social learning theory*. Prentice Hall.

Barrot, J. S. (2018). Facebook as a learning environment for language teaching and learning: A critical analysis of the literature from 2010 to 2017. *Journal of Computer Assisted Learning*, *34*(6), 863–875.

Bleakley, A., Vaala, S., Jordan, A. B., & Romer, D. (2014). The Annenberg media environment survey: Media access and use in U.S. homes with children and adolescents. In A. B. Jordan, D. Romer, A. B. Jordan, & D. Romer (Eds.) *Media and the Well-being of Children and Adolescents*. Oxford University Press.

Brom, C., Sisler, V. Slussareff, M., Selmbacherova, T., & Hlavka, Z. (2016). You like it, you learn it: Affectivity and learning in competitive social role play gaming. *International Journal Computer-Supported Collaborative Learning, 11*, 313–348. http://doi.org/10.1007/s11412-016-9237-3

Brown, S. (2010). From VLEs to learning Webs: The implications of Web 2.0 for learning and teaching. *Interactive Learning Environments*, *18*(1), 1–10.

Cain, J., & Policastri, A. (2011). Using Facebook as an informal learning environment. *American Journal of Pharmaceutical Education*, *75*(10), 1–8.

Castro, J. C. (2014). Constructing, performing, and perceiving identity(ies) in the place of online Art education. *Journal of Cultural Research in Art Education*, *31*, 31–53.

Chen, B., & Bryer, T. (2012). Investigating instructional strategies for using social media in formal and informal learning. *The International Review of Research in Open and Distance Learning*, *13*(1), 87–100.

Chugh, R., & Ruhi, S. (2018). Social media in higher education: A literature review of Facebook. *Education and Information Technologies*, *23*(2), 605–616.

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research*, *53*(4), 445–459.

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of educational research*, *53*(4), 445–459.

Çoklar, A. N. (2012). Evaluations of students on Facebook as an educational environment. *Turkish Online Journal of Qualitative Inquiry*, *3*(2), 42–53.

Collin, R., & Street, B. V. (2014). Ideology and interaction: Debating determinisms in literacy studies. *Reading Research Quarterly*, *49*(3), 351–359. http://doi.org/10.1002/rrq.75.

Cress, U., & Kimmerle, J. (2008). A systemic and cognitive view on collaborative knowledge building with Wikis. *International Journal of Computer-Supported Collaborative Learning*, *3*(2), 105–122.

Davis, C. H. F., Del-Amen, R., Rios-Aguilar, C., & Gonzalez Canche, M.S. (2012). *Social media in higher education: A literature review and research directions*. Center for the study of HE, report printed by the University of Arizona and Claremont Graduate University. http://works.bepress.com/hfdavis/2/

Davis, C. H. F., Del-Amen, R., Rios-Aguilar, C., & Gonzalez Canche, M. S. (2014). Social media, higher education, and community colleges: A research synthesis and implications for the study of two-year institutions. *Community College Journal of Research and Practice*, 39(5),409–422 . http:// doi.org/10.1080/10668926.2013.828665.

Duggan, M. (2015). Mobile messaging and social media 2015. *Pew Research Centre*. http://www.pewinternet.org/2015/08/19/mobile-messaging-and-social-media-2015/

Dwivedi Y. K., Mantymaki M., Ravishankar M. N., Janssen M., Clement M., Slade E. L., Rana N. P., Al Sharhan S., & Simintiras A.C. (Eds.) (2016). *Social media: The good, the bad, and the ugly*. 15th IFIP WG 6.11 Conference on e-Business, e-Services, and e-Society, I3E 2016, Swansea, UK, September 13–15, 2016, proceedings (9844).

Ebner, M., Lienhardt, C., Rohs, M., & Meyer, I. (2010). Microblogs in higher education – A chance to facilitate informal and process-oriented learning. *Computers and Education*, *55*(1), 92–100.

European Commission (2017). *Recommendations on key competences for lifelong learning.* https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)&rid=7

Eurostat (2017). *Are you using social networks?* Social-media-in-education-statistics European Commission. http://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20170713-1

Evans, C. (2014). Twitter for teaching: Can social media be used to enhance the process of learning? *British Journal of Educational Technology*, *45*(5), 902–915. http:// doi.org/10.1111/bjet.12099.

Fox, A., & Bird, T. (2017). #any use? What do we know about how teachers and doctors learn through social media use? Qwerty. *Open and Interdisciplinary Journal of Technology*, *Culture and Education*, *12*(2), 64–87.

Gao, F., Luo, T., & Zhang, K. (2012). Tweeting for learning: A critical analysis of research on microblogging in education published in 2008-2011. *British Journal of Educational Technology, 43*(5), 783–801.

Goodyear, V. A., Casey, A., & Kirk, D. (2014). Tweet me, message me, like me: Using social media to facilitate pedagogical change within an emerging community of practice. *Sport, Education & Society, 19*(7), 927–943.

Greenhow, C., & Lewin, C. (2015). Social media and education: Reconceptualizing the boundaries of formal and informal learning. *Learning, Media and Technology*, *41*(1), 6–30.

Greenhow, C., & Askari, E. (2017). Learning and teaching with social network sites: A decade of research in K-12 related education. *Education and Information Technologies*, *22*(2), 623–645.

Hall, A. (2007). Vygotsky goes online: Learning design from a socio-cultural perspective, *Learning and socio-cultural theory: Exploring Modern Vygotskian Perspectives International Workshop* . 1(1), 93–107

Halverson, E. R. (2011). Do social networking technologies have a place in formal learning environments? *On the Horizon*, *19*(1), 62–67.

Hew, K. F. (2011). Students' and teachers' use of Facebook. *Computers in Human Behavior*, *27*(2), 662–676.

De Jong, T., Lazonder, A., Pedaste, M., & Zacharia, Z. (2018). Simulations, games, and modelling tools for learning. In F. Fischer, C. E. Hmelo-Silver, S. R. Goldman, & P. Reimann (Eds.) *International Handbook of the Learning Sciences* (pp. 256–266). Routledge.

Judd, T., Kennedy, G., & Cropper, S. (2010). Using wikis for collaborative learning: assessing collaboration through contribution. *Australasian Journal of Educational Technology*, *26*(3), 341–354.

Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computers in Human Behavior*, *6*(26), 1237–1245.

Kori, K., Pedaste, M., Leijen, A., & Maeots, M. (2014). Supporting reflection in technology-enhanced learning. *Educational Research Review*, *11*, 45-55.

Kozma, R. B. (1991). Learning with media. *Review of Educational Research*, *61*(2), 179–211.

Kurtenbach, J. (2016). *Adolescent task management: multitasking and social media in the student search process* [Unpublished doctoral dissertation], University of North Texas.

de, M., Castro, J. C., & Pariser, D. (2016). Identity tableaux: Multimodal contextual constructions of adolescent identity. *Visual Arts Research*, *42*(1), 38–55.

LaRue, E. M. (2012). Using Facebook as course management software: A case study. *Teaching and Learning in Nursing*, *7*(17), 17–22.

Leijen, A., Allas, R., Toom, A., Husu, J., Marcos, J. J. M., Meijer, P., Knezic, D., Pedaste, M., & Krull, E. (2014). Guided reflection for supporting the development of student teachers' practical knowledge. *Procedia-Social and Behavioral Sciences*, *112*(2014), 314–322.

Leijen, A., Valtna, K., Leijen, D. A. J., & Pedaste, M. (2012). How to determine the quality of students' reflections? *Studies in Higher Education*, *37*(2), 203–217.

Lenhart, A. (2015). *Teens, Social media and technology overview*. Pew Research Center. http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015

Leung, L. (2015). A panel study on the effects of social media use and internet connectedness on academic performance and social support. *International Journal of Cyber Behavior, Psychology and Learning*, *5*(1), 1–15.

Magrino, W., & Sorrell, P. (2014). Teaching the new paradigm: Social media inside and outside the classroom. *Writing and Pedagogy*, *5*(2), 357–373. http://doi.org/10.1558/wap.v5i2.357.

Magogwe, J. M., Ntereke, B., & Phetlhe, K. R. (2015). Facebook and classroom group work: A trial study involving University of Botswana advanced oral presentation students." *British Journal of Educational Technology*, *46*(6), 1312–1323. http:// doi.org/10.1111/bjet.12204

Makri, K., & Schlegelmilch, B. B. (2017). Time orientation and engagement with social networking sites: A cross-cultural study in Austria, China and Uruguay. *Journal of Business Research*, *80*(C), 155–163.

Malva, L., Leijen, A., & Pedaste, M. (submitted). What constitutes teachers' general pedagogical knowledge and how can it be assessed: Literature review. *Teachers and Teaching: Theory and Practice*.

Manca, S., & Ranieri, M. (2013). Is it a tool suitable for learning? A critical review of the literature on Facebook as a technology-enhanced learning environment. *Journal of Computer-Assisted Learning*, *29*(6), 487–504.

Manca, S., & Ranieri, M. (2016). Is Facebook still a suitable technology-enhanced learning environment? An updated critical review of the literature from 2012 to 2015. *Journal of Computer-Assisted Learning*, *32*(6), 503–528.

Manca, A., & Whitworth, A. (2018). Social media and workplace practices in higher education institutions: A review. *The Journal of Social Media in Society*, *7*(1), 151–183.

Miyaji, I. (2018). Comparison of technical terms and consciousness of blended classes in 'AI technology' and 'artificial intelligence'. *European Journal of Educational Research*, *8*(1), 107–121.

Nadkarni, A., & Hofmann, S. (2012). Why do people use Facebook? *Personality and Individual Differences, 52*(3), 243–249.

Ndaku, A. J. (2013). Impact of social media on the students' academic performance in Ghana. *Networking*, *18*(5), 275–285.

Novak, E., Razzouk, R., & Johnson, T. (2012). The Educational use of social annotation tools in higher education: A literature review. *The Internet and Higher Education*, *15*(1), 39–49.

Nui, L. (2017). Using Facebook for academic purposes: Current literature and directions for future research. *Journal of Educational Computing Research*, *56*(8), 1384–1406.

O'Byrne, B., & Murrell, S. (2014). Evaluating multimodal literacies in student blogs: Evaluating multimodal literacies in student blogs. *British Journal of Educational Technology, 45*(5), 926–940. http:// doi.org/10.1111/bjet.12093.

OECD (2018). *Enrolment rate in secondary and tertiary education*. OECD Data. https://data.oecd.org/students/enrolment-rate-in-secondary-and-tertiary-education.htm

Padilla-Walker, L. M., Coyne, S. M., & Collier, K. M. (2016). Longitudinal relations between parental media monitoring and adolescent aggression, prosocial behavior, and externalizing problems. *Journal of Adolescence*, *46*, 86–97.

Palmer, S. (2013). Characterization of the use of Twitter by Australian universities. *Journal of Higher Education Policy and Management*, *35*(4), 333–344.

Paraskevopoulou-Kollia, E-A, Zachos, G., & Anagnostopoulos, I. (2018). Social media use in higher education: A review. *Education Sciences*, *8*(4), 194. http://doi.org/10.3390/educsci8040194

Pedaste, M., de Jong, T., Sarapuu, T., Piksoot, J., van Joolingen, W. R., & Giemza, A. (2013). Investigating ecosystems as a blended learning experience. *Science*, *340*(6140), 1537–1538.

Peppler, K. A. (2013) Social media and creativity. In D. Lemish (Ed.), *The Routledge International Handbook of Children, Adolescents, and Media* (pp. 193–200). Routledge.

Peterson, C., Oltmann, S. M., & Knox, E. J. M. (2017). The inconsistent work of Web filters: mapping information access in Alabama public schools and libraries. *International Journal of Communication 11*, 4583–4609

Ranker, J. (2008). Composing across multiple media: A case study of digital video production in a fifth grade classroom. *Written Communication*, *25*(2), 196–234.

Rithika, M., & Selvaraj, S. (2013). Impact of social media on student's academic performance. *International Journal on Logistics and Supply Chain Management Perspective*, *2*(4), 636–640.

Robbins, S. P., & Singer, J. B. (2014). From the editor—The medium is the message: Integrating social media and social work education. *Journal of Social Work Education*, *50*(3), 387–390.

Roblyer, M. D., McDaniel, M., Webb, M., Herman, J., & Witty, J. V. (2010). Findings on Facebook in higher education: A comparison of college faculty and student uses and perceptions of social networking sites. *Internet and Higher Education*, *13*(3), 134–140.

Rodriguez-Hoyos, C., Haya Salmon, I., & Fernandez-Diaz, E. (2015). Research on SNS and education: The state of the art and its challenges. *Australasian Journal of Educational Technology*, *31*(1), 100–111.

Rutherford, C. (2013). Facebook as a source of informal teacher professional development. *In Education*, *16*(1), 60–74.

Sadauskas, J. (2014). *Improving adolescent writing quality and motivation with Sparkfolio, a social media based writing tool*. [PhD dissertation, Arizona State University]. ASU Library. https://repository.asu.edu/items/26893

Sadauskas, J., Byrne, D., & Atkinson, R. K. (2013). *Toward social media based writing*. In A. Marcus (Ed.) Proceedings of the 15th International Conference on Human-Computer Interaction - DUXU/HCII 2013, Part II, LNCS 8013 (pp. 276–285). Springer. https://doi.org/10.1007/978-3-642-39241-2_31

Sarac, H. (2018). Use of instructional technologies by teachers in the educational process: Metaphor analysis study. *European Journal of Educational Research*, *7*(2), 189–202.

Schunk, D. H., & Zimmerman, B. J. (2003). Self-regulation and learning. In W. M. Reynolds, & G. E. Miller (Eds.), *Handbook of Psychology* (pp.59–78). John Wiley & Sons, Inc.

Smith, J., Hewitt, B., & Skrbis, Z. (2015). Digital socialization: Young people's changing value orientations towards internet use between adolescence and early adulthood. *Information, Communication and Society*, *18*(9), 1022–1038. http:// doi.org/10.1080/1369118X.2015.1007074

Statista.com (2018). *Social media – Statistics & Facts*. J. Clement. https://www.statista.com/topics/1164/social-networks/

Street, B. (2013). Literacy in theory and practice: Challenges and debates over 50 years. *Theory into Practice*, *52*(1), 52–62. http://doi.org/10.1080/00405841.2013.795442.

Tang, Y., & Hew, K. F. (2017). Using Twitter for education: Beneficial or simply a waste of time? *Computers & Education*, *106*, 97–118.

Tess, P. A. (2013). The role of social media in higher education classes (real and virtual): A literature review. *Computers in Human Behavior*, *29*(5), 60–68.

Tunc-Aksan, A. (2019). Smartphone addiction, fear of missing out, and perceived competence as predictors of social media addiction of adolescents. *European Journal of Educational Research*, *8*(2), 559–566.

Tur, G., & Marin, V. I. (2015). Enhancing learning with the social media: student teachers' perceptions on Twitter in a debate activity. *New Approaches in Educational Research*, *4*(1), 46–57. http:// doi.org/10.7821/naer.2015.1.102

Voivonta, T., & Avraamidou, L. (2018). Facebook: A potentially valuable educational tool? *Educational Media International, 55*(1), 34–48.

Vygotsky, L. S. (1978). *Mind in society: the development of higher psychological process* (Trans. M. Cole), Harvard University Press.

Yang, Y., Wang, Q., Woo, H. L., & Quek, C. L. (2011). Using Facebook for teaching and learning: A review of the literature. *International Journal of Continuing Engineering Education and Lifelong Learning*, *21*(1), 72–86.

Yeboah, J., & Ewur, G. D. (2014). The impact of WhatsApp messenger usage on students' performance in tertiary institutions in Ghana. *Journal of Education and Practice*, *5*(6), 157–165.