International Journal of Contextual Science Education (IJCSE)
e-ISSN. 3046-8876
Vol. 2, No. 4, December 2024
pp. 116-125

Model Coaching Supported by LMS in E-Module Development: A Systematic Literature Review on Enhancing Teacher Competence

Ni Nengah Sri Swathi[1*], A.Wahab Jupri[1,2], AA Sukarso[1,2], I Putu Artayasa[1,2], Joni Rokhmat[1,2]
[1]Doctoral Program in Science Education, Graduate School, University of Mataram, NTB, Indonesia
[2]Biology Education Program, Faculty of Teacher Training and Education, University of Mataram, NTB, Indonesia
[3]Physics Education Program, Faculty of Teacher Training and Education, University of Mataram, NTB, Indonesia
Corresponding author email: ninengahsriswathi@gmail.com

Accepted: November 30th 2024, Approved: December 18th 2024, Published: December 31st 2024

Abstract— This study explores the integration of Learning Management Systems (LMS) with coaching models to enhance teacher competencies, particularly in e-module development. Using the PRISMA framework, the systematic literature review synthesizes global research from 2019 to 2024. The findings emphasize the transformative impact of LMS-supported coaching in professional development, highlighting themes such as digital competency enhancement, collaborative learning, and adaptability in remote education. Significant contributions emerge from regions like are noted in regions such as the United States, the United Kingdom, and Indonesia, alongside persistent challenges including technological disparities, cultural resistance, and infrastructural limitations. The study identifies emerging technologies, including artificial intelligence and adaptive LMS, as promising solutions for advancing teacher training. These insights underscore the need for inclusive, scalable strategies to address global educational challenges and improve teacher professional development frameworks strengthen frameworks for teacher professional development.

Keywords— Learning Management Systems, Teacher Professional Development, Coaching Models, E-Module Development
How to Cite— Nengah, N. N. S. S., A.Wahab Jupri, AA Sukarso, I Putu Artayasa, & Joni Rokhmat. (2024). Model Coaching Supported by LMS in E-Module Development: A Systematic Literature Review on Enhancing Teacher Competence. *International Journal of Contextual Science Education*, *2*(4), 116-125. https://doi.org/10.29303/ijcse.v2i4.820

1. Introduction

The integration of Learning Management Systems (LMS) with coaching models represents a pivotal advancement in teacher professional development, addressing the dynamic needs of educators in the digital age. This synergy empowers teachers to enhance their skills in developing and utilizing e-modules, which are essential tools for fostering critical thinking, engagement, and academic success in students. Teachers are the cornerstone of education form the foundation of educational systems, and equipping them with effective methodologies and tools is integral to improving learning outcomes.

Coaching, augmented by LMS, has emerged as a transformative approach, providing personalized, data-driven feedback and fostering collaboration through evidence-based practices. Research underscores that coaching improves instructional effectiveness and student outcomes, particularly when frameworks such as the Pyramid Model and gradual release strategies are employed are applied effectively (Collet, 2015; Fettig & Artman-Meeker, 2016). LMS platforms further enhance these coaching interventions by offering flexible, accessible, and data-rich environments for monitoring and optimizing teacher progress (Balang et al., 2019; Christopher et al., 2023).

The LMS-coaching model supports lifelong learning principles and mitigates geographic disparities in professional development access. This integration is particularly relevant in addressing rapidly changing curricula and technological advancements in education (Dippenaar & Schaap, 2017; Tarwiyah et al., 2019). E-modules play a crucial role, enabling self-directed, interactive, and adaptive learning experiences. These digital resources enhance motivation and critical thinking through multimedia and learner-centered designs learner motivation and critical thinking skills through multimedia content and learner-centered instructional designs (Miftakhurrohmah et al., 2023; Septianti et al., 2022).

In STEM disciplines, e-modules have demonstrated notable success in cultivating analytical and problem-solving skills, signifying a shift toward adaptive, personalized learning environments (Putri, 2023). This digital transformation mirrors broader educational trends emphasizing flexibility and innovation (Reza et al., 2022). However, the implementation of LMS-supported coaching in Indonesia faces barriers, including limited educator digital proficiency, infrastructural deficiencies, and resistance to technological change encounters significant barriers such as limited digital proficiency among educators, inadequate infrastructure, and resistance to adopting technological innovations (Mayuni et al., 2022; Russell et al., 2020). Cultural preferences for face-to-face interactions further challenge adoption, highlighting the need for strategies that address localized needs are tailored to address specific local needs (Green et al., 2023).

This systematic literature review explores effective LMS-supported coaching models for e-module development, with a focus on enhancing teacher competencies in Indonesia. Utilizing the PRISMA framework, the study synthesizes global research to

identify best practices, challenges, and opportunities. The findings aim to inform scalable and inclusive professional development initiatives, bridging traditional coaching practices with digital innovations integrating traditional coaching practices with innovative digital tools. This research contributes critical insights for educators, policymakers, and developers striving to enhance education through strategic technological interventions.

2. Method

This systematic literature review employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to ensure methodological transparency, rigor, and reproducibility. PRISMA is widely recognized as a robust approach for systematically identifying, selecting, and synthesizing research findings in a structured and replicable manner (Rosidah, 2024; Wei et al., 2023). This study focused on literature published between 2019 and 2024 to capture recent advancements the latest advancements in Learning Management Systems (LMS) and coaching models for teacher professional development, with a particular emphasis on e-module development.

The review process encompassed extensive searches in major academic databases, including Scopus, Web of Science, ERIC, and Google Scholar. These databases were selected for their comprehensive coverage of peer-reviewed articles, conference proceedings, and academic reports (Docktor & Mestre, 2014). Search queries incorporated targeted keywords such as “Coaching Models,” “Model Coaching,” “Learning Management System,” “E-Module,” “Teacher Competence,” and “Coaching berbantuan LMS.” Boolean operators and filters were applied to refine search results and ensure precision and relevance (Sumarni et al., 2019).

Eligibility criteria for study inclusion were meticulously defined. Selected studies needed to address LMS-supported coaching for teacher professional development, emphasize e-module design, and meet the following standards: publication in peer-reviewed sources, a focus on empirical data, and adherence to the timeframe of 2019–2024. Publications in English and Indonesian were considered. Studies were excluded if they lacked empirical evidence, addressed unrelated topics, or were duplicates did not provide empirical evidence, focused on unrelated topics, or were identified as duplicates. This approach ensured the inclusion of high-quality, relevant research (Ripsam, 2024; Đorđević et al., 2021).

Data collection and extraction followed a structured protocol to capture key study attributes, including title, authorship, publication year, methodology, findings, and relevance to the research objectives. Bibliometric tools such as Vosviewer were utilized to visualize keyword co-occurrence and thematic trends, facilitating the identification of significant patterns and relationships across the literature (Sumarni et al., 2019). Analytical methods incorporated thematic synthesis to evaluate the effectiveness of LMS-supported coaching models, implementation challenges, the challenges of implementation, and their impact on teacher competencies.

To ensure the validity and reliability of findings, the quality of included studies was assessed based on adherence to established methodological standards, alignment with the research objectives, and compliance with PRISMA guidelines. This rigorous evaluation process strengthened the reliability of the synthesized insights reinforced the dependability of the synthesized findings (Đorđević et al., 2021). Ethical considerations were meticulously addressed by accurately citing all sources, maintaining transparency, and exclusively relying on secondary data to minimize ethical risks and uphold research integrity.

This methodology enabled a comprehensive synthesis of existing knowledge on LMS-supported coaching models. The findings provide evidence-based recommendations for enhancing teacher professional development and advancing e-module creation. By addressing critical gaps and challenges, the study contributes valuable insights for improving professional development practices in diverse educational contexts.

3. Results and Discussion

The analysis of research trends in LMS-supported coaching and e-module development reveals substantial growth, propelled by advancements in digital learning technologies and global educational shifts caused by the COVID-19 pandemic. An examination of Scopus data, encompassing 3,377 documents published from 2014 to 2024, highlights a notable rise in scholarly attention, particularly after 2020. This surge aligns with the urgent demand for remote learning solutions and the increased integration of LMS into teacher professional development, reflecting the academic community's response to pandemic-induced challenges challenges brought about by the pandemic (Perry et al., 2021; Aldosari et al., 2022).

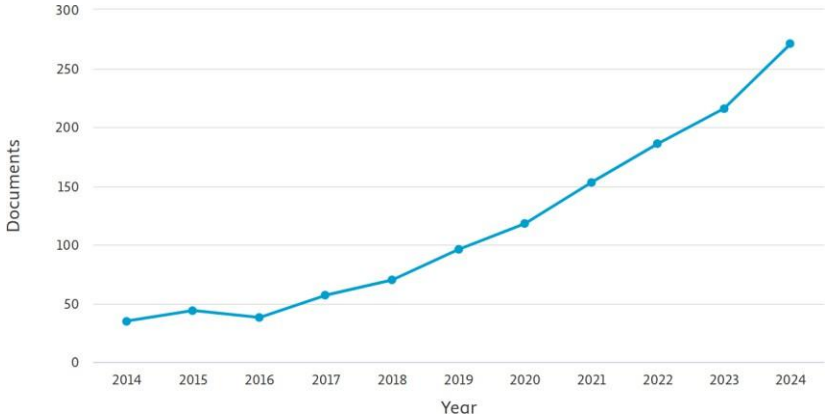

Figure 1. Document by Year

The annual trends indicate a gradual increase in publications starting in 2017, corresponding to the broader adoption of educational technologies and recognition of their potential to enhance teaching competencies. A sharp rise post-2020 underscores the intensified focus on LMS-supported coaching as educators adapted to remote and hybrid learning environments. By 2024, the field reached its peak, affirming peaked, confirming the pivotal role of LMS in professional development (Baig, 2023).

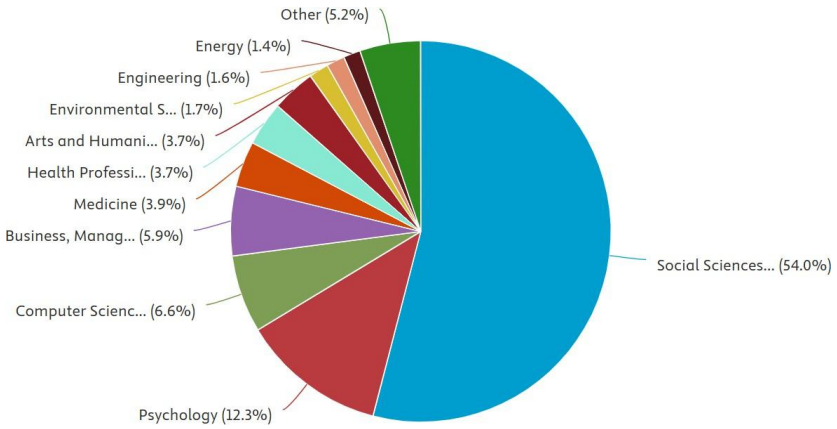

Figure 2. Document by Subject Area

Analysis of subject areas reveals the interdisciplinary nature of LMS research. Social sciences dominate with 54% of publications, emphasizing its strong ties their strong connection to education and pedagogy. Psychology accounts for 12.3%, highlighting growing interest in behavioral and cognitive responses to LMS-based learning. Contributions from computer science (6.6%) demonstrate the technological innovations underlying LMS platforms, while publications in business, medicine, and the arts reflect the diverse applications of e-modules and coaching models in specialized contexts (Timonen & Ruokamo, 2021).

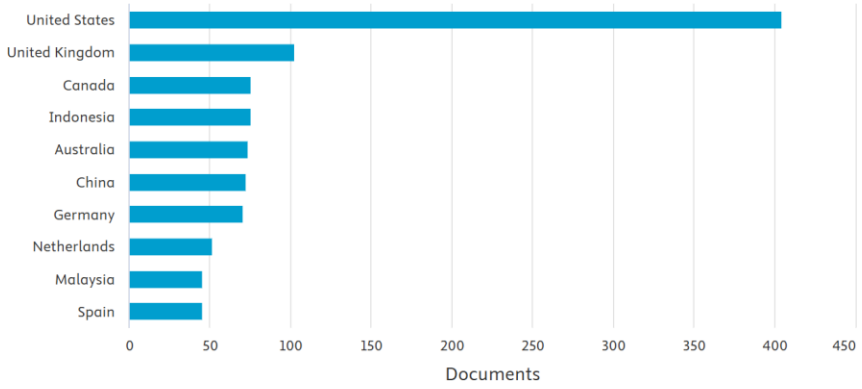

Figure 3. Document by Country or Territory

Geographically, significant contributions originate from the United States, the United Kingdom, and Indonesia. The United States leads with nearly 400 publications, driven by advanced research infrastructure and a focus on digital integration in education. Indonesia's noteworthy position reflects its efforts to address diverse educational challenges through LMS adoption, particularly in geographically dispersed regions. Emerging contributions from China and Malaysia highlight regional efforts to address educational disparities through technological solutions (Wu et al., 2023; Banda, 2024).

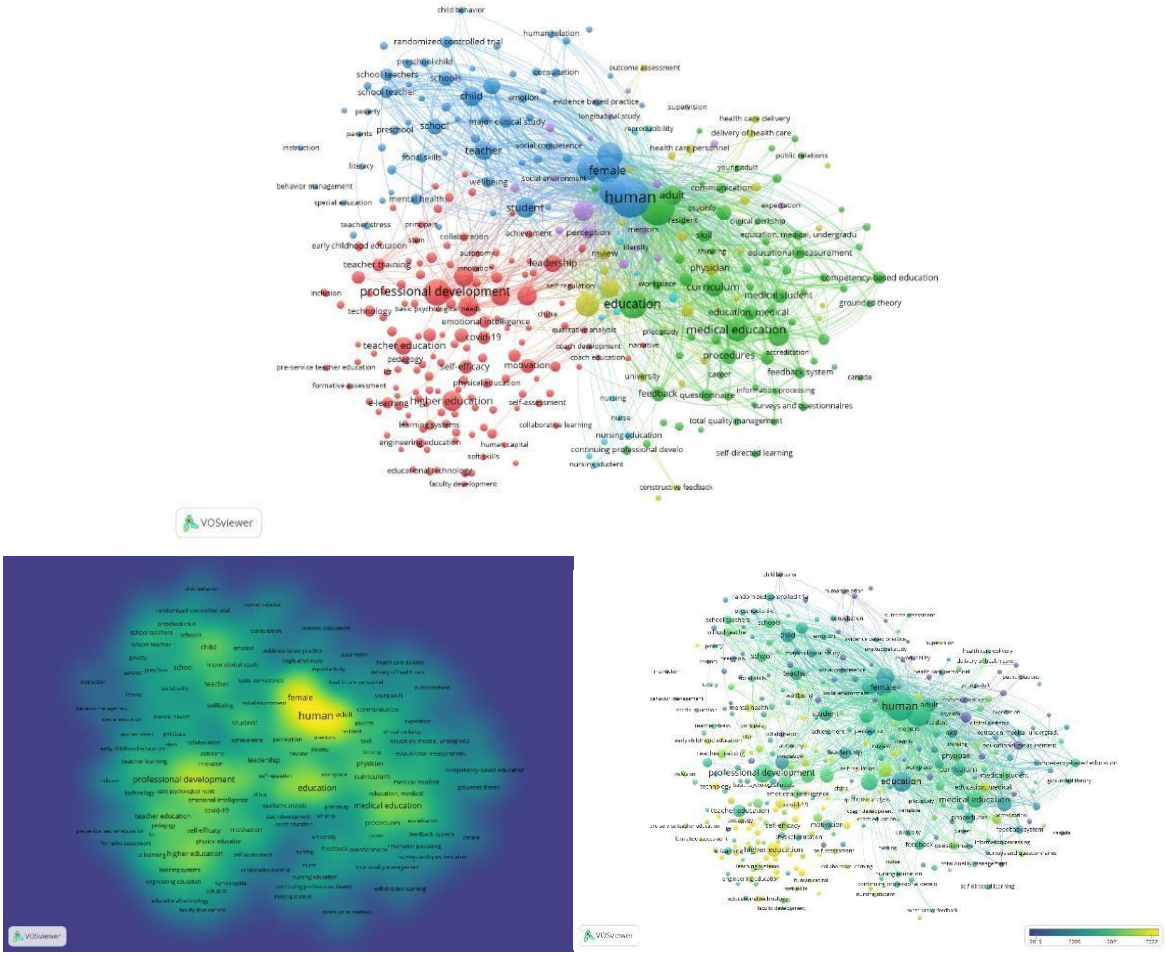

Figure 4. Co-occurance with All Keywords Analysis by Vosviewer

Keyword analysis reveals "professional development," "LMS," and "e-module" as central themes, reflecting their integration in teacher training. The inclusion of terms such as “COVID-19” and “online learning” "COVID-19" and "online learning" illustrates the field’s responsiveness to global shifts in education delivery. Clusters of themes like "teacher education" "educator training" and "digital competence" "technological proficiency" underscore the evolving needs of modern educators to navigate technological advancements (Parra-Camacho et al., 2023; Rakhat et al., 2022).

LMS platforms facilitate collaborative learning, fostering engagement and shared professional growth among educators (Timonen & Ruokamo, 2021). Research highlights their role in building digital competencies and self-efficacy, enabling teachers to confidently integrate technology into their practices while enhancing instructional quality (Berestova et al., 2020; Shatroubi, 2023).

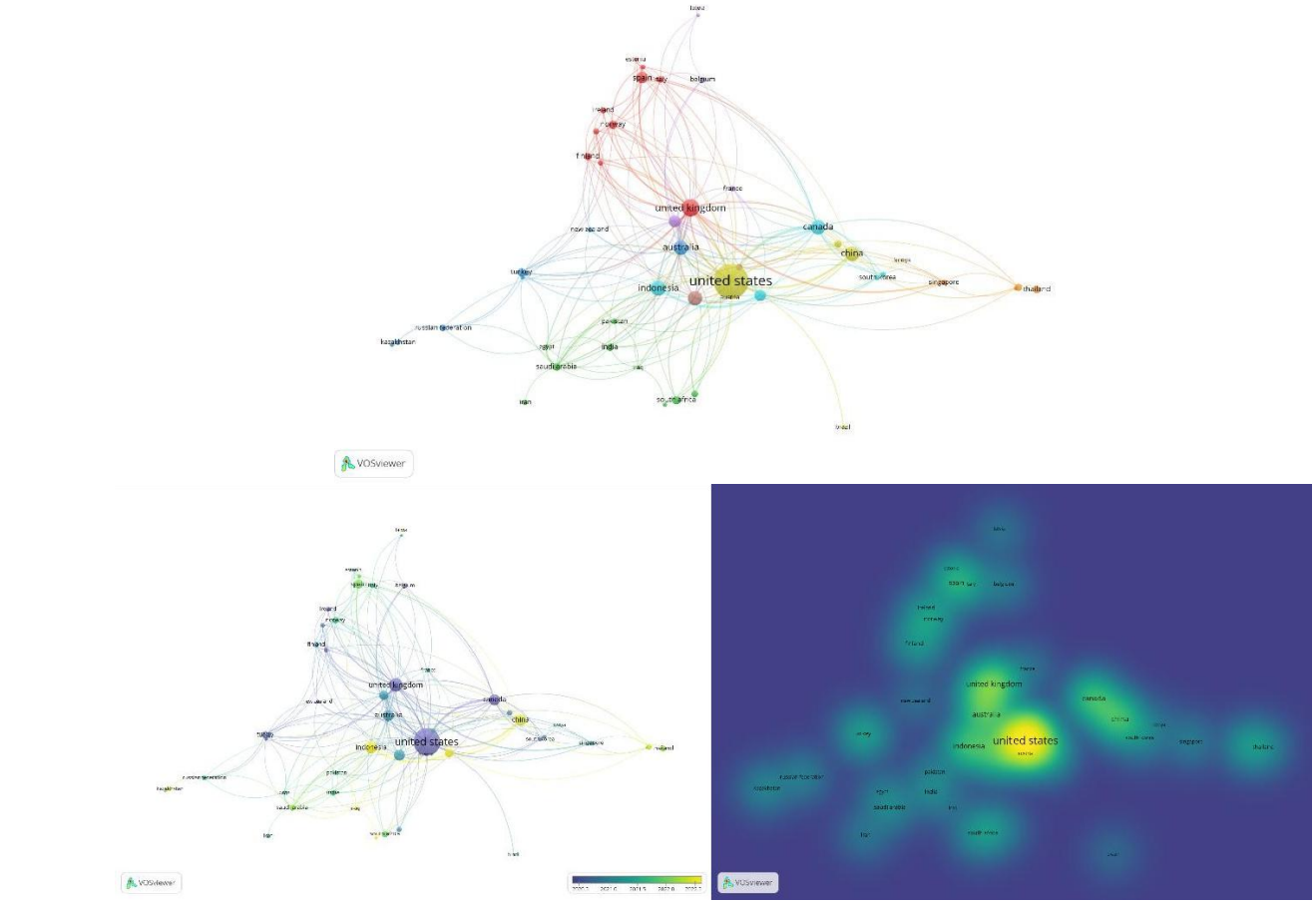

Figure 5. Co-authorship by Countries Analysis by Vosviewer

Collaboration analysis demonstrates robust co-authorship networks between established research hubs like the United States and the United Kingdom. Emerging contributors such as Indonesia and China highlight regional partnerships aimed at addressing localized challenges through LMS-supported coaching (Timonen & Ruokamo, 2021; Wu et al., 2023).

Table 1. Key Articles on LMS and Coaching for Teacher Competence

Author(s) (Year)	Study Title	Methodology	Key Findings	Conclusions
Basaran & Yalman (2020)	Examining Preservice Teachers' Self-Efficacy Levels	Quantitative; Structural Equation Modeling	Male teachers' self-efficacy perceptions were positively influenced by web communication; female teachers benefited more from web pedagogical content knowledge (p. 5–6).	Web-based self-efficacy training impacts teachers differently based on gender, emphasizing personalized approaches to technology integration.
Nguyen et al. (2024)	Factors Affecting ICT Application in Teaching	Mixed-Methods; EFA & CFA Analysis	Identified seven key factors for ICT effectiveness: training methods, content, objectives, LMS usage, facilities, and support systems (p. 60–63).	Effective training must integrate Blended Learning models with well-organized training programs tailored for specific teacher needs.
Baig & Yadegaridehkordi (2023)	Flipped Classroom in Higher Education: Challenges	Systematic Literature Review	Identified technologies such as LMS, content repositories, and collaboration tools; highlighted challenges in adoption and need for better teacher preparation (p. 7–9).	To optimize flipped classrooms, training in diverse tools like LMS and continuous professional development is critical.
Dinnen et al. (2024)	Effective Teacher Professional Development for SMHP	Systematized Review	Key PD elements include interactive sessions, feedback loops, and addressing teachers' self-efficacy; training must be ongoing and involve active teacher participation (p. 6–9).	Continuous PD and teacher involvement in planning ensure effective implementation of mental health and pedagogical innovations.

Author(s) (Year)	Study Title	Methodology	Key Findings	Conclusions
Cromley et al. (2020)	Combined Cognitive–Motivational Modules Delivered Via LMS	Meta-analysis of 10 experiments across 3 universities	Combining cognitive and motivational modules improved grades by ~6.6 percentage points (e.g., from C+ to B−); timely and iterative delivery methods enhanced impact (p. 19–20).	Combined cognitive and motivational supports through LMS provide scalable improvements in student achievement, emphasizing the importance of targeted, context-sensitive approaches.

Among the 1,284 relevant documents identified, five key studies were selected for in-depth analysis (Table 1). These studies illustrate the transformative impact of LMS-supported coaching, emphasizing its effectiveness in fostering teacher competencies through tailored approaches like blended learning models and cognitive-motivational modules (Nguyen et al., 2024; Cromley et al., 2020). The findings underscore the scalability and adaptability of LMS tools in diverse educational contexts.

The results affirm LMS-supported coaching as a transformative approach to modern teacher development, addressing critical barriers such as geographic inaccessibility and digital inequities limited access in remote regions and digital skill gaps. The insights provide a solid foundation for advancing policy and research efforts aimed at optimizing LMS tools for professional development. Future work should focus on sustaining engagement with LMS platforms and exploring emerging technologies such as artificial intelligence to further enhance their impact on education.

This systematic literature review underscores the transformative potential of integrating Learning Management Systems (LMS) with coaching models to enhance teacher professional development. The findings align with established frameworks like TPACK, which emphasize the synergy of technology, pedagogy, and content knowledge as a foundation for effective teaching (Konukman, 2024; Aasheim et al., 2020). LMS functionalities such as real-time feedback, advanced analytics, and adaptive learning pathways enable personalized and scalable professional development programs. These innovations foster constructivist pedagogies, promoting collaborative and reflective teaching practices that empower educators to tackle complex educational challenges (Hinon, 2024; Khurshid et al., 2020).

The surge in research output on LMS-supported coaching post-COVID-19 following the COVID-19 pandemic reflects the urgent global need to adapt educational systems to remote and hybrid learning models. LMS platforms demonstrated resilience in mitigating disruptions and providing continuity in professional development. However, the pandemic also exposed disparities in technological infrastructure and digital literacy, particularly in under-resourced areas like rural Indonesia underserved regions, such as rural Indonesia. Bridging these inequities is critical to ensuring that the advantages of LMS-based coaching are accessible to all educators (Russell et al., 2020; Perry et al., 2021).

The global distribution of research highlights the widespread applicability of LMS-supported coaching. Countries like the United States and the United Kingdom lead in contributions, showcasing robust research ecosystems and advanced technological integration in education. Indonesia's significant presence in the field underscores its commitment to leveraging LMS to address geographic and infrastructural challenges, offering scalable and resource-efficient solutions for teacher training (Rugaiyah et al., 2021; Wang et al., 2023).

The literature emphasizes the critical role of digital competencies in maximizing the effectiveness of LMS tools. Teachers must integrate technical proficiency with pedagogical strategies to optimize these platforms for classroom use. Policymakers are urged to design comprehensive professional development programs that prioritize both technical and pedagogical skill-building (Parra-Camacho et al., 2023; Rakhat et al., 2022). Furthermore, fostering a collaborative culture through peer coaching and mentoring can enhance the adoption of LMS-based strategies, promoting shared growth and professional learning among educators (Montiel-Cabello & Zermeño, 2022; Mynaříková & Novotný, 2020).

Despite these advancements, challenges persist. Resistance to change, insufficient infrastructure, and limited support mechanisms frequently hinder the successful adoption of LMS-supported coaching. Cultural preferences for face-to-face interaction also pose obstacles, particularly in regions where digital engagement remains unfamiliar or undervalued pose additional challenges, especially in regions where digital engagement is less familiar or undervalued. Tailored interventions that address local contexts while fostering innovation are essential. This includes targeted training, infrastructural investments, and sustained mentorship programs to build long-term capacity for LMS-based professional development (Green et al., 2023; Saclarides, 2021).

4. Conclusion

In conclusion, the integration of LMS with evidence-based coaching practices represents a promising pathway for addressing educational inequities and enhancing teacher competencies. This review highlights the importance of developing scalable and inclusive LMS solutions that cater to diverse educational contexts. Future research should explore the sustained impact of LMS on teacher performance and student outcomes, as well as the role of emerging technologies like artificial intelligence in further personalizing professional development frameworks. Policymakers and educational leaders must prioritize investment in LMS platforms to cultivate a culture of lifelong learning, empowering educators to meet the evolving demands of 21st-century education. These efforts will not only improve teaching effectiveness but also contribute to the broader goal of equitable and high-quality education for all learners.

5. Recommendations

Future research on LMS-supported coaching and e-module development provides extensive opportunities for exploration

offers numerous avenues for exploration, particularly through the integration of emerging technologies like artificial intelligence (AI) and adaptive LMS. AI has the potential to revolutionize teacher training by delivering tailored content, feedback, and resources based on individual performance and needs (Shustova, 2024; Parra-Camacho et al., 2023). Adaptive LMS, which dynamically adjusts pacing and content delivery in response to learner progress, can further enhance engagement and effectiveness in professional development programs. These advancements pave the way for creating individualized learning pathways that accommodate diverse teaching styles and competencies (Sagnak & Baran, 2021).

Cross-cultural studies represent a critical area for future research, offering insights into how different cultural contexts influence the adoption and effectiveness of LMS-based coaching. Investigating variations in attitudes toward technology, professional development methodologies, and teaching practices across regions can inform the development of culturally relevant strategies (Irby et al., 2022; Abildgren et al., 2022). Comparative studies between regions such as across regions, including Southeast Asia, Europe, and Africa, could elucidate the socio-economic and cultural factors that shape the scalability and impact of digital coaching models, promoting globally adaptable frameworks (Shatroubi, 2023; Aliriad, 2024).

Ethical considerations in implementing LMS-supported coaching are crucial, particularly in resource-limited settings. Addressing disparities in access to technology is essential to prevent the exacerbation of existing inequalities. Ensuring equitable distribution of digital resources and training opportunities can foster inclusivity in professional development (Guiné et al., 2023; Montiel-Cabello & Zermeño, 2022). Additionally, privacy and data security must be prioritized, especially when platforms involve the collection collect sensitive participant information (Karyotaki, 2024; Bélisle, 2024). Designing programs that align with local cultural norms and educational practices is vital to ensure acceptance and relevance within diverse communities (Levin et al., 2023; Matuszewska-Kubicz, 2023).

Longitudinal studies are needed to investigate the sustained impact of LMS-supported coaching on teacher performance and student outcomes. While current research highlights immediate benefits, deeper exploration into how prolonged engagement with these platforms affects teaching efficacy and classroom environments over time is necessary. Emerging technologies, such as AI-driven analytics and immersive virtual reality training modules, hold significant promise for further personalizing and enhancing professional development frameworks, warranting thorough examination making their thorough investigation essential.

Policymakers and educational leaders are encouraged to invest in scalable, context-sensitive LMS solutions that address both the immediate and evolving needs of educators. Establishing partnerships between technology developers, educational institutions, and local communities can facilitate innovation and ensure the effective implementation of research findings. These collaborative efforts can contribute to building an inclusive and equitable education system that supports lifelong learning, empowering educators to meet the demands of 21st-century education and advancing global educational outcomes drive improvements in global educational outcomes.

References

[1] A., N., Suyanto, S., Arifi, A., Putranta, H., & Azizah, A. (2021). Experiences of participants in teacher professional education on obtaining soft skills: a case study in indonesia. European Journal of Educational Research, volume-10-2021(volume-10-issue-1-january-2021), 313-325. https://doi.org/10.12973/eu-jer.10.1.313

[2] Aasheim, M., Fossum, S., Reedtz, C., Handegård, B., & Martinussen, M. (2020). Examining the incredible years teacher classroom management program in a regular norwegian school setting: teacher-reported behavior management practice, problem behavior in classroom and school environment, teacher self- and collective efficacy, and classroom climate. Sage Open, 10(2). https://doi.org/10.1177/2158244020927422

[3] Abildgren, L., Lebahn-Hadidi, M., Mogensen, C., Toft, P., Nielsen, A., Frandsen, T., … & Hounsgaard, L. (2022). The effectiveness of improving healthcare teams' human factor skills using simulation-based training: a systematic review. Advances in Simulation, 7(1). https://doi.org/10.1186/s41077-022-00207-2

[4] Ada, E., Ahmad, H., Uzun, N., Jowett, S., & Kazak, Z. (2021). Cross-cultural adaptation of the turkish and kuwaiti teacher–student relationship questionnaire in physical education (tsrq- pe teacher version): testing for measurement invariance. Sustainability, 13(3), 1387. https://doi.org/10.3390/su13031387

[5] Akhavan, N. and Walsh, N. (2020). Cognitive apprenticeship learning approach in k-8 writing instruction: a case study. Journal of Education and Learning, 9(3), 123. https://doi.org/10.5539/jel.v9n3p123

[6] Aldosari, A., Eid, H., & Chen, Y. (2022). A proposed strategy based on instructional design models through an lms to develop online learning in higher education considering the lockdown period of the covid-19 pandemic. Sustainability, 14(13), 7843. https://doi.org/10.3390/su14137843

[7] Aliriad, H. (2024). Improvement of motor skills and motivation to learn physical education through the use of traditional games. Teorìâ Ta Metodika Fizičnogo Vihovannâ, 24(1), 32-40. https://doi.org/10.17309/tmfv.2024.1.04

[8] Baig, M. (2023). Flipped classroom in higher education: a systematic literature review and research challenges. International Journal of Educational Technology in Higher Education, 20(1). https://doi.org/10.1186/s41239-023-00430-5

[9] Baker, C. and Galanti, T. (2017). Integrating stem in elementary classrooms using model-eliciting activities: responsive professional development for mathematics coaches and teachers. International Journal of Stem Education, 4(1). https://doi.org/10.1186/s40594-017-0066-3

[10] Balang, N., Mahamod, Z., & Buang, N. (2019). Blended coaching and coaching curve approaches in enhancing teaching competency: a case study. Creative Education, 10(12), 2718-2729. https://doi.org/10.4236/ce.2019.1012198

[11] Banda, L. (2024). Is face-to-face scrambled teaching practice supervision effective amidst natural disasters and pandemics? the teaching practice students' perspectives. Sage Open, 14(2). https://doi.org/10.1177/21582440241241368

[12] Berestova, A., Gayfullina, N., & Tikhomirov, S. (2020). Leadership and functional competence development in teachers: world experience. International Journal of Instruction, 13(1), 607-622. https://doi.org/10.29333/iji.2020.13139a
[13] Berestova, A., Gayfullina, N., & Tikhomirov, S. (2020). Leadership and functional competence development in teachers: world experience. International Journal of Instruction, 13(1), 607-622. https://doi.org/10.29333/iji.2020.13139a
[14] Blazar, D. (2020). Teacher coaching to improve instruction at scale: opportunities and challenges in policy contexts. Teachers College Record, 122(10), 1-9. https://doi.org/10.1177/016146812012201001
[15] Bélisle, M. (2024). The educational development of university teachers: mapping the landscape. Frontiers in Education, 9. https://doi.org/10.3389/feduc.2024.1376658
[16] Chaturvedi, S., Purohit, S., & Verma, M. (2021). Effective teaching practices for success during covid 19 pandemic: towards phygital learning. Frontiers in Education, 6. https://doi.org/10.3389/feduc.2021.646557
[17] Chidayati, N., Distrik, I., & Abdurrahman, A. (2021). Improving students' higher order thinking skill with stem-oriented e-module. Indonesian Journal of Science and Mathematics Education, 4(3), 274-286. https://doi.org/10.24042/ijsme.v4i3.9930
[18] Christopher, C., Wilson, S., Fuhs, M., Layzer, C., & Litschwartz, S. (2023). Preliminary evaluation of a mobile, web-based coaching tool to improve pre-k classroom practices and enhance learning. Education Sciences, 13(6), 542. https://doi.org/10.3390/educsci13060542
[19] Collet, V. (2015). The gradual increase of responsibility model for coaching teachers. International Journal of Mentoring and Coaching in Education, 4(4), 269-292. https://doi.org/10.1108/ijmce-06-2015-0017
[20] Crawford, A., Varghese, C., Hsu, H., Zucker, T., Landry, S., Assel, M., … & Bhavsar, V. (2021). A comparative analysis of instructional coaching approaches: face-to-face versus remote coaching in preschool classrooms.. Journal of Educational Psychology, 113(8), 1609-1627. https://doi.org/10.1037/edu0000691
[21] Dippenaar, M. and Schaap, P. (2017). The impact of coaching on the emotional and social intelligence competencies of leaders. South African Journal of Economic and Management Sciences, 20(1). https://doi.org/10.4102/sajems.v20i1.1460
[22] Docktor, J. and Mestre, J. (2014). Synthesis of discipline-based education research in physics. Physical Review Special Topics - Physics Education Research, 10(2). https://doi.org/10.1103/physrevstper.10.020119
[23] Fettig, A. and Artman-Meeker, K. (2016). Group coaching on pre-school teachers' implementation of pyramid model strategies. Topics in Early Childhood Special Education, 36(3), 147-158. https://doi.org/10.1177/0271121416650049
[24] Green, A., Olsen, A., & Nandakumar, V. (2023). Increasing teacher opportunities to respond in a head start program using a bug-in-ear coaching model. Early Childhood Education Journal, 52(6), 1107-1119. https://doi.org/10.1007/s10643-023-01498-4
[25] Green, A., Olsen, A., & Nandakumar, V. (2023). Increasing teacher opportunities to respond in a head start program using a bug-in-ear coaching model. Early Childhood Education Journal, 52(6), 1107-1119. https://doi.org/10.1007/s10643-023-01498-4
[26] Guiné, R., Oliveira, J., Coelho, C., Costa, D., Correia, P., Correia, H., … & Costa, C. (2023). Professional training in beekeeping: a cross-country survey to identify learning opportunities. Sustainability, 15(11), 8953. https://doi.org/10.3390/su15118953
[27] Hammond, L. and Moore, W. (2018). Teachers taking up explicit instruction: the impact of a professional development and directive instructional coaching model. Australian Journal of Teacher Education, 43(7), 110-133. https://doi.org/10.14221/ajte.2018v43n7.7
[28] Hemmeter, M., Hardy, J., Schnitz, A., Adams, J., & Kinder, K. (2015). Effects of training and coaching with performance feedback on teachers' use of pyramid model practices. Topics in Early Childhood Special Education, 35(3), 144-156. https://doi.org/10.1177/0271121415594924
[29] Hinon, K. (2024). Competency-based online teaching supervision process for technical and vocational preservice teachers. Tem Journal, 1028-1037. https://doi.org/10.18421/tem132-17
[30] Irby, B., Pashmforoosh, R., Druery, D., Lara-Alecio, R., Tong, F., Etchells, M., … & Algert, N. (2022). Virtual professional development on conflict management for school leaders. Frontiers in Education, 7. https://doi.org/10.3389/feduc.2022.84927810.1111/josh.12686
[31] Jakopovic, P. (2021). Coaching to develop teacher professional noticing: planning with students and mathematics in mind. International Journal of Mentoring and Coaching in Education, 10(3), 339-354. https://doi.org/10.1108/ijmce-10-2020-0064
[32] Jakopovic, P. (2021). Coaching to develop teacher professional noticing: planning with students and mathematics in mind. International Journal of Mentoring and Coaching in Education, 10(3), 339-354. https://doi.org/10.1108/ijmce-10-2020-0064
[33] Kamali, J. (2024). Applying galperin model to teacher professional development: a qualitative case study of a peer coaching program. International Journal of Training and Development, 28(3), 275-297. https://doi.org/10.1111/ijtd.12323
[34] Karyotaki, M. (2024). Contributions of the 9-layered model of giftedness to the development of a conversational agent for healthy ageing and sustainable living. Sustainability, 16(7), 2913. https://doi.org/10.3390/su16072913
[35] Khurshid, Z., Brún, A., Moore, G., & McAuliffe, É. (2020). Virtual adaptation of traditional healthcare quality improvement training in response to covid-19: a rapid narrative review. Human Resources for Health, 18(1). https://doi.org/10.1186/s12960-020-00527-2
[36] Konukman, F. (2024). Turkish physical education teachers' use of technology: application and diffusion of technological innovations. Education Sciences, 14(6), 616. https://doi.org/10.3390/educsci14060616
[37] Konukman, F. (2024). Turkish physical education teachers' use of technology: application and diffusion of technological innovations. Education Sciences, 14(6), 616. https://doi.org/10.3390/educsci14060616

[38] Koslouski, J. (2022). Developing empathy and support for students with the “most challenging behaviors:” mixed-methods outcomes of professional development in trauma-informed teaching practices. Frontiers in Education, 7. https://doi.org/10.3389/feduc.2022.1005887
[39] Levin, O., Frei-Landau, R., & Goldberg, C. (2023). Development and validation of a scale to measure the simulation-based learning outcomes in teacher education. Frontiers in Education, 8. https://doi.org/10.3389/feduc.2023.1116626
[40] Maldybayev, U. (2023). The study of professional competencies of physical education teachers in water sports. Retos, 52, 42-51. https://doi.org/10.47197/retos.v52.100838
[41] Maldybayev, U. (2023). The study of professional competencies of physical education teachers in water sports. Retos, 52, 42-51. https://doi.org/10.47197/retos.v52.100838
[42] Maldybayev, U. (2023). The study of professional competencies of physical education teachers in water sports. Retos, 52, 42-51. https://doi.org/10.47197/retos.v52.100838
[43] Matuszewska-Kubicz, A. (2023). Development of competencies by students. the case of the university of lodz. Journal of Education Culture and Society, 14(2), 328-348. https://doi.org/10.15503/jecs2023.2.328.348
[44] Mayuni, I., Leiliyanti, E., Palupi, T., Sitorus, M., & Chen, Y. (2022). Designing literacy e-coaching model for english language teachers of junior high schools in indonesia. Teflin Journal - A Publication on the Teaching and Learning of English, 33(2), 310. https://doi.org/10.15639/teflinjournal.v33i2/310-329
[45] Mayuni, I., Leiliyanti, E., Palupi, T., Sitorus, M., & Chen, Y. (2022). Designing literacy e-coaching model for english language teachers of junior high schools in indonesia. Teflin Journal - A Publication on the Teaching and Learning of English, 33(2), 310. https://doi.org/10.15639/teflinjournal.v33i2/310-329
[46] Miftakhurrohmah, N., Masykuri, M., Ariyani, S., & Noris, M. (2023). Effect of guided inquiry-based excretion system e-module to improve critical thinking and ict literacy skills for students. Jurnal Penelitian Pendidikan Ipa, 9(2), 681-689. https://doi.org/10.29303/jppipa.v9i2.2036
[47] Montiel-Cabello, H. and Zermeño, M. (2022). Rock the boat! shaken by the covid-19 crisis: a review on teachers’ competencies in ict. Frontiers in Education, 6. https://doi.org/10.3389/feduc.2021.770442
[48] Montiel-Cabello, H. and Zermeño, M. (2022). Rock the boat! shaken by the covid-19 crisis: a review on teachers’ competencies in ict. Frontiers in Education, 6. https://doi.org/10.3389/feduc.2021.770442
[49] Mynaříková, L. and Novotný, L. (2020). Knowledge society failure? barriers in the use of icts and further teacher education in the czech republic. Sustainability, 12(17), 6933. https://doi.org/10.3390/su12176933
[50] Parra-Camacho, D., Piqueras, R., & Ballester-Esteve, I. (2023). Influence of teaching digital competence and professional competencies on the professional performance of the soccer coach. Physical Culture and Sport Studies and Research, 99(1), 43-54. https://doi.org/10.2478/pcssr-2023-0012
[51] Parra-Camacho, D., Piqueras, R., & Ballester-Esteve, I. (2023). Influence of teaching digital competence and professional competencies on the professional performance of the soccer coach. Physical Culture and Sport Studies and Research, 99(1), 43-54. https://doi.org/10.2478/pcssr-2023-0012
[52] Parra-Camacho, D., Piqueras, R., & Ballester-Esteve, I. (2023). Influence of teaching digital competence and professional competencies on the professional performance of the soccer coach. Physical Culture and Sport Studies and Research, 99(1), 43-54. https://doi.org/10.2478/pcssr-2023-0012
[53] Parra-Camacho, D., Piqueras, R., & Ballester-Esteve, I. (2023). Influence of teaching digital competence and professional competencies on the professional performance of the soccer coach. Physical Culture and Sport Studies and Research, 99(1), 43-54. https://doi.org/10.2478/pcssr-2023-0012
[54] Parra-Camacho, D., Piqueras, R., & Ballester-Esteve, I. (2023). Influence of teaching digital competence and professional competencies on the professional performance of the soccer coach. Physical Culture and Sport Studies and Research, 99(1), 43-54. https://doi.org/10.2478/pcssr-2023-0012
[55] Perry, T., Findon, M., & Cordingley, P. (2021). Remote and blended teacher education: a rapid review. Education Sciences, 11(8), 453. https://doi.org/10.3390/educsci11080453
[56] Puspitasari, R., Herlina, K., & Suyatna, A. (2020). A need analysis of stem-integrated flipped classroom e-module to improve critical thinking skills. Indonesian Journal of Science and Mathematics Education, 3(2), 178-184. https://doi.org/10.24042/ijsme.v3i2.6121
[57] Putri, S. (2023). E-module with the borg and gall model with a contextual approach to thematic learning. Journal for Lesson and Learning Studies, 6(1), 27-34. https://doi.org/10.23887/jlls.v6i1.57482
[58] Rakhat, B., Sabirova, L., & Makarova, O. (2022). Modern techniques in organizing the individual work of students-future teachers. World Journal on Educational Technology Current Issues, 14(4), 1163-1178. https://doi.org/10.18844/wjet.v14i4.7651
[59] Rakhat, B., Sabirova, L., & Makarova, O. (2022). Modern techniques in organizing the individual work of students-future teachers. World Journal on Educational Technology Current Issues, 14(4), 1163-1178. https://doi.org/10.18844/wjet.v14i4.7651
[60] Raley, S. (2023). An analysis of the self-determined learning model of instruction coaching model principles in high school classrooms. The Journal of Special Education, 58(2), 63-75. https://doi.org/10.1177/00224669231197405
[61] Reza, M., Saleh, R., & Murtinugraha, R. (2022). Students’ perceptions on the use of e-modules in building engineering education study program. Jurnal Pensil, 11(3), 214-230. https://doi.org/10.21009/jpensil.v11i3.28437
[62] Ripsam, M. (2024). Teachers’ attitudes and self-efficacy toward augmented reality in chemistry education. Frontiers in Education, 8. https://doi.org/10.3389/feduc.2023.1293571

[63] Rosidah, R. (2024). Human resource management of physical education teachers for students with special needs in inclusive schools. Retos, 61, 1495-1509. https://doi.org/10.47197/retos.v61.110181
[64] Ruble, L., McGrew, J., Toland, M., Dalrymple, N., Adams, M., & Snell-Rood, C. (2018). Randomized control trial of compass for improving transition outcomes of students with autism spectrum disorder. Journal of Autism and Developmental Disorders, 48(10), 3586-3595. https://doi.org/10.1007/s10803-018-3623-9
[65] Rugaiyah, R., Kustandi, C., Rahmawati, D., & Fadhillah, D. (2021). The improvement of elementary school teachers through web-based clinical supervision. International Journal of Web-Based Learning and Teaching Technologies, 16(5), 158-170. https://doi.org/10.4018/ijwltt.20210901.oa9
[66] Russell, J., Correnti, R., Stein, M., Thomas, A., Bill, V., & Speranzo, L. (2020). Mathematics coaching for conceptual understanding: promising evidence regarding the tennessee math coaching model. Educational Evaluation and Policy Analysis, 42(3), 439-466. https://doi.org/10.3102/0162373720940699
[67] Saclarides, E. (2021). An exploration of challenges and support when coaches model instruction for teachers. International Journal of Mentoring and Coaching in Education, 11(1), 52-68. https://doi.org/10.1108/ijmce-02-2021-0032
[68] Sagnak, H. and Baran, E. (2021). Faculty members' planned technology integration behaviour in the context of a faculty technology mentoring programme. Australasian Journal of Educational Technology, 1-21. https://doi.org/10.14742/ajet.5912
[69] Septianti, S., Muzzazinah, M., & Indrowati, M. (2022). Development of process oriented guided inquiry learning-based e-module to improve critical thinking skill. Jurnal Penelitian Pendidikan Ipa, 8(4), 2070-2077. https://doi.org/10.29303/jppipa.v8i4.1808
[70] Shatroubi, T. (2023). Coaching-based pedagogy and its impact on students' self-regulation among marginalized and segregated communities: palestinian arab middle school students as a case study. Education Sciences, 13(5), 527. https://doi.org/10.3390/educsci13050527
[71] Shatroubi, T. (2023). Coaching-based pedagogy and its impact on students' self-regulation among marginalized and segregated communities: palestinian arab middle school students as a case study. Education Sciences, 13(5), 527. https://doi.org/10.3390/educsci13050527
[72] Shustova, S. (2024). Topical issues of methodology of developing mentor's communication competence through teaching foreign languages. Integration of Education, 28(1), 40-51. https://doi.org/10.15507/1991-9468.114.028.202401.040-051
[73] Sumarni, S., Ramadhani, R., Sazaki, Y., Astika, R., Andika, W., & Prasetiyo, A. (2019). Development of "child friendly ict" textbooks to improve professional competence of teacher candidates : a case study of early childhood education program students. Journal for the Education of Gifted Young Scientists, 7(3), 643-658. https://doi.org/10.17478/jegys.596095
[74] Sumedi, S., Mayuni, I., & Sulistyaningrum, S. (2022). Investigating the implementation of an online literacy coaching program for junior high school english teacher. Nobel Journal of Literature and Language Teaching, 13(1), 117-137. https://doi.org/10.15642/nobel.2022.13.1.117-137
[75] Tarwiyah, S., Bharati, D., & Sutopo, D. (2019). Professional learning through coaching: toward the enhancement of the teachers' pedagogical competence.. https://doi.org/10.31235/osf.io/xsku9
[76] Timonen, P. and Ruokamo, H. (2021). Designing a preliminary model of coaching pedagogy for synchronous collaborative online learning. Journal of Pacific Rim Psychology, 15. https://doi.org/10.1177/1834490921991430
[77] Timonen, P. and Ruokamo, H. (2021). Designing a preliminary model of coaching pedagogy for synchronous collaborative online learning. Journal of Pacific Rim Psychology, 15. https://doi.org/10.1177/1834490921991430
[78] Wang, C. (2024). Education reform and change driven by digital technology: a bibliometric study from a global perspective. Humanities and Social Sciences Communications, 11(1). https://doi.org/10.1057/s41599-024-02717-y
[79] Wang, Q., Zhang, N., & Ma, W. (2023). Chinese efl teachers' use of digital resources in doing research: its current status and influential factors. Sage Open, 13(1). https://doi.org/10.1177/21582440231153852
[80] Wei, X., Chow, M., Huang, L., Huang, X., & Cheng, G. (2023). Teacher evaluation in primary and secondary schools: a systematic review of ssci journal publications from 2012 to 2022. Sustainability, 15(9), 7280. https://doi.org/10.3390/su15097280
[81] Wetzel, M., Hoffman, J., Maloch, B., Vlach, S., Taylor, L., Svrcek, N., … & Lavender, H. (2018). Coaching elementary preservice teachers. International Journal of Mentoring and Coaching in Education, 7(4), 357-372. https://doi.org/10.1108/ijmce-12-2017-0074
[82] Wu, S., Zhu, X., Tian, G., & Xiao-wei, K. (2023). Exploring the relationships between pre-service preparation and student teachers' social-emotional competence in teacher education: evidence from china. Sustainability, 15(3), 2172. https://doi.org/10.3390/su15032172
[83] Đorđević, A., Klochkov, Y., Arsovski, S., Stefanović, N., Shamina, L., & Pavlović, A. (2021). The impact of ict support and the efqm criteria on sustainable business excellence in higher education institutions. Sustainability, 13(14), 7523. https://doi.org/10.3390/su13147523
[84] Акимова, О., Dorozhkin, E., Чапаев, Н., Kiseleva, A., & Stroganova, A. (2021). Determination of the elements of architecture students' readiness to conduct professional activities. International Journal of Engineering Pedagogy (Ijep), 11(2), 102. https://doi.org/10.3991/ijep.v11i2.18431