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A Bibliometric Analysis of Epistemic Beliefs Research: Trends and Knowledge Structure in Education

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ABSTRACT

This study aims to provide a comprehensive bibliometric analysis of epistemic beliefs research in education by examining its development, intellectual structure, and emerging trends. Using a dataset of publications indexed in Scopus from 2010 to 2025, this study applies bibliometric techniques, including co-occurrence, overlay, and density visualization, to map the evolution of the field. The analysis was conducted using VOSviewer to identify key themes, influential topics, and relationships among research variables. The findings reveal that epistemic beliefs research is strongly centered on educational contexts, with dominant themes including learning, teaching, epistemology, and higher education. Over time, the field has evolved from focusing on pedagogical structures and curriculum design toward learner-centered constructs such as motivation, self-efficacy, and epistemic cognition. More recent trends indicate a growing emphasis on critical thinking, artificial intelligence, and digital learning environments, reflecting the increasing complexity of knowledge construction in contemporary education. The density analysis further highlights a mature research core complemented by emerging topics that offer significant opportunities for future investigation. Despite its growth, the field remains fragmented across disciplines, suggesting the need for greater theoretical integration and practical application. This study contributes to the literature by providing a systematic mapping of epistemic beliefs research and offering insights into its future directions, particularly in addressing challenges related to digital transformation and information evaluation in education.

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1. INTRODUCTION

Education in the twenty-first century increasingly emphasizes not only the acquisition of knowledge but also the understanding of how knowledge is constructed, justified, and evaluated [1]. Within educational psychology and learning sciences, this dimension is conceptualized through the notion of epistemic or epistemological beliefs. Epistemic beliefs refer to individuals' beliefs about the nature of knowledge, including what counts as knowledge, how knowledge is acquired, and how it should be evaluated in different contexts [2]. These beliefs influence how learners interpret information, evaluate evidence, and engage in learning processes.

Scholars argue that epistemic beliefs play a critical role in shaping cognitive engagement, reflective thinking, and academic achievement because they guide how students approach learning tasks and problem-solving activities. In modern educational environments characterized by complex information ecosystems, the ability to critically evaluate knowledge has become increasingly important for both learners and educators.

The concept of epistemic beliefs has been widely studied in educational research over the past several decades [3], [4]. Early studies in this field were rooted in philosophical discussions about epistemology—the branch of philosophy that investigates the nature and limits of knowledge. In educational contexts, however, epistemology has been operationalized as individuals' personal beliefs about knowledge and knowing. These beliefs are multidimensional and may include perceptions about the certainty of knowledge, the simplicity of knowledge structures, the sources of knowledge, and the processes through which knowledge is justified. Research has demonstrated that learners with more sophisticated epistemic beliefs tend to demonstrate stronger critical thinking, deeper learning strategies, and greater ability to evaluate information sources. Consequently, epistemic beliefs have become a key construct in studies examining learning processes, science education, teacher beliefs, and knowledge construction in classrooms.

Recent developments in educational research further highlight the relevance of epistemic beliefs in the digital and information age. The rapid expansion of online information sources requires learners to engage in sophisticated epistemic evaluation, particularly when encountering conflicting or unreliable information. In this context, epistemic beliefs influence how individuals judge the credibility of information and determine the validity of knowledge claims. Studies indicate that epistemic beliefs affect learners' self-regulated learning processes, including goal setting, strategy selection, and metacognitive monitoring. These processes ultimately shape academic outcomes and learning performance [5]. Moreover, research in science education has shown that epistemic beliefs are linked to reflective thinking and the development of science identity among students, illustrating the broader educational implications of these beliefs beyond simple knowledge acquisition.

Despite the growing importance of epistemic beliefs, the literature on this topic has expanded rapidly across different educational disciplines and research traditions. Scholars from educational psychology, science education, teacher education, and learning sciences have investigated epistemic beliefs from various theoretical perspectives and methodological approaches. As a result, the field has become increasingly complex, with diverse conceptual frameworks, measurement instruments, and research focuses emerging over time. This expansion has led to a large body of scientific publications addressing different aspects of epistemic beliefs in education. However, the diversity of studies also makes it difficult to obtain a comprehensive understanding of how the field has evolved, what topics have been most frequently studied, and which research areas remain underexplored. Therefore, systematic approaches are required to map and analyze the development of research on epistemic beliefs within the educational domain.

One method that has proven useful for examining the development of scientific knowledge is bibliometric analysis. Bibliometric analysis is a quantitative research method used to evaluate patterns in scientific publications, including research productivity, citation networks, collaboration patterns, and thematic evolution within a field. By analyzing large datasets of scholarly publications, bibliometric techniques allow researchers to identify influential authors, institutions, and countries, as well as emerging research themes and knowledge structures. In educational research, bibliometric analysis has been applied to various topics to reveal the dynamics of research development and to identify potential gaps for future investigation. For

instance, previous bibliometric studies on epistemic beliefs have examined publication trends across international databases and identified increasing scholarly attention to topics such as epistemic practices, epistemological beliefs, and epistemic access in educational contexts.

Although research on epistemic beliefs has expanded significantly in recent decades, the field still lacks a comprehensive overview that systematically maps its development and knowledge structure within educational research. The rapid growth of publications has resulted in fragmented knowledge across different theoretical frameworks, disciplines, and methodological approaches. Consequently, it becomes difficult for researchers and educators to identify dominant research trends, influential scholars, collaborative networks, and emerging themes within the field. Without a clear mapping of the scientific landscape, opportunities for theoretical integration and future research directions may remain unclear. Therefore, there is a need for a bibliometric study that systematically analyzes the trends and intellectual structure of epistemic beliefs research in education in order to provide a clearer understanding of how this field has developed and where it is heading.

The objective of this study is to conduct a bibliometric analysis of research on epistemic beliefs in education in order to identify publication trends, influential authors and institutions, collaboration patterns, and the knowledge structure within the field. By analyzing scientific publications from major academic databases, this study aims to map the development of epistemic beliefs research, reveal dominant research themes, and highlight emerging topics that may guide future investigations. Ultimately, the findings are expected to contribute to a deeper understanding of the evolution of epistemic beliefs research and provide insights for scholars, educators, and policymakers seeking to advance research and practice related to knowledge construction and learning in educational contexts.

2. METHODS

This study employed a bibliometric research design to systematically analyze the development and intellectual structure of scholarly publications related to epistemic beliefs in education. Bibliometric analysis is a quantitative method commonly used to examine patterns in academic literature through statistical analysis of publication data, including authorship, citation relationships, and keyword occurrences. The method allows researchers to identify research trends, influential publications, and thematic developments within a particular field of study. In this research, bibliometric techniques were used to map the evolution of epistemic beliefs research, identify prominent contributors, and explore the relationships among research topics in educational contexts. The approach is particularly suitable for synthesizing large volumes of scientific publications and providing a structured overview of the knowledge landscape within a research domain.

The data for this study were collected from a major international academic database that indexes peer-reviewed journals and conference proceedings in education and related disciplines. Publications were retrieved using keywords related to epistemic beliefs and epistemological beliefs in educational contexts. The search process involved several stages, including keyword identification, database filtering, and data screening to ensure the relevance of the retrieved documents. Only publications that focused on epistemic beliefs in education and were written in English were included in the dataset. After the initial search, duplicate records and unrelated documents were removed through a screening process based on titles, abstracts, and keywords. The final dataset consisted of relevant publications that were then exported in a compatible format for bibliometric analysis.

3. RESULT AND DISCUSSION

3.1 Result

a. Keyword Co-Occurrence Analysis

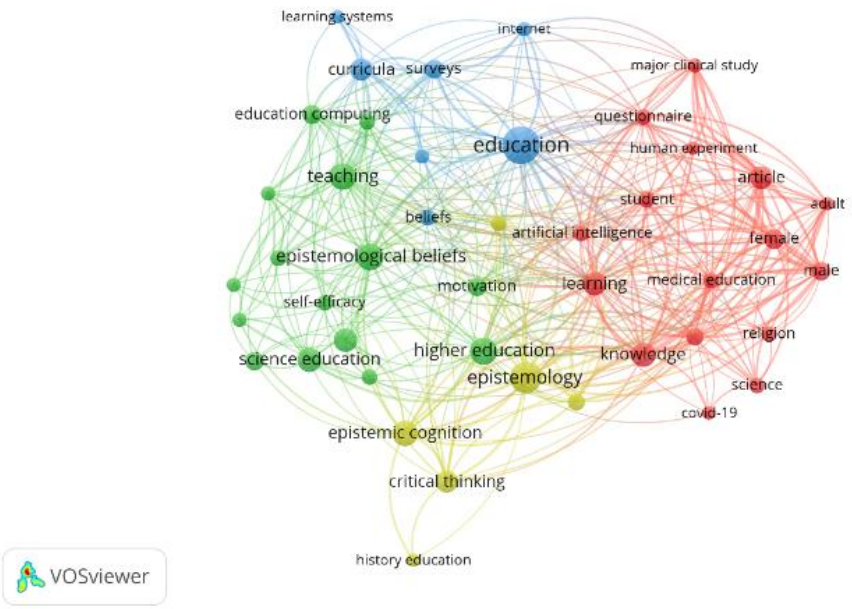

Figure 1. Network Visualization
Source: Data Analysis

Figure 1 reveals a well-structured and interconnected knowledge landscape within epistemic beliefs research, with several dominant thematic clusters. At the center of the map lies the term "education," indicating its role as the primary anchor of the field. This central positioning suggests that epistemic beliefs are predominantly studied within educational contexts, linking various subtopics such as teaching, learning, curriculum, and student development. The dense interconnections surrounding "education" highlight the integrative nature of the field, where epistemic beliefs serve as a bridge between cognitive, pedagogical, and contextual dimensions of learning. The green cluster represents the core theoretical and psychological foundation of epistemic beliefs research. Key terms such as "epistemological beliefs," "science education," "self-efficacy," and "teaching" indicate a strong emphasis on how beliefs about knowledge influence learning processes and instructional practices. This cluster reflects a traditional yet still dominant research stream focused on learners' cognitive frameworks and their implications for motivation, understanding, and academic performance. The presence of "science education" further suggests that epistemic beliefs are particularly in domains requiring critical evaluation of evidence and conceptual understanding.

The blue cluster highlights the role of educational systems, methodologies, and technological contexts. Terms such as "curricula," "surveys," "education computing," and "learning systems" suggest that this cluster is oriented toward measurement approaches and the integration of epistemic beliefs into structured educational environments. The inclusion of "internet" and digital-related concepts indicates a growing interest in how epistemic

beliefs operate in technology-mediated learning contexts. This reflects an emerging trend where epistemic beliefs are examined not only as internal constructs but also as factors shaping interaction with digital information and online learning platforms. The red cluster introduces a distinct yet complementary perspective, focusing on empirical, demographic, and applied research contexts. Keywords such as "student," "female," "male," "medical education," and "questionnaire" indicate that this cluster is heavily oriented toward quantitative and survey-based studies. The presence of terms like "clinical study," "human experiment," and "covid-19" suggests that epistemic beliefs research has expanded into applied fields such as health and medical education. This expansion demonstrates the adaptability of epistemic beliefs as a construct, extending beyond traditional education into interdisciplinary domains where knowledge evaluation and decision-making are critical.

The yellow cluster represents higher-order cognitive processes and conceptual development, with terms such as "epistemology," "epistemic cognition," "critical thinking," and "knowledge." This cluster appears to connect theoretical foundations with advanced learning outcomes, emphasizing the role of epistemic beliefs in fostering critical thinking and deep understanding. The linkage between this cluster and others—particularly education and learning—suggests that epistemic beliefs are increasingly viewed as central to developing 21st-century competencies.

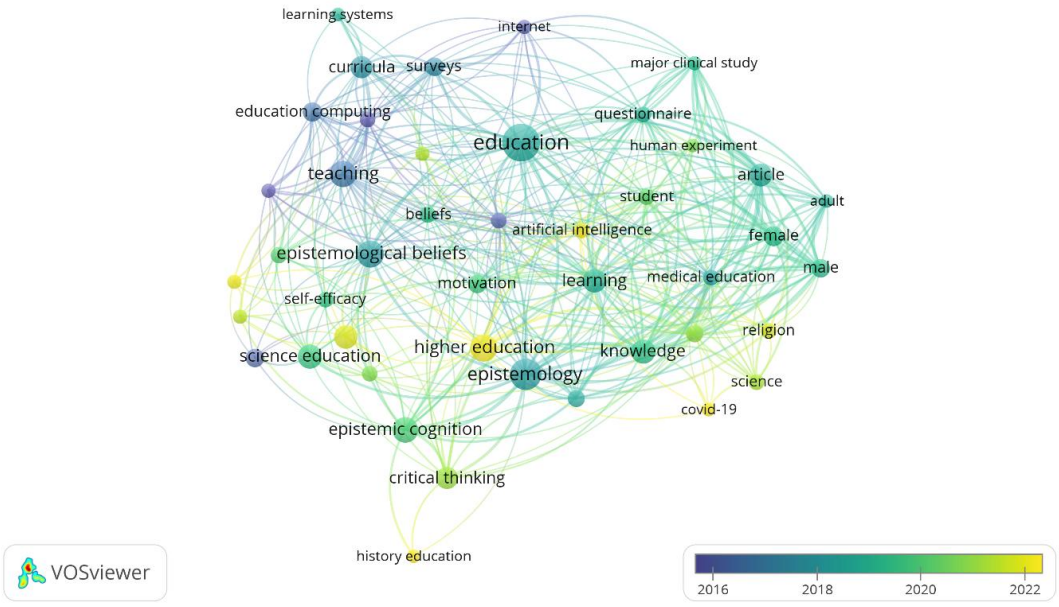

Figure 2. Overlay Visualization
Source: Data Analysis

Figure 2 illustrates the temporal evolution of epistemic beliefs research, where colors represent the average publication year of keywords (from earlier—blue/purple—to more recent—yellow). Foundational terms such as "teaching," "education computing," and "curricula" appear in darker tones, indicating that early research in

this field was primarily centered on pedagogical structures and instructional design. These early studies laid the groundwork by examining how epistemic beliefs operate within traditional educational systems, particularly in relation to teaching practices and curriculum development. As the field progressed into the mid-phase (green tones), the focus shifted toward learner-centered constructs such as "epistemological beliefs," "learning," "student," "motivation," and "self-efficacy." This indicates a growing interest in understanding the psychological and cognitive dimensions of learners, emphasizing how beliefs about knowledge influence learning behavior and academic outcomes. During this period, epistemic beliefs became more deeply integrated into educational psychology, with increasing attention to higher education contexts and the role of individual differences in shaping learning processes.

In more recent years (yellow tones), the research frontier has expanded toward more complex and contemporary themes, including "epistemology," "epistemic cognition," "critical thinking," "artificial intelligence," and "covid-19." This shift reflects the field's adaptation to modern educational challenges, particularly those arising from digital transformation and global disruptions. The emergence of topics like artificial intelligence suggests a new direction where epistemic beliefs are examined in relation to technology-driven learning environments, while the presence of "critical thinking" highlights the growing emphasis on higher-order cognitive skills.

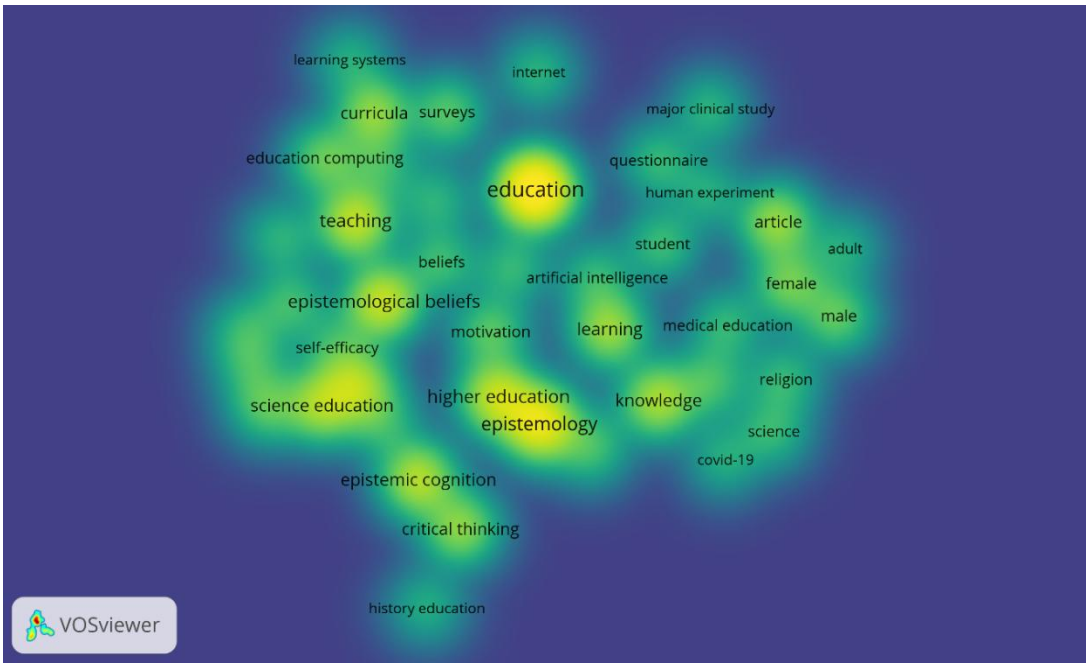

Figure 3. Density Visualization
Source: Data Analysis

Figure 3 highlights the most intensively studied and frequently occurring themes within epistemic beliefs research. Areas with brighter yellow intensity—particularly around "education," "teaching," "learning," and "epistemology"—indicate the core concentration of

scholarly attention. This suggests that the field is strongly anchored in educational contexts, with a primary focus on how epistemic beliefs influence teaching practices and learning processes. The prominence of "higher education," "knowledge," and "epistemological beliefs" further reinforces that much of the literature is centered on understanding how learners conceptualize knowledge within formal academic environments. In addition, moderately dense regions surrounding terms such as "science education," "self-efficacy," "student," and "medical education" reveal important but slightly more specialized subdomains. These areas indicate that epistemic beliefs research extends into applied educational settings and intersects with psychological constructs like motivation and confidence. Meanwhile, less dense but still visible nodes such as "critical thinking," "artificial intelligence," and "covid-19" suggest emerging or developing topics that have not yet reached the same level of saturation.

b. Citation Analysis

Table 1. Most Cited Article

Citations	Author and Year	Title
203	[6]	Building a conceptual framework for data literacy
181	[7]	Scientific epistemic beliefs, conceptions of learning science and self-efficacy of learning science among high school students
177	[8]	Says Who?: Epistemic Authority Effects in Social Judgment
159	[9]	Technology-enhanced creativity: A multiple case study of digital technology-integration expert teachersâ€™ beliefs and practices
144	[10]	The role of teacher epistemic cognition, epistemic beliefs, and calibration in instruction
136	[11]	Are sophisticated students always better? The role of topic-specific personal epistemology in the understanding of multiple expository texts
134	[12]	Exploring teachers' beliefs about teaching knowledge: Where does it come from? Does it change?
132	[13]	Epistemic beliefs: Setting the standards for self-regulated learning
132	[14]	Personal epistemology and culture
131	[15]	Science without literacy: a ship without a sail?

Source: Scopus, 2026

3.2 Discussion

This study provides a comprehensive bibliometric overview of epistemic beliefs research in education, revealing a dynamic and evolving intellectual landscape characterized by strong theoretical foundations and increasing interdisciplinary expansion. The findings demonstrate that the field is structurally anchored around the central concept of education, which acts as a unifying domain connecting various thematic clusters, including teaching practices, cognitive processes, and applied research contexts. This centrality confirms that epistemic beliefs remain fundamentally tied to educational inquiry, particularly in understanding how learners construct, evaluate, and apply knowledge within formal and informal learning environments.

The co-occurrence network analysis highlights the dominance of psychological and pedagogical constructs such as epistemological beliefs, self-efficacy, motivation, and

science education. These findings suggest that the field has been historically grounded in educational psychology, with a strong emphasis on individual cognitive development and its implications for learning outcomes. The prominence of science education within this cluster is particularly noteworthy, as it reflects the importance of epistemic beliefs in domains that require evidence evaluation, reasoning, and conceptual understanding. This aligns with prior research indicating that learners' beliefs about knowledge significantly influence their engagement with scientific inquiry and problem-solving processes.

At the same time, the presence of clusters related to educational systems and methodologies indicates that epistemic beliefs research has increasingly incorporated structural and contextual dimensions. Keywords such as curricula, surveys, and learning systems suggest a growing emphasis on measurement, assessment, and the integration of epistemic beliefs into instructional design. This shift reflects a maturation of the field, moving beyond purely theoretical models toward practical applications that inform curriculum development and educational policy. Furthermore, the integration of digital-related terms such as internet and artificial intelligence highlights the field's responsiveness to technological advancements, suggesting that epistemic beliefs are now being examined in the context of digital literacy and online learning environments.

The overlay visualization further reveals a clear temporal evolution of research themes. Early studies were primarily concerned with foundational pedagogical elements, including teaching and curriculum design. Over time, the focus shifted toward learner-centered constructs such as motivation, beliefs, and self-efficacy, indicating a deeper engagement with the psychological dimensions of learning. More recent research has expanded into advanced and interdisciplinary areas, including epistemic cognition, critical thinking, artificial intelligence, and global issues such as COVID-19. This progression suggests that the field is continuously adapting to emerging educational challenges, particularly those associated with digital transformation and the increasing complexity of knowledge ecosystems.

The density visualization reinforces these findings by identifying core and peripheral research areas. The high-density concentration around education, learning, and epistemology indicates a well-established and mature research core. These themes represent the foundational knowledge base of the field and continue to attract significant scholarly attention. In contrast, emerging topics such as artificial intelligence and critical thinking appear in less dense regions, suggesting that they are still developing but hold substantial potential for future research. The inclusion of these topics reflects a shift toward addressing contemporary issues in education, particularly the need to equip learners with the skills required to navigate complex and rapidly changing information environments. Another important insight from this study is the interdisciplinary nature of epistemic beliefs research. The presence of terms related to medical education, human experiments, and demographic variables (e.g., gender and age) indicates that the field has extended beyond traditional educational settings into applied domains. This expansion demonstrates the versatility of epistemic beliefs as a construct, capable of informing research in diverse contexts where knowledge evaluation and decision-making are critical. However, this interdisciplinary growth also contributes to the fragmentation of the field, as research becomes dispersed across multiple

disciplines with varying theoretical and methodological approaches.

Despite the significant advancements identified in this study, several gaps and opportunities for future research remain. First, there is a need for greater integration between theoretical and applied research streams. While the field has developed robust conceptual frameworks, their practical implementation in educational settings is still limited. Future studies should focus on bridging this gap by exploring how epistemic beliefs can be effectively incorporated into teaching practices and curriculum design. Second, the increasing prominence of digital technologies calls for more research on how epistemic beliefs influence learners' interactions with online information, particularly in the context of misinformation and artificial intelligence–driven content. Moreover, the global distribution of research suggests potential imbalances in geographical representation, with certain regions contributing more extensively to the literature than others. This highlights the need for more inclusive and diverse research that considers cultural and contextual variations in epistemic beliefs. Understanding these differences is essential for developing educational strategies that are responsive to local needs while maintaining global relevance. Additionally, future bibliometric studies could further explore collaboration networks to identify key research hubs and opportunities for international partnerships.

4. CONCLUSION

This bibliometric study demonstrates that research on epistemic beliefs in education has developed into a well-established yet continuously evolving field, anchored in core themes such as education, learning, and epistemology while expanding toward interdisciplinary and technology-oriented domains. The findings reveal a clear progression from foundational pedagogical and cognitive perspectives to more complex issues involving epistemic cognition, critical thinking, and digital learning environments. Although the field shows strong theoretical maturity and increasing global relevance, challenges remain in integrating conceptual frameworks into practical educational applications and addressing emerging issues such as artificial intelligence and information credibility.

REFERENCES

[1] A. Zohar, "What and How to Teach in Twenty-First-Century Schools: Common Confusions Regarding Knowledge, Thinking, Pedagogy, and the Curriculum," in *Scaling-up Higher Order Thinking: Demonstrating a Paradigm for Deep Educational Change*, Springer, 2023, pp. 21–45.

[2] M. Kelly, "Epistemology, epistemic belief, personal epistemology, and epistemics: A review of concepts as they impact information behavior research," *J. Assoc. Inf. Sci. Technol.*, vol. 72, no. 4, pp. 507–519, 2021.

[3] M. Aguilar-Valdés, A. Almonacid-Fierro, K. Valdebenito, and S. Sepúlveda-Vallejos, "Epistemological beliefs and teaching practice: a systematic literature review 2011 to 2021," *Int. J. Eval. Res. Educ.*, vol. 13, no. 2, pp. 767–773, 2024.

[4] G. L. Stoel, A. Logtenberg, and M. Nitsche, "Researching epistemic beliefs in history education: A review," 2022.

[5] I. C. Mulaudzi, "Factors affecting students' academic performance: a case study of the university context," *J. Soc. Sci. Policy Implic.*, vol. 11, no. 1, pp. 18–26, 2023.

[6] E. S. Gummer and E. B. Mandinach, "Building a conceptual framework for data literacy," *Teach. Coll. Rec.*, vol. 117, no. 4, pp. 1–22, 2015.

[7] C.-C. Tsai, H. N. J. Ho, J.-C. Liang, and H.-M. Lin, "Scientific epistemic beliefs, conceptions of learning science and self-efficacy of learning science among high school students," *Learn. Instr.*, vol. 21, no. 6, pp. 757–769, 2011.

[8] A. W. Kruglanski *et al.*, "Says who? Epistemic authority effects in social judgment," *Adv. Exp. Soc. Psychol.*, vol. 37, no. 37, pp. 345–392, 2005.

[9] E. O. Bereczki and A. Kárpáti, "Technology-enhanced creativity: A multiple case study of digital technology-integration expert teachers' beliefs and practices," *Think. Ski. Creat.*, vol. 39, p. 100791, 2021.

[10] L. Maggioni and M. M. Parkinson, "The role of teacher epistemic cognition, epistemic beliefs, and calibration in

instruction," *Educ. Psychol. Rev.*, vol. 20, no. 4, pp. 445–461, 2008.

[11] I. Bråten, H. I. Strømsø, and M. S. Samuelstuen, "Are sophisticated students always better? The role of topic-specific personal epistemology in the understanding of multiple expository texts," *Contemp. Educ. Psychol.*, vol. 33, no. 4, pp. 814–840, 2008.

[12] M. M. Buehl and H. Fives, "Exploring teachers' beliefs about teaching knowledge: Where does it come from? Does it change?," *J. Exp. Educ.*, vol. 77, no. 4, pp. 367–408, 2009.

[13] K. R. Muis and G. M. Franco, "Epistemic beliefs: Setting the standards for self-regulated learning," *Contemp. Educ. Psychol.*, vol. 34, no. 4, pp. 306–318, 2009.

[14] B. K. Hofer, "Personal epistemology and culture," in *Knowing, knowledge and beliefs: Epistemological studies across diverse cultures*, Springer, 2008, pp. 3–22.

[15] J. Osborne, "Science without literacy: A ship without a sail?," *Cambridge J. Educ.*, vol. 32, no. 2, pp. 203–218, 2002.