OPTIMIZING PRE-UNIVERSITY EDUCATION WITH SOCIAL MEDIA INTEGRATION. A LITERATURE REVIEW

Elena Georgiana Zamfiroiu
Alexandru Ioan Cuza University of Iaşi, Faculty of Economics and Business Administration, Iasi, Romania
georgiana.zamfiroiu@feaa.uaic.ro
ORCID: 0009-0004-2998-1495

Radu Mircea Georgescu
Alexandru Ioan Cuza University of Iaşi, Faculty of Economics and Business Administration, Iasi, Romania
mirceag@uaic.ro
ORCID: 0000-0002-7022-3715

Abstract: *The speed at which information is shared in the digital age is astounding. In a relatively short period, we've gone from lugging around numerous heavy textbooks to having all the information we need at our fingertips through a simple tap on a screen. Today, information is readily available to anyone and is easier than ever to find and sift through. Social media has become ubiquitous among younger generations, representing a versatile tool within the educational landscape. The youth consistently engage with social networking platforms, utilizing them not only for leisure but also as integral mediums for acquiring and disseminating information and knowledge. This article serves as a starting point to a comprehensive study. By drawing upon articles sourced from diverse databases and employing bibliometric analysis using VOSViewer software, the article endeavors to scrutinize the impact of various frameworks aimed at integrating social media technologies into educational process. It seeks to delineate the evolutionary trajectory of these frameworks while we point out the discerned positive but also the less favorable aspects.*

Key words: *ICT, education, social media, high school.*

JEL classification: *A19, A20, A21, A22, A31*

1. INTRODUCTION

In recent years, the integration of technology and the role of social media within educational contexts, particularly In the midst of the COVID-19 pandemic, has become paramount. While social media facilitates swift student engagement, ongoing concerns persist regarding its impact on academic performance and excessive Internet use. Academic performance encompasses students comprehension of concepts and performance in exams. Despite limited research on the correlation between social media usage and academic performance, this relationship varies by country. Nonetheless, social media remains popular among university students, underscoring its significance in educational contexts. Understanding social media's acceptance as a learning tool is essential for effective knowledge dissemination, yet resistance to new technology may impede progress (Rfeqallah, 2021).

According to the definition in the Explanatory Dictionary of the Romanian Language (DEX), a framework is a conceptual or structural framework that provides an organizational and functional basis for the development and implementation of a variety of projects or systems. It may include a set of rules, principles, standards, and tools that help

define the architecture, interactions, and workflows in a coherent and efficient manner. In the field of software development, a framework can provide a modular and reusable skeleton for building an application, as well as facilitate integration with other components or technologies (*https://dexonline.ro/*, accesed on 25.03.2024).

The transition to Web 2.0 and now to Web 3.0 has profoundly altered how people communicate, with significant implications across various domains, especially in the extensive use of social media. This paradigm shift has prompted a reconfiguration of higher education, with institutions increasingly adopting digital technologies, recognizing their transformative potential. This shift has transformed social media from mere communication tools into integral components of the educational process, facilitating interactive interactions between students and instructors, and providing access to a variety of learning resources. (Oktavia et al., 2016)**.** Thus, the modernization of advising and consulting practices must be intricately woven into this digital fabric, ensuring alignment with contemporary technological trends to foster equitable, adaptable, and effective student support **(**Salem,et al, 2017).

This article focuses on conducting an in-depth bibliometric analysis using VOSviewer, a specialized tool for analyzing word and citation networks, to evaluate and illustrate the impact of specific theoretical frameworks. These frameworks are developed to optimize the learning process in the academic and educational context. The bibliometric analysis aims to identify the connections and mutual influences between different theoretical frameworks, highlighting the significant contributions made by each of them in the field of education. Therefore, the research provides a detailed perspective on how these theoretical frameworks are perceived, integrated, and applied in educational practice, thus contributing to understanding the evolution and trends in the field of educational technologies.

2. LITERATURE REVIEW

Gawade's study focuses on the impact of using the WhatsApp platform in the field of education, particularly in the context of the COVID-19 crisis. It examines how the utilization of WhatsApp has influenced the teaching and learning process,

highlighting both the advantages and disadvantages of this platform in the educational environment. Additionally, the study analyzes students' perception of using WhatsApp compared to traditional teaching methods. While it does not explicitly mention the use of a specific theoretical framework in analyzing the impact of WhatsApp usage in education, the research may have been structured around relevant theoretical concepts or models for assessing the influence of technology in the learning process. The study's conclusions emphasize both the positive and negative aspects of using WhatsApp in education during the COVID-19 pandemic. (Gawade, 2023)

The advantages of using WhatsApp in education include facilitating communication between students and teachers, the ability to share various types of information, accessibility to multiple forms of communication, flexibility in interaction, and saving travel time to school. On the other hand, the disadvantages include the lack of face-to-face interaction, information overload, potential technology dependence, associated costs, and difficulty in monitoring students during online learning sessions. (Gawade, 2023)

On the other hand Nicholas study delves into how social media, particularly Facebook, is utilized for collaboration among educators across different educational sectors, such as early childhood and primary education. The research examines teachers' interactions within a dedicated Facebook group, focusing on how they improve their professional practice and assist children in transitioning to school. Through Activity Theory, the study explores how knowledge and learning are mediated by social tools and interactions, providing insights into the challenges and opportunities of online collaboration in education. The conclusions underscore the benefits of social networks in facilitating collaboration and professional learning among teachers, while also highlighting potential drawbacks such as distractions and privacy concerns. This highlights the need for careful management of social media use to maximize benefits while minimizing risks in professional collaboration. (Nicholas, 2024)

Tanty Oktavia examines the applicability of the Zachman Framework in the context of social learning in higher education. Within the study, key

factors of social learning are identified and distributed across each of the six major components of the Zachman Framework: What (Data), How (Function), Where (Network), Who (People), When (Time), and Why (Motivation). Through this strategic integration, the authors propose the development of a specific conceptual architecture for higher education, drawing upon theoretical and empirical knowledge from the field of social learning. This endeavor is envisioned to provide not only a clear and coherent structure but also a robust framework for the efficient implementation and management of social learning processes in the higher academic environment. The author has identified numerous benefits in utilizing the Zachman Framework within the pre-university education context. Among these include providing a universally applicable structure, facilitating efficient integration of social learning factors into a conceptual architecture. This approach supports the design process of social learning models, while also offering a clear and detailed method for identifying and managing relevant information and data. However, there are also drawbacks, including the necessity of validation by internal and external domain experts, the requirement for statistical approaches to measure the quality of identified factors, study limitations stemming from reliance on specialized literature, and the complexity of implementing a social learning model based on the Zachman Framework, necessitating careful planning, adequate resources, and expertise in enterprise architecture and information systems. (Oktavia et al., 2016)

On the other hand, the framework proposed by Salem et al. consists of a web and mobile platform that facilitates communication and time management between instructors and students. It utilizes a secure HTTPS connection and authentication for access, with access based on authentication. The framework interacts with a local database to record activities and can interact with other learning platforms. The advantages include increased efficiency, improved accessibility, security, and development potential. It allows students to interact with instructors without the need for face-to-face meetings, simplifying counseling and consulting processes. (Salem, et al., 2017)

A study proposed by Maged Rfeqallah investigates how the use of social media platforms influences students' performance in academics by integrating the Technology Acceptance Model (TAM) with factors from the communication theory. This conceptual approach focuses on exploring how self-regulation influences the relationship between social media usage and academic outcomes. Despite the advantages offered by using social media in education, such as rapid access to information and facilitating collaboration, there are also associated disadvantages, such as excessive dependence, security issues, and difficulties in time management. It is essential to carefully evaluate both the benefits and challenges of social media usage in an educational context to maximize its positive impact on the learning process and students' academic performance (Rfeqallah, M, 2021). Another study made by Alhumaid et al. explore social media acceptance post-Covid-19, proposing a hybrid model merging TAM with social factors. Through 500 student surveys, they unveil insights into social media's role in learning. Benefits include enhanced understanding and practical guidance for technology integration in education. (Alhumaid, et al., 2022)

The study conducted by Alhumaid, and colleagues focuses on understanding the factors influencing students' intention to use social media for educational purposes post-Covid-19. It proposes a hybrid theoretical model drawing from the Technology Acceptance Model (TAM), this study investigates the impact of perceived social influence., social capital, and mobility in social media acceptance in education (Alhumaid, et al., 2022). In contrast, Rfeqallah's study explores how social media platforms affect students' academic performance by integrating TAM with factors from communication theory, particularly analyzing the moderating role of self-regulation in shaping the connection between social media usage and academic performance. (Rfeqallah, M, 2021)
While Alhumaid et al. emphasize the importance of factors such as perceived social influence and social capital in shaping students' intention to use social media for educational purposes (Alhumaid, et al., 2022), Rfeqallah's study focuses on the interaction between social media usage and academic outcomes, highlighting the potential moderating role of self-regulation. Additionally,

Rfeqallah's study discusses both the advantages and disadvantages of using social media in education, such as rapid access to information and time management difficulties, while Alhumaid and colleagues primarily focus on identifying factors influencing social media acceptance post-Covid-19. (Rfeqallah, M, 2021)

Alex Becheru's research endeavors to devise a conceptual framework geared towards extracting knowledge within a social learning milieu through the lens of social network analysis methods. This framework, designed around the eMUSE social learning platform, aims to discern and amalgamate methodologies for scrutinizing student interactions. eMUSE is an educational platform developed at university of Craiova to support social and collaborative learning processes. It brings together various social media tools such as blogs, wikis, web page annotation, microblogging, and media content sharing.Its overarching objective is to enrich collaborative learning endeavors by distilling and visually representing pertinent insights. Through this framework, key elements such as collaborative network identification, collaboration quantification, relevant student or community identification, course environment appraisal, external influence analysis, instructor intervention evaluation, and coherent information presentation are meticulously addressed. The adoption of this framework promises a gamut of benefits, including enhanced comprehension of student relationships, refined collaboration dynamics assessment, timely identification of non-participatory students, enriched course environment scrutiny, nuanced insight into external collaboration influencers, judicious evaluation of instructor interventions, and streamlined knowledge elucidation. (Becheru, A et al. 2017) The study by Jagatheesaperumal delves into the potential of Extended Reality (XR) and Internet of Everything (IoE)-enabled metaverses to enhance education. It explores how these emerging technologies can provide more engaging and personalized learning experiences while also examining the challenges and open issues in implementing IoE in educational metaverse environments. The study introduces the XR-ED framework, designed for developing XR systems tailored to instructional needs. Its aim is to offer a personalized and interactive learning experience adapted to educational users' specific requirements. In conclusion, the study highlights the transformative potential of XR technologies and IoE-enabled metaverses in education. These technologies offer advantages such as interactive learning experiences, realistic simulations, and tailored instruction. However, challenges like technology dependence and data security issues must be addressed for their effective implementation. (Jagatheesaperumal, 2022)

In the contemporary educational environment, the use of digital technologies is becoming increasingly common, bringing with it numerous ethical challenges. The educational metaverse, a virtual platform where students and teachers interact, is no exception. Here, the development and implementation of digital games are crucial but also raise significant ethical dilemmas. In this context, the study "SimCollege" and its associated ethical framework provide opportunities for exploration and understanding of the impact of digital games in promoting ethical behavior within the educational metaverse. Through their analysis, ethical issues can be identified and addressed, contributing to the development of a responsible and ethical virtual education. (Wu et al., 2022)

The framework proposed by author Katharina Sophie Stark integrates research from multiple relevant domains for the effective use of videos in higher education. It combines aspects of professional vision, video implementation, technological pedagogical knowledge, and interactive, constructive, active, and passive learning activities. Through this framework, educators receive a practical and accessible guide, providing support in planning, implementing, evaluating, and disseminating video-based teaching and learning scenarios in various academic fields. It is designed to offer a coherent and structured approach for researching and implementing video-based teaching and learning. This framework addresses the need for clear direction and effective methods to maximize the benefits of using videos in the educational process, offering higher education an innovative and efficient way to support the development of students' skills and improve their engagement and involvement in learning. (Stark et al., 2023)

Compared to Stark's research on video utilization in education, Doukakis' study delves into the integration of e-tutoring initiatives within secondary education. While Stark investigates video usage to bolster student competency across diverse academic realms, Doukakis offers a comprehensive framework for facilitating online interactions between educators and pupils, aiming to augment the learning outcomes of students. (Doukakis, et. al., 2020) In their study, Alturki and Blanchfield propose a conceptual framework for the expansion of mobile computing in higher education in Kuwait. This framework includes a structure that provides guidance for curriculum developers and other parties involved in the education process. Through this framework, the aim is to facilitate innovation in higher education in Kuwait and to extend the educational experience in the same way as in other countries. (Alturki, et al, 2018) Compared to other studies, the framework proposed by Alturki and Blanchfield focuses on the successful adaptation of mobile learning in the specific context of higher education in Kuwait. It offers a detailed approach to addressing the challenges and barriers faced in implementing mobile learning in this region. Through this framework, the goal is to ensure an efficient methodology for mobile learning, to improve the educational process, and to provide a broader educational experience for students in Kuwait. (Alturki, et al, 2018)

2.1. METHODOLOGY

In the pursuit of research for this article, an extensive analysis was conducted on the repository of scholarly articles available within the esteemed Clarivate Web of Science database. Renowned for its comprehensive collection of peer-reviewed publications, this database was utilized as the primary reservoir for sourcing relevant data. Employing a meticulously crafted search strategy, outlined in Figure 1, the initial exploration resulted in the identification of an impressive compilation of 9,639 articles.

**Figure 1.** The string of keywords used.
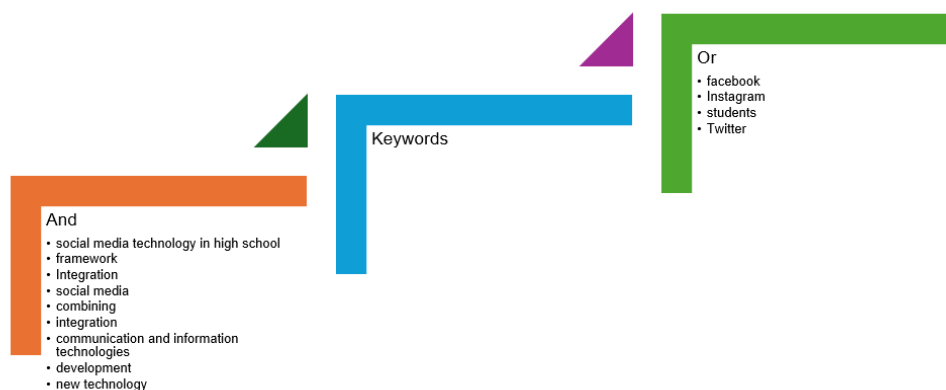
Through careful examination of key terms and relevant context, we have chosen to narrow down the research interval to the years 2022-2024. This methodological decision reflects our aim to ensure that the data and information obtained are pertinent and up-to-date regarding recent developments in the research field. This filtering process has led to a decrease in the total number of articles to 2,034.
An additional filtration criterion was applied at the level of individual articles, wherein a thorough scrutiny was conducted to ensure alignment with the study's objectives and relevance to the research topic. This meticulous evaluation led to a discerning reduction in the total count from 2034 to 1884. A further refinement was implemented to prioritize articles published in English, the predominant language of international scholarly communication. This strategic filtration aimed to enhance accessibility and comprehension across diverse audiences. Through this rigorous selection process, we meticulously curated the dataset, culminating in a refined total of 1787 articles. This meticulous approach underscores our commitment to scholarly rigor and the pursuit of high-quality research. Another crucial aspect considered was the accessibility of articles, a criterion reflecting our commitment to transparency and equal access to knowledge. Thus, we chose to filter only those

articles that are freely available for reading, ensuring that information is accessible to all, regardless of financial resources. This decision not only reflects our desire to promote transparency in research but also to facilitate the dissemination and sharing of knowledge to as wide an audience as possible. By applying this rigorous filter, we managed to reduce the number of articles to 1217, representing a careful selection of materials that are not only relevant to our research objectives but also accessible to anyone wishing to explore them. The careful selection of these articles ensures not only the quality but also the accessibility of the information we present in our study. Another pivotal filtering parameter pertained to the categorization within the Clarivate Web of Science database. Consequently, we meticulously selected articles falling within our specific domains of interest: "Computer Science Interdisciplinary Applications," comprising 17 articles, "Educational Research," encompassing 68 articles, and "Economics," consisting of 13 articles. This meticulous filtration process culminated in a refined dataset comprising a total of 98 articles eligible for inclusion in our study. The residual articles did not correspond to the thematic domains of interest delineated for our study. Despite their presence within the broader corpus, they lacked substantive relevance or applicability to the focal topics of "Computer Science Interdisciplinary Applications," "Educational Research," and "Economics." Therefore, they were excluded from further consideration to maintain the study's coherence and relevance to our specified research objectives.

The final refinement stage involved the use of Zotero software, renowned for its ability to identify and manage PDF files attached to articles. This functionality was crucial to ensure that we had access to the full text of the selected articles, thereby enhancing the coherence and reliability of our data. By using this tool, we eliminated articles for which we did not have access to complete PDF files, focusing exclusively on those for which we could access the entire content. This filtering stage strengthened the quality and relevance of our dataset, ensuring that each article included in the study underwent a thorough and rigorous analysis. As a result, we were left with a final number of 68 articles, which were subsequently examined in detail in our research. Figure 2 illustrates the intricate steps involved in bibliometric analysis, outlining the methodology from initial data selection to geographical filtering, exclusion of non-open-access sources, and the final curation of the dataset. This visual representation underscores the rigorous and systematic approach adopted to ensure the accuracy and reliability of the research outcomes. The sheer volume of papers generated highlights the robust interest in the field under investigation. No filters were initially applied to the gathered publications, enabling a comprehensive analysis using VOSviewer. Through the development of network graphs, intricate connections between keywords, authors, and institutions were revealed.

The analysis primarily aimed at identifying prominent trends and collaborative relationships among authors and institutions, with a particular focus on emerging research areas such as artificial intelligence and machine learning.

Figure 2. Own bibliometric analysis process
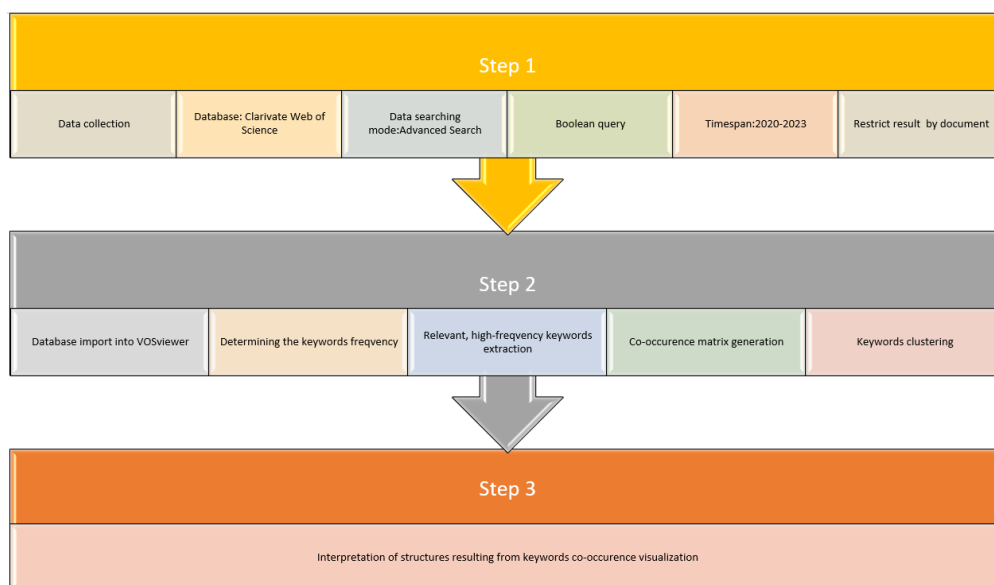
A meticulous process was undertaken for keyword selection, requiring a minimum occurrence threshold of 10. This process resulted in the identification of 174 significant keywords, which were further refined to 254 based on a relevance score mechanism, ensuring a comprehensive and relevant representation of the literature. The significance of the keyword selection process cannot be overstated, as it plays a pivotal role in providing an accurate depiction of the research domain under scrutiny. By anchoring the data analysis and insights on these carefully chosen keywords, we ensure a comprehensive and in-depth exploration of the subject matter at hand. These keywords serve as the foundation upon which our analysis is built, guiding us through the vast landscape of research literature and allowing us to navigate key concepts, themes, and trends within the field. By focusing our attention on these central terms, we can uncover the underlying patterns, connections, and nuances inherent in the body of literature, ultimately leading to more informed and insightful conclusions. In essence, the meticulous selection of keywords serves as a compass, guiding us through the complexities of the research landscape and facilitating a nuanced understanding of the subject matter. It allows us to capture the essence of the domain and ensures that our analysis remains both comprehensive and focused, thereby enhancing the validity and reliability of our findings.

3. RESULTS AND DISCUSSIONS BASED ON THE BIBLIOMETRIC ANALYSIS

Bibliometric research represents a meticulously structured quantitative methodology that scrutinizes academic literature through a lens focused on the network of bibliographic references. This methodological approach hinges on the examination of citation frequency and breadth, serving as empirical metrics to gauge the influence and impact of scholarly works. The broad applicability of bibliometrics spans across diverse academic domains, offering a comprehensive evaluation of scholarly impact attributed to authors, publications, and institutions. Through the analysis of citation patterns and trends, bibliometric research provides invaluable insights into the dynamic landscape of knowledge dissemination and discovery, facilitating a deeper comprehension of the underlying mechanisms driving contemporary scholarship.

Cluster analysis constitutes a pivotal component within the realm of bibliometric research, amplifying data interpretation by unearthing latent patterns and thematic clusters embedded within the scholarly network. By pinpointing interconnected nodes and thematic clusters, researchers gain visibility into the intricate web of relationships linking researchers, institutions, and their contributions to scholarly dialogue. This symbiotic relationship between bibliometric analysis and cluster investigation not only enriches the assessment of research impact but also illuminates emerging paradigms and interdisciplinary intersections shaping the academic landscape. Through the synergistic integration of these complementary methodologies, scholars can navigate the complexities of scholarly communication with precision, fostering collaboration, innovation, and the continuous advancement of knowledge across disciplinary boundaries.
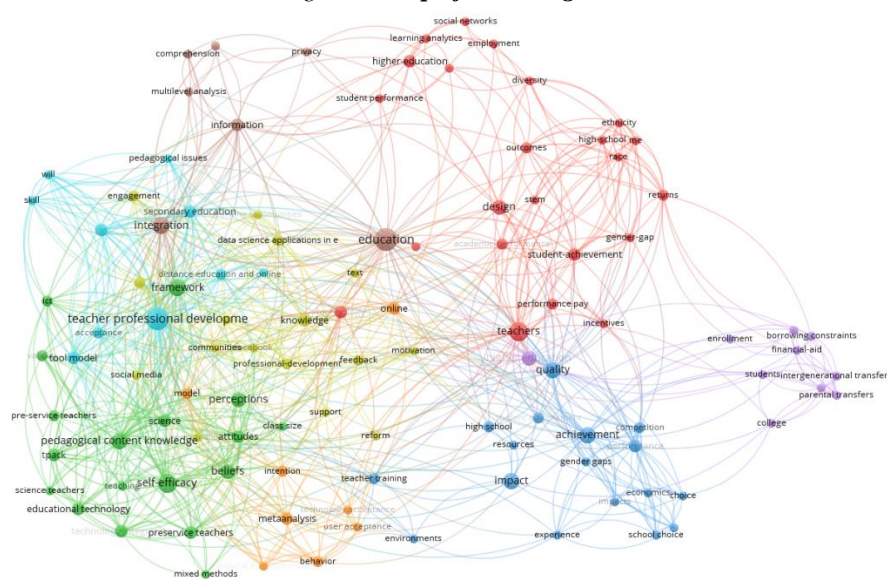
*Figure 3. **Map of recurring words***

Figure 3 provides a detailed analysis of the clusters identified within the academic network. We observe that one of the most prominent and influential clusters is associated with the field of education. This suggests that academic literature in the field of education is central and vital within the analyzed research network. The educational cluster indicates a significant concentration of works, authors, and institutions contributing to the development and advancement of knowledge in this domain.

This finding offers profound insight into the importance and impact of education within the academic network, highlighting the relevance and diversity of research conducted in this field. It also suggests that the field of education is active and dynamic, with multiple connections and collaborations among various actors in the academic community. Cluster analysis helps us to paint a clearer and more detailed picture of the academic landscape, highlighting trends, connections, and emerging directions in educational research.

In Figure 4, we observe that "education" emerges as a pivotal keyword within the analyzed academic network. It serves as a central node, intricately linked to several thematic clusters, including "framework," "integration," and "teacher professional development."

This interconnectedness underscores the multifaceted nature of education as a domain of scholarly inquiry, indicating its relevance and significance across various facets of research discourse.

Figure 4. Education cluster
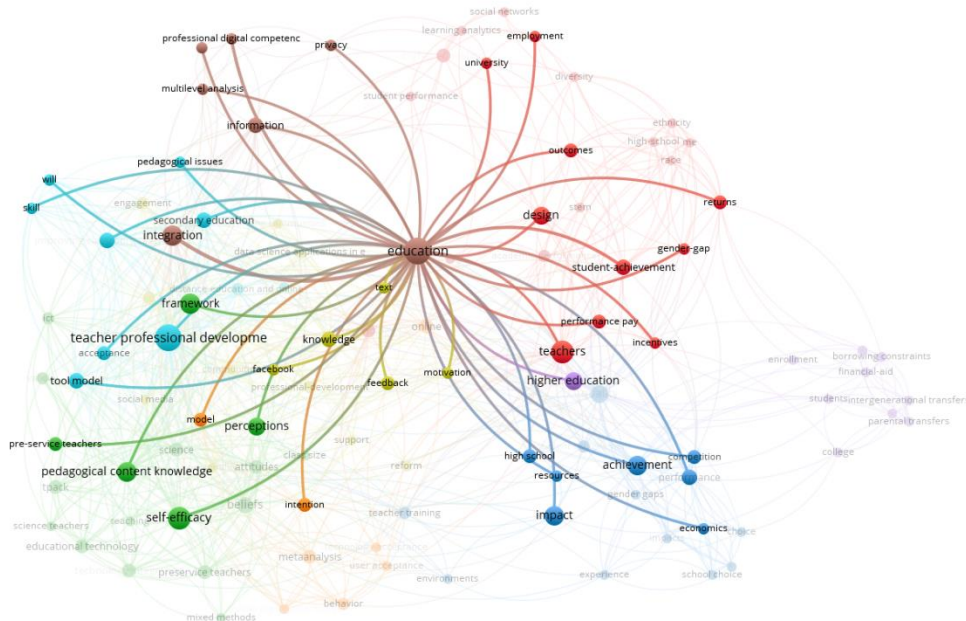
The presence of "education" as a central keyword suggests its overarching importance in shaping the scholarly landscape, with its connections to diverse thematic clusters reflecting its broad scope and interdisciplinary nature. The association with clusters such as "framework," "integration," and "teacher professional development" further elucidates the key dimensions and subfields within the realm of education that are actively explored and researched. This intricate network of connections highlights the dynamic interplay between different concepts and areas of inquiry within the field of education, emphasizing the interconnected nature of research endeavors and the multidimensional perspectives through which education is studied and understood. Figure 5 provides a comprehensive visualization of the interconnections within the "framework" cluster, which holds particular significance for the article under study. This cluster serves as a pivotal nexus, linking various themes such as social media, pedagogical content knowledge, and improving classroom teaching. The prominence of the "framework" cluster suggests its central role in contextualizing and organizing the discourse surrounding the research topic. Its connections to themes like social media underscore the evolving landscape of educational practices, where digital technologies play a transformative role in pedagogy and communication.

Figure 5. Education cluster
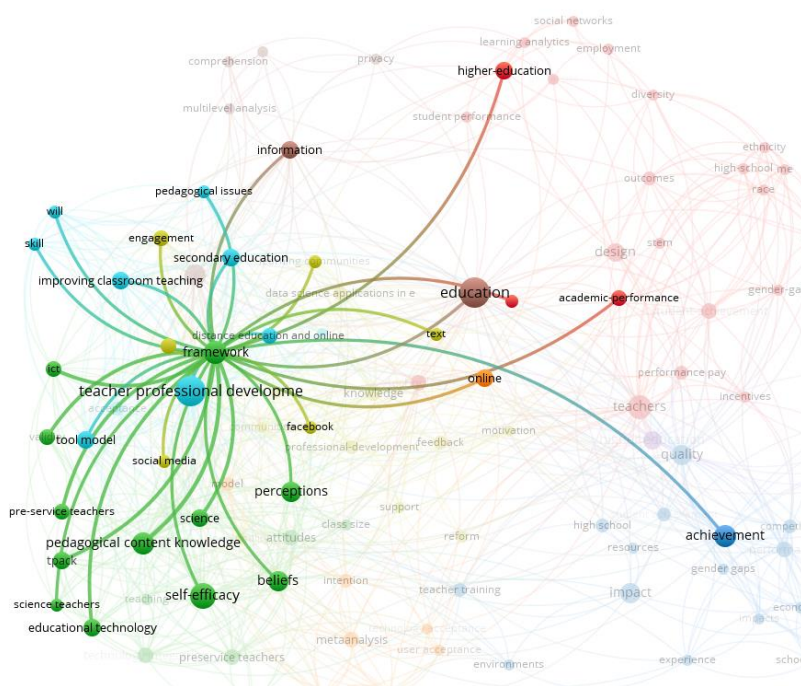
Moreover, the linkage to pedagogical content knowledge reflects an emphasis on the theoretical underpinnings of teaching and learning, indicating a scholarly focus on the intersection between subject matter expertise and instructional strategies.

Furthermore, the association with "improving classroom teaching" highlights the practical implications of research within this cluster, emphasizing a commitment to enhancing teaching practices and educational outcomes.

Figure 6. Facebook cluster
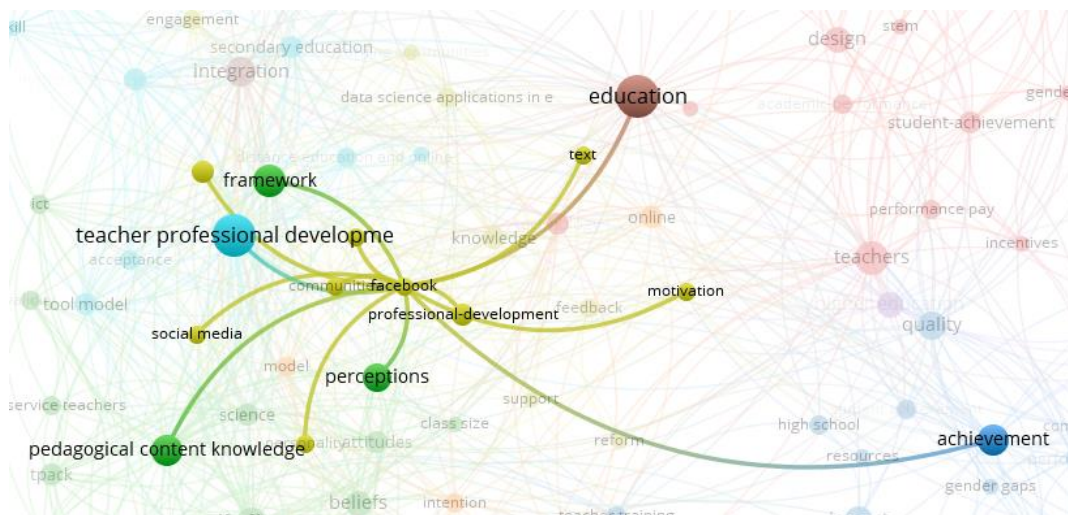
Another significant cluster with connections to both education and the "framework" and "pedagogical content knowledge" clusters is "Facebook." This cluster denotes a focal point within the academic network, highlighting the platform's relevance and influence in educational contexts.

The presence of "Facebook" within the cluster analysis underscores the growing importance of social media platforms in educational settings, where they serve as dynamic tools for communication, collaboration, and learning. The inclusion of "Facebook" in this cluster suggests a specific focus on this particular platform and its

implications for educational practices and frameworks.

Moreover, the connections to the "framework" cluster indicate that discussions surrounding "Facebook" in education are often situated within broader theoretical frameworks or conceptual models. This suggests that scholars are actively exploring the ways in which social media platforms like "Facebook" intersect with established frameworks for educational research and practice.

Additionally, the linkage to "pedagogical content knowledge" suggests a focus on the integration of "Facebook" into instructional practices, highlighting efforts to leverage the platform to enhance teaching effectiveness and support student learning outcomes. Another highly significant cluster, which is closely related to both the "framework" and "education" clusters, is "integration." This cluster serves as a crucial focal point within the academic network, indicating a profound intersection between theoretical frameworks and educational practices.

Figure 7. Integration Cluster
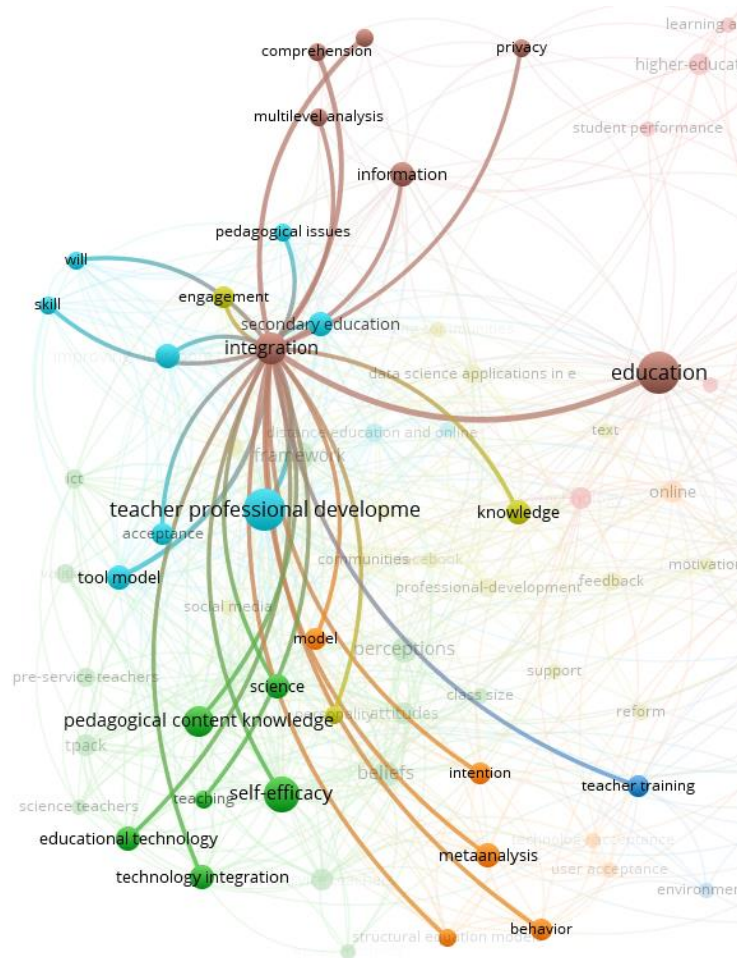
The "integration" cluster's connections to both the "framework" and "education" clusters suggest its pivotal role in bridging theoretical constructs with practical applications in educational settings. This signifies a concerted effort among researchers to explore how various theoretical frameworks can be integrated into educational practices to enhance teaching and learning outcomes.

Moreover, the connections to themes such as "knowledge information" and "educational technology" underscore the multifaceted nature of the "integration" cluster. This indicates that

scholars are actively investigating how information and communication technologies, as well as digital resources, can be effectively integrated into educational contexts to support teaching and learning processes.

The presence of the "integration" cluster within the academic network reflects a growing recognition of the importance of seamlessly incorporating diverse elements, such as theoretical frameworks, technological tools, and educational practices, to create cohesive and effective learning

environments. By examining the connections between these clusters, researchers can gain valuable insights into the complex dynamics shaping contemporary educational discourse and identify strategies for fostering integration and innovation within educational settings.

CONCLUSIONS

The current study conducted an extensive bibliometric analysis on the usage of different types of frameworks in education. This analysis involved examining numerous scholarly works to identify trends, patterns, and developments regarding the utilization and application of these frameworks in educational practice.

Although social media networks have existed for many years and have been used to some extent in the education system, increased interest in them was sparked with the onset of he COVID-19 pandemic has led to considerable shifts and hurdles in the field of education, prompting educational institutions to seek t solutions to continue the educational process in a virtual environment.

In this context, social media networks have become valuable tools for educators, providing the opportunity to maintain contact with students and facilitate communication and collaboration in the online environment. Teachers began to explore different social platforms, such as Facebook, Twitter, or Instagram, to connect and interact with students outside of class hours.

Additionally, social media networks have been used to facilitate the exchange of information and educational resources among teachers, parents, and students. These platforms have become places where teaching materials, activity suggestions, or educational advice can be shared, thus contributing to supporting the learning process in a virtual environment.

Although in the articles found there have been attempts to use various frameworks to integrate technology into the learning process, very few have focused on the integration of social media networks, thus opening a new horizon for research, namely the integration of social media networks in the teaching-learning process.

So far, academic literature has traditionally addressed the use of technology in education, focusing on tools such as e-learning platforms, mobile applications, or simulation programs. However, integrating social media networks into the educational process represents relatively uncharted territory, with the potential to bring new ways of engaging students and fostering collaboration between them and teachers.

Using social media networks in education can offer multiple advantages, such as increasing student interaction and engagement, facilitating collaboration and communication among members of the educational community, and creating a more dynamic and interactive learning environment.

However, integrating social media networks into the teaching-learning process also raises some challenges and risks, such as managing data confidentiality, monitoring students' online behavior, and managing time spent on social platforms to the detriment of academic activities.

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