Social Media Use in Higher Education during the COVID-19 Pandemic: A Systematic Review

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***Abstract*—Social networking platforms have had an important impact on the way of life of modern humans due to their interoperability and real-time nature, and this impact is also reflected in the field of higher education. The COVID-19 pandemic has acted as a catalyst for social media to enter the field of education, making social media an indispensable and important tool. A complete screening of relevant papers was carried out using the PRISMA method, resulting in a systematic review of the 26 papers screened. The papers investigate how social media platforms are being used in higher education during the pandemic. It not only derives current research trends and popular research methods, but also investigates the impact of social network adoption on industry development and student populations. Additional surveys covered perceptions of the social network, and recommendations for its post-pandemic development and use. It can be concluded that the use of social media in higher education is valuable and beneficial.**

***Keywords*—social media, higher education, technology, COVID-19, systematic review**

I. Introduction

A. How Social Media Entered the Education Industry

There is widespread agreement that Web 2.0 and user-generated content are at the heart of social media as we know it today [1]. Different from online learning platforms, social media refers to open platforms used to disseminate diverse information, such as Facebook, Twitter, WeChat, etc. When this online platform evolves from a one-way voice bulletin board to an interactive collaborative project in which all users can publish content, social media is revitalized, and new functions and variants emerge [2]. It has significantly altered how people carry out their personal and professional activities, removing time and space barriers from interpersonal and inter-organizational communication and achieving higher communication efficiency [3].

Technological advancements have had a significant positive impact on the education sector, ushering in new trends. Prior to the pandemic, the most common application of higher education systems was learning management systems, which were more than adequate for assisting offline lectures in sharing learning resources [4]. However, during the special period when the isolation policy must be implemented, social media will almost definitely become a medium for higher education institutions to organize learning activities, announce daily affairs, and communicate with stakeholders [5].

Online learning via social media has evolved into a completely new type of learning. Students are also eager to use social media to complete course activities such as answering questions, participating in group discussions, and completing assignments. This is all due to social media's real-time, accessible, and interactive nature [6]. At the same time, the growth of social networks has brought numerous online academic institutions, through which students can enjoy streaming media services, participate in discussions on hot topics in their professional fields, and stay in touch with classmates or tutors via online applications [7].

B. Research Question

An initial search on the topic yielded 4 systematic reviews. Table I shows the related 4 papers' research content.

TABLE I. A Comparative Analysis of Related Reviews

	Year	Research Topics	Grade level	Summary
[8]	2005–2020	e-learning system	Higher education	A comprehensive review on the topic of learning management systems, including advantages and disadvantages of use, user attitudes, future use trends, etc.
[9]	2009–2019	Professional development	Higher education	Examine current social media communities related to teacher professional skills to identify key characteristics and trends in the field.
[10]	2011–2020	Social network	Not specified	The specific characteristics of e-learning use are obtained by reviewing the use of social networks in education.
[11]	2019–2020	Education	Higher education	A SWOT analysis of the entire higher education sector during the covid pandemic to gain recommendations for future growth.

Manuscript received July 7, 2022; revised August 1, 2022; accepted November 16, 2022.

As can be seen from Table I, none of the papers involved comprehensively cover the post-COVID-19 pandemic use of social networks in higher education, the impact on educational disciplines, and industry trends. As a result, the objective of this paper is to fill that gap by addressing the following questions:

RQ1. What are the current trends in research?

RQ2. What research methods were employed?

RQ3. What impact does social networking have on higher education?

RQ4. How does the use of social media influence students?

RQ5. What are students' and teachers' perspectives on the use of social media in education?

RQ6. How to effectively use social media in the process of higher education in the post-pandemic era?

II. Methods

A. Searching Strategy and Inclusion Criteria

For searching and screening articles, the review strictly adhered to the PRISMA 2020 guidelines [12]. In June 2022, a systematic search was performed on popular scientific databases in the current research field, including Scopus, Web of Science, EBSCO, and PsycINFO. Boolean logic was used to search for the terms ("higher education" OR "university student" OR "college education") and ("social media" OR "social network" OR "social learning"). The search period is limited to 2019-present due to the focus of this review on the COVID-19 pandemic period. Only peer-reviewed journal articles with full text are included in this review to ensure its accuracy. Table II displays the detailed inclusion and exclusion criteria standards. Finally, this study manually reviewed the content of each paper to determine whether it fell within the scope of the study. The initial search retrieved 357 articles.

TABLE II. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Using social media as a tool for university activities	Related to business or industrial development
Participants are undergraduate, graduate, or doctoral students	For preschool or K-12 students
Posted after COVID pandemic	Posted before the COVID pandemic
Written in English	Written in other languages

This study then screened the items pulled from the database. When an article met one of the following criteria, it was included in the study: (1) social media activities were relevant to higher education; (2) the impact of social media access to higher education was investigated; and (3) the application of social media to higher education was investigated. Based on this, the researchers carried out a full PRISMA review process (Fig. 1), which included identification, screening, validation, and analysis. Following several rounds of screening, 26 papers met the criteria and were included (see Appendix A), labelled ID1-ID26.

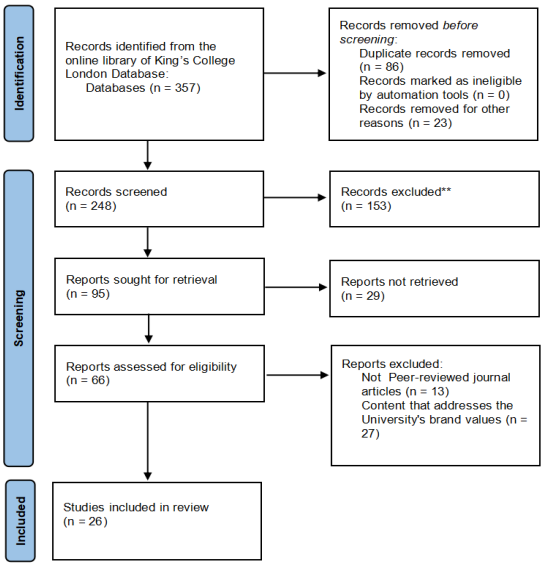

Figure 1. Article search and screening process.

B. Coding Scheme

This study analyzes the selected papers using a six-dimensional coding scheme to better understand these studies: (1) The code used for statistical literature analysis. The basic information in the literature can be classified based on the publication year, journal distribution, and relevance to the research problem. (2) Research plan. According to Zhang's classification [13], the research design has four components: research type, research method, sampling procedure, and method of data analysis. (3) Subjects for research. The researcher concluded five focus areas after conducting a thematic review of the selected papers: impact on industry development trends, impact on students, new attempts to use social networks, school branding, and impact on campus sustainability. (4) The impact on students is divided into two aspects: positive impact and negative impact. (5) Teacher and student perspectives: There are four levels of satisfaction to measure: Satisfactory or Effective, Partially Satisfied, Doubtful or Worried, and Overwhelming Opposition. (6) Suggestions and strategies. There are roughly eight categories of suggestions for the future development of this field: Appropriate and efficient platform, High-quality teaching research, Developing policy and consensus, Support for students, Diversification, Staff training, Accurate marketing strategies, Don't abuse social media.

III. Results

A. Research Trends

The first section seeks to determine the current research trend in this field by compiling the basic information from the selected papers. Fig. 2 depicts the distribution of journals by year. Journals in this field continued to be published in 2019 and 2020, reaching a peak of 13 in 2021, indicating that the global covid epidemic has increased the research value of this research field.

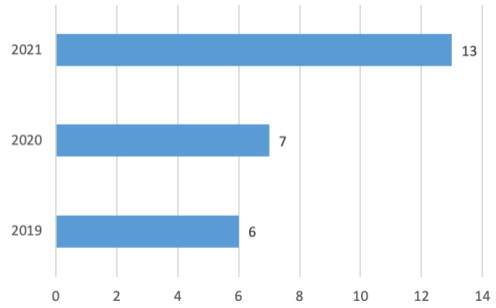

Figure 2. Number of journals.

Fig. 3 illustrates the distribution of journals. The two journals with the highest number of publications, accounting for 26.9% of the total, were Computers and Education (four) and Education and Information Technologies (three). However, 57.7% of the papers were from other journals, suggesting that many publishers publish journals in this field.

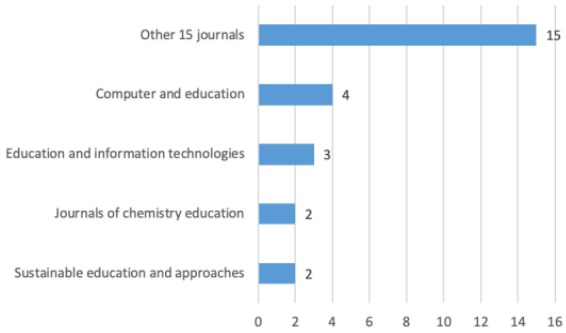

Figure 3. Journal distribution.

Fig. 4 depicts the relationship between the papers chosen and the six research questions raised in this paper. Almost all the questions showed a high correlation with the selected papers except RQ4 (related to impact on students).

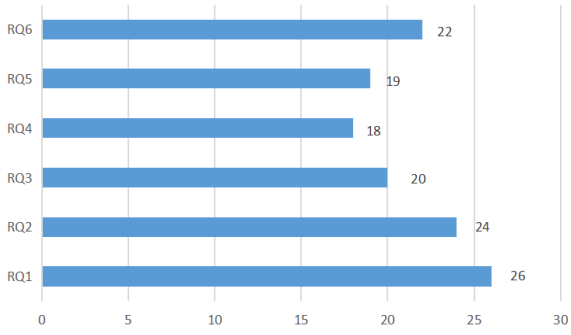

Figure 4. Number of answers for research question.

B. Research Design

This part aims to answer RQ2, which is what research methods were used in these studies. The research methods are analyzed from four perspectives, and the statistical results are shown in Table III. First, there are slightly more experimental studies (16 papers) than survey studies (10 papers). Second, half of the studies used quantitative designs (13 papers), and a few papers (five papers) opted for mixed research methods. Third, questionnaires (17 papers) and focus groups (6 papers) were used as the main data collection methods. Finally, descriptive statistics and structural equation modeling are the most used data analysis methods (20 papers).

TABLE III. RESEARCH METHOD

Research type	**Percentage (%)**	**Research method**	**Percentage (%)**
Experimental study	16(61.5%)	Quantitative research	13(50%)
Investigation research	10(38.5%)	Qualitative research	8(30.8%)
		Mixed research	5(19.2%)
Data collection method	**Percentage (%)**	**Data analysis method**	**Percentage (%)**
Questionnaire	17(65.4%)	Descriptive statistics	12(46.2%)
Interview	6(23.1%)	Structural equation model	8(30.8%)
Observation/ethnography/Student diary	5(19.2%)	ANOVA	4(15.4%)
		Regression analysis	2(7.7%)
		Independent/Paired sample *t*-test	2(7.7%)

C. Field of Focus

The aim of this chapter is to examine RQ3. The key findings of research on the impact of social media on higher education during the covid pandemic. Ultimately, it is possible to arrive at the following categories:

(1) Impact on industry development trend: When online education becomes the sole mode of communication in education, the impact of this transition will be felt.
(2) Impact on students: including learning experience, achievement, and skill acquisition
(3) New attempts to use social networks: experimenting with new teaching or assessment methods
(4) School branding: entails utilizing social media to attract potential students and promote alumni donations.
(5) Impact on campus sustainability: The impact of social media as a tool for engagement and education

In this review, 21 papers discuss the impact of social media on the development trend of the education industry, i.e., the digital transformation driven by social media technology, its benefits and drawbacks, and future trends.

17 papers discussed the impact of social media learning on students, such as learning efficiency, learning performance, creativity, and knowledge sharing: as well as students' and faculty's experiences and evaluations of using social networks while learning.

4 papers describe the exploration of new teaching models using social media in three disciplines: chemistry, medicine, and management, as well as how satisfied students are after class.

1 paper examines how colleges and universities should use social media to develop their brands, draw in prospective students, encourage alumni giving, and foster communication among students from the standpoint of brand marketing.

2 papers examine the University's use of online community as an educational medium to promote a campus sustainability culture.

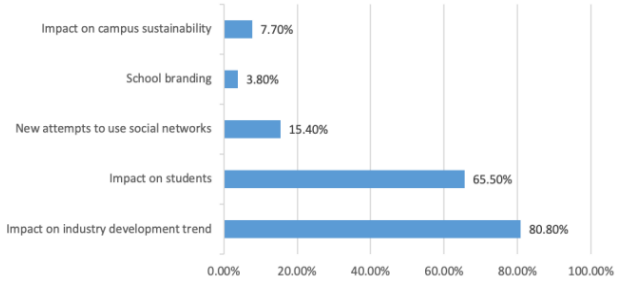

Figure 5. Frequency of 5 categories in selected papers.

Fig. 5 depicts the frequency differences for the categories described. It should be noted that these research topics total more than 100% because some papers will cover more than one topic.

D. Impact on Students

This chapter discusses the RQ4, which seeks to determine the positive and negative impact of social networks on students in higher education. The survey of student impact was mentioned in 23 papers included in the scope of the review.

The main positive effects can be summarized as follows:

(1) Knowledge sharing: Sharing learning materials on social platforms can promote the dissemination of knowledge and facilitate students' acquisition of knowledge.

(2) Encourage interaction and communication: Because social media can share information in real time, students can gain in-depth learning experience online; at the same time, forming study groups can reduce communication costs while increasing communication with classmates.

(3) Academic Performance: Students use social media to build a better reputation, share newly acquired knowledge, and exchange documents to improve their academic performance.

(4) Creativity: Using social media encourages students to share their knowledge with their classmates, resulting in more creativity in their research training.

(5) Organizational and collaborative skills: Social media's interactive nature fosters peer-to-peer learning and group interaction, allowing students to gain from conversations in groups and feedback from faculty and peers.

(6) Technology Exposure: Learning using electronic devices exposes students to commonly used computer technologies, which helps develop expertise in digital media and enables them to excel in future job markets in a highly digitized and automated world.

(7) Gain a global perspective: One of the most appealing aspects of social media technology is that it brings students from various countries and regions together. Student exchanges will easily spark ideas and help students gain more diverse thinking.

Based on the preceding points, Table IV lists research articles that mention the positive impact of social media on students.

TABLE IV. POSITIVE IMPACT

Positive impact	Reference	Frequency	Percentage
Knowledge sharing	ID3, ID5, ID7, ID9, ID13, ID14, ID19, ID22, ID24	9	34.6%
Encourage interaction and communication	ID4, ID5, ID7, ID9, ID10, ID12, ID14, ID17, ID20, ID22, ID23	11	42.3%
Academic Performance	ID3, ID8, ID9, ID12, ID17, ID18, ID19, ID20, ID21, ID23	10	38.5%
Gain a global perspective	ID8, ID12	2	7.7%
Organizational and collaborative skills	ID10, ID12, ID15, ID21, ID22	5	19.2%
Technology Exposure	ID5, ID8, ID15	3	11.5%
Creativity	ID7	1	3.8%

The major negative impacts include:

(1) Learning Efficiency: The presence of social media content can distract students, interrupting the learning process and lowering learning efficiency.

(2) Bringing health problems: Long-term use of social media and disconnection from real society may result in psychological issues such as anxiety, depression, and so on.

(3) Blurred professional boundaries: Professional, in-depth disciplinary issues are difficult to comprehend and are not appropriate for dissemination on social media, but they may result in certain misunderstandings.

(4) Privacy concerns: Students' social media posts will be seen by more teachers and classmates, diluting the sense of separation between learning and life.

Based on the preceding points, Table V lists research articles that mention the negative impact of social media on students.

TABLE V. NEGATIVE IMPACT

Negative impact	Reference	Frequency	Percentage
Learning Efficiency	ID1, ID11, ID13, ID14, ID18, ID26	6	23.1%
Bringing health problems	ID11, ID13	2	7.7%
Blurred professional boundaries	ID6	1	3.8%
Privacy concerns	ID14	1	3.8%

E. Student and Teacher Perspectives

This chapter identifies the RQ5 and sheds light on student and teacher attitudes toward the app and how it affects their experience, which can be summarized broadly as follows:

(1) Satisfactory or Effective: Using social media in higher education results in a good learning experience and can improve user's efficiency, to

help users learn better; in addition to improving some aspects of others' skills.

(2) Partially Satisfied: The social network was deemed satisfactory at certain points in its pursuit of educational objectives. Some participants believed that social media could help them with their teaching or research and that it would be a better fit for teaching in the future. However, in some cases, it is considered inapplicable or insufficient.

(3) Doubtful or worried perspectives: Participants expressed reservations about learning activities through social networks, as well as concerns about long-term consequences. Although students find traditional teaching difficult to interact with peers, the majority prefer traditional learning.

(4) Overwhelming Opposition: Due to the abrupt technological transition, some employees struggled to adapt. Many had to create new teaching programmed, which increased their workload. While adjusting to a new study schedule and dealing with the current pandemic situation, some participants reported feeling stressed or anxious.

Table VI contains a list of research articles on student and teacher perceptions of social media use based on the points raised above.

TABLE VI. STUDENT AND TEACHER PERSPECTIVES

Attitude	Reference	Frequency	Percentage
Satisfactory or Effective	ID2, ID3, ID4, ID7, ID9, ID16, ID20, ID21, ID24	9	34.6%
Partially Satisfied	ID5, ID6, ID8, ID10, ID12, ID14, ID15, ID17, ID20, ID23	10	38.5%
Doubtful or worried perspectives	ID13, ID18, ID19, ID22,	4	15.4%
Overwhelming Opposition	ID1, ID11, ID26	3	11.5%

F. Recommendations and Strategies

This section is an answer to RQ6. The purpose of this section is to summarize the options presented by study participants for better integrating social media into higher education in the post-pandemic era.

The following are the main recommendations:

(1) Appropriate and efficient platform: Generate more segmented teaching functions on social platforms, such as learning resources, expertise blending, expanding learning scope, and so on, to make e-learning portals more functional, accessible, and user-friendly.

(2) High-quality teaching research: Higher-quality research is required to identify long-term effects on knowledge and skills or emerging teaching practices, clarify professional standards, and thus lead to innovative models of good practice.

(3) Developing policy and consensus: Policymakers should be aware of and address any risks or inequalities that may arise because of the rapid transition to online learning; researchers should work to build community consensus on social media professionalism.

(4) Support for students: both technical and psychological. Introduce some modern technology courses to ensure students can use media tools smoothly; improve and maintain student motivation to combat any anxiety caused by the lockdown.

(5) Diversification: To maximize efficiency, use a range of online resources. For instance, taking a course might involve texting, anonymous online forums, and videoconferencing all at once.

(6) Staff training: Teacher training is a critical component of integrating social networking into higher education. Such training should include knowledge on how to create online technologies and how to manage privacy and security issues when using social media.

(7) Accurate marketing strategies: Correct social media account strategies and tactics can make it easier to create workable solutions that can be applied to higher education and the larger nonprofit sector.

(8) Don't abuse social media: If higher education institutions use social media in moderation, these platforms can become dominated by "noise," disrupting students' learning experiences. After the pandemic has passed, students' higher education experiences can be improved through offline interactions rather than digital means.

Table VII contains a list of research articles that propose the previously stated suggestions and strategies.

TABLE VII. RECOMMENDATIONS AND STRATEGIES

Recommendations and Strategies	Reference	Frequency	Percentage
Appropriate and efficient platform	ID3, ID4, ID5, ID10, ID15, ID21, ID22, ID23, ID24	9	34.6%
High-quality teaching research	ID6, ID8, ID9, ID22, ID24	5	19.2%
Developing policy and consensus	ID2, ID6, ID7, ID13, ID14, ID19, ID20, ID25	8	30.8%
Support for students	ID7, ID18, ID19, ID20	4	15.4%
Diversification	ID9, ID12, ID20	3	11.5%
Staff training	ID14, ID17, ID18, ID19, ID22	5	19.2%
Accurate marketing strategies	ID16	1	3.8%
Don't abuse social media	ID1, ID10, ID11, ID12, ID26	5	19.2%

IV. DISCUSSION

Today, as streaming media has completely transformed people's lives, higher education has also opened a new phase. The worldwide prevalence of the COVID-19 pandemic has made social media technology an irreplaceable and important role in the field of education, as well as bringing new research focus areas.

To begin with, there is a trend of increased research in this field, with papers published in 2021 accounting for half of the selected papers, indicating that as the pandemic continues, the research value in this field has grown. The distribution of journal publications demonstrates that researchers in education, information, chemistry, and technology are still interested in this interdisciplinary field. Future research in this area should concentrate on how social media works in subdivided subject areas, with the goal of developing new software or functions that are relevant to education.

Second, in terms of research methods, experimental research (61.5%) outnumbers survey research (38.5%), because experimental research can assist researchers in validating a hypothesis and obtaining unique and valuable conclusions. There are also more quantitative studies (50%) than qualitative studies (30.8%) and hybrid studies (19.2%), with quantitative studies primarily used to investigate the relationship between social media and student performance.

The review concentrated on the impact of social media on students, with positive outcomes including improved academic performance, exposure to technology, improved organizational and collaboration skills, and a broad perspective. However, negative consequences include health and privacy concerns. The next issue that policymakers and educational institutions must consider is how to use social media for learning activities in an efficient and safe manner.

According to current teacher and student attitudes toward the use of social media in education, while a few people expressed their rejection of social media, they believed that the massive change caused them stress and anxiety. However, most people still have a positive attitude toward social media and believe it will continue to evolve to better serve higher education.

While many social media platforms have made it critical for educational institutions to be able to teach online during the covid pandemic, we have also learned how to avoid disrupting education during times of emergency. However, in the post-epidemic era, when face-to-face teaching and offline exams are gradually resuming, the question of how to provide better services on a more efficient platform remains.

Based on the above problems, the researchers put forward the following suggestions. For higher education institutions, combining the activities of social media platforms with normal offline teaching activities enables students to obtain higher efficiency and experience; for teachers, they should be encouraged to explore new course designs on social media In order to obtain higher research or teaching quality; for relevant policy makers, the contradictions and hidden dangers brought by online education should be discovered as soon as possible, and the problems should be solved to better promote the effective use of social media.

V. Conclusion

This review screened 26 papers for systematic research on the use of social media in higher education during the COVID-19 pandemic. It analyses and summarizes the published situation, the focus of the research, the impact on students, and the future development of the industry by answering six main research questions. The review discovered that there is an increasing amount of research in this area, but it is primarily focused on student performance studies, and there is a lack of review of the higher education industry. Furthermore, quantitative research is the primary method for students, data is primarily obtained through questionnaires and interviews, and data analysis methods such as structural model equations, variance analysis, and regression analysis are used. It can be concluded that the use of social media in higher education will continue to be a valuable research direction in the future, and the researchers' findings will have significant implications for the industry's future development.

However, there are numerous limitations to this review. First, the search is restricted to four scientific databases, and relevant literature from other databases may be excluded. Second, only English-language journals were considered for review, excluding excellent papers written in other languages. Finally, the review spans only from 2019 to the present, and the conclusions drawn from such a short time frame may be insufficient. It is expected that in the future, the search scope will be expanded to include data sets, journal types, and time ranges to conduct more general research.

Appendix Included Papers

ID	Title	Journal Title	Publisher	Reference
ID1	Can digital technologies improve students' efficiency? Exploring the role of Virtual Learning Environment and Social Media use in Higher Education	Computers and Education	Elsevier	[14]
ID2	Exploring the usage of social media in extant campus sustainability assessment frameworks for sustainable campus development	International journal of sustainability in higher education	Emerald Publishing Limited	[15]
ID3	Individual motivation and social media influence on student knowledge sharing and learning performance: Evidence from an emerging economy	Computers and Education	Elsevier	[16]
ID4	Turning Information Dissipation into Dissemination: Instagram as a Communication Enhancing Tool during the COVID-19 Pandemic and Beyond	Journal of Chemical Education	American Chemical Society	[17]

ID5	Social media in knowledge translation and education for physicians and trainees: a scoping review	Perspectives on Medical Education	Springer	[18]
ID6	Social media in undergraduate medical education: A systematic review	MEDICAL EDUCATION	Wiley	[19]
ID7	Usage of social media, student engagement, and creativity: The role of knowledge sharing behavior and cyberbullying	Computers and Education	Elsevier	[20]
ID8	Active learning tools improve the learning outcomes, scientific attitude, and critical thinking in higher education: Experiences in an online course during the COVID-19 pandemic	Biochemistry and Molecular Biology education	Wiley	[21]
ID9	Rapid Adaptation of a Traditional Introductory Lecture Course on Catalysis into Content for Remote Delivery Online in Response to Global Pandemic	Journal of Chemical Education	American Chemical Society	[22]
ID10	A multi-stakeholder view of social media as a supporting tool in higher education: An educator student perspective	European management journal	Elsevier	[23]
ID11	Examining the impact of digital technologies on students' higher education outcomes: the case of the virtual learning environment and social media	Studies in Higher Education	Society for Research into Higher Education	[24]
ID12	Social Media Applications Affecting Students 'Academic Performance: A Model Developed for Sustainability in Higher Education	Technology and Innovation Management in Education	Multidisciplinary Digital Publishing Institute	[25]
ID13	What leads to social learning? Students' attitudes towards using social media applications in Omani higher education	Education and information technologies	Springer	[26]
ID14	Students' perceptions on social media teaching tools in higher education settings	Communication & society	Universidad de Navarra	[27]
ID15	Snapping, pinning, liking, or texting: Investigating social media in higher education beyond Facebook	The internet and higher education	Elsevier	[28]
ID16	Getting Granular—Uncovering Actionable Insights for Effective Social Media Management in the Higher Education Sector	Journal of Nonprofit & Public Sector Marketing	Taylor and Francis Ltd.	[29]
ID17	Social media usage by higher education academics: A scoping review of the literature	Education and information technologies	Springer	[5]
ID18	Impact of social media use on student satisfaction in Higher Education	Higher education quarterly	Wiley	[30]
ID19	Responses to COVID-19 in Higher Education: Social Media Usage for Sustaining Formal Academic Communication in Developing Countries	Sustainable Education and Approaches	Multidisciplinary Digital Publishing Institute	[31]
ID20	Breaching Learners' Social Distancing through Social Media during the COVID-19 Pandemic	2nd Edition of Social Media and Public Health: Opportunities and Challenges	Multidisciplinary Digital Publishing Institute	[32]
ID21	A study on the determinants of social media based learning in higher education	Educational Technology Research and Development	Springer	[33]
ID22	The academic turn: social media in higher education	Education and information technologies	Springer	[34]
ID23	The Influence of Information System Success and Technology Acceptance Model on Social Media Factors in Education	Sustainability	Multidisciplinary Digital Publishing Institute	[35]
ID24	Evaluation of higher education services: social media learning	International Journal of Information and Learning Technology	Emerald Publishing Limited	[36]
ID25	Social Media for Engaging and Educating: From Universities' Sustainability Reporting to Dialogic Communication	Corporate Social Responsibility, Stakeholder Engagement, and Universities	Multidisciplinary Digital Publishing Institute	[37]
ID26	The effects of social media usage on attention, motivation, and academic performance	Active learning in higher education	SAGE publication Ltd	[38]

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGMENT

The author wishes to thank the School of Natural, Mathematical and Engineering Sciences at King's College London for resource support.

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