



Review Article

Generational Shift in Learning Discomfort: A Systematic Literature Review of Pedagogical Tensions Between Millennials and Generation Z

Abstract

This study aims to map the development of scientific studies on pedagogical tensions between Millennials and Generation Z in the context of formal and digital learning. This study employs a Systematic Literature Review (SLR) approach, following the PRISMA protocol. A total of 115 scientific articles indexed in the Scopus database from 2019 to 2024 were analyzed using bibliometric tools VOSviewer and CiteSpace. The results indicate six main clusters in the literature on intergenerational pedagogical tension: (1) culture and perception; (2) learning experiences and generational differences; (3) communication and intergenerational activities; (4) development of digital content and media; (5) Gen Z consumer behavior and local values; and (6) strategies and institutional support. Keywords such as generation, student, education, and medium emerged as central nodes in the literature network, highlighting the importance of generational and media aspects in learning dynamics. Additionally, topics such as trust, intention, and belief also show an increasing trend in recent publications, indicating a shift in focus toward affective and psychological aspects in digital education. This study contributes to expanding intergenerational education research through a visual bibliometric approach and provides a conceptual foundation for developing inclusive and adaptive pedagogical strategies tailored to the characteristics of digital-native generations like Gen Z. The main limitation of this study is its focus on articles in the Scopus database, which does not include literature from other databases such as Web of Science or Google Scholar. Therefore, further research is recommended to expand the scope of data and deepen exploration of practical dimensions in the implementation of intergenerational pedagogy.

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1. Introduction

Studies on generational dynamics in the context of education continue to evolve with the emergence of Generation Z as the dominant subject of learning in academic settings [1]. Scientific attention to the unique characteristics of Gen Z in absorbing information and interacting with learning media has become an increasingly prominent issue in recent years [2]. Additionally, debates have arisen regarding the differences in values and learning preferences between Gen Z and previous generations, particularly Millennials, leading to tensions in conventional pedagogical practices [3]. The discomfort experienced by educators and learners from different generations in the learning process signifies a fundamental shift in the dynamics of modern classrooms [4]. These changes also reflect new challenges for educational institutions to respond adaptively and reflectively to the ever-changing generational landscape [5].

Previous research has shown that differences in value orientation, technology preferences, and communication styles between Millennials and Generation Z have created a gap in learning experiences that is not always easy to bridge [3], [6], [7], [8]. In studies on sustainable consumption preferences, Gen Z demonstrates a more practical and digitally native mindset compared to Millennials, who are more idealistic, reflecting fundamental differences in motivation and approach to social issues, including in the context of learning [3], [9], [10], [11]. Meanwhile, other studies highlight that Generation Z is more interested in visual, instant, and personalized learning experiences, unlike Millennials who still show a preference for collaborative and structured approaches [2], [12]. This creates pedagogical tension in educational settings, especially when educators from older generations must adapt their teaching methods to align with Gen Z's more digital and autonomous expectations [4], [13], [14]. Additionally, differing interpretations of authority, the meaning of hard work, and expectations regarding learning outcomes further exacerbate generational differences in learning dynamics [5]. These findings underscore the importance of understanding generational dimensions in curriculum design and teaching strategies to bridge intergenerational learning discomfort.

Although previous studies have extensively discussed the dynamics of intergenerational learning, particularly the differences in characteristics between Millennials and Generation Z, these studies have mostly been partial, descriptive, and not systematically integrated [15]. Previous research has not extensively utilized the systematic literature review (SLR) approach with data sources concentrated on internationally reputable scientific publications such as Scopus. Additionally, very few studies have employed bibliometric analysis tools like VOSviewer and Scopus to map knowledge networks and research topic developments within the context of intergenerational pedagogical tensions. Therefore, this study focuses on literature analysis using the SLR approach on 500 scientific articles sourced from the Scopus database over the past five years. The SLR approach is considered effective in systematically and objectively reviewing, sorting, and synthesizing previous research findings, thereby providing a comprehensive overview of the scientific landscape and the direction of development of issues related to learning discomfort and pedagogical tensions between generations.

The focus of this research study is directed toward answering the main question: "How has research on pedagogical tensions between Millennials and Generation Z in the context of learning developed and progressed over the past five years?" Data analysis was conducted using bibliometric tools VOSviewer and CiteSpace to map publication trends, dominant keywords, collaboration networks among researchers, and relevant thematic developments. This study is expected to make a significant contribution to intergenerational education research, particularly in understanding the complexity of pedagogical tensions in the digital age. Additionally, this study contributes to expanding literature review methodologies in the field of education by integrating systematic approaches and bibliometric visualization techniques that have not been widely used in similar contexts.

2. Literature Review

In the context of contemporary education, intergenerational issues have become a key focus due to rapid changes in technology, social values, and patterns of interaction cepat [16], [17], [18], [19]. Millennials, who grew up during the transition from analog to digital, tend to have an adaptive learning style [20], [21], [22], [23], preferring formal and collaborative structures, while Generation Z, who were born and raised in a fully digital ecosystem, show a preference for independent, fast-paced, visual, and high-tech learning [1]. The disparity in expectations between these two generations, particularly in the classroom and academic environment, has given rise to unique forms of pedagogical tension, ranging from resistance to conventional teaching methods to low interest in curricula that are unresponsive to the needs of the digital-native generation [24], [25].

The shift in educational paradigms also plays a role in shaping the patterns of interaction between educators and students across generations [26], [27]. Twenty-first century education emphasizes flexibility, innovation, and the use of technology [28], [29], [30], [31], but implementation in practice often remains trapped in traditional pedagogical models shaped by the values and assumptions of previous generations [5], [32]. In this context, educators from both the Millennial and Baby Boomer [15], [33], [34], [35], face challenges in understanding and adapting to the cognitive and emotional dynamics of Gen Z. On the other hand, Gen Z also feels uncomfortable in a learning system that does not align with their preferences, such as the speed of information access, use of multimedia, and personalized learning approaches [2]. Therefore, it is important to address this issue as a structural problem in education, not merely a matter of differing learning styles.

Recent studies show that generational differences play an important role in shaping learning patterns [36] and social relationships [8], [37], [38] in academic environments. Some studies have identified that Generation Z tends to avoid overly formal learning structures and seeks autonomy in determining their own learning pace and format [2]. Meanwhile, Millennial educators, who were raised in a more linear and collaborative system, often find it challenging to build effective pedagogical connections with Gen Z, particularly due to differences in expectations regarding the role of teachers, learning media, and classroom structure [1].

Other research also shows that value-based or ideological approaches to learning that were previously effective with Millennials are not always relevant for Gen Z [39], [40]. In a study by Masserini et al. [3], it was found that Gen Z tends to prioritize practical experience, technological efficiency, and higher emotional engagement in the learning process over grand narratives about the meaning or purpose of education. This implies the need for a more flexible, project-based, and real-time technology-assisted redesign of pedagogy to align with Gen Z's way of thinking and preferences.

In addition, Rosen [4] notes that Generation Z tends to adopt visual language and digital expression as the dominant form of communication, including in academic contexts. This difference creates tension when educators from previous generations [34] are unable to adapt teaching materials to new formats such as short videos, interactive animations, and fast-paced, dense multimedia narratives. This mismatch not only causes boredom or burnout but also generates passive resistance from Gen Z toward a learning system that does not align with their digital habits.

Another key finding comes from Foster's [5] study, which reveals that perspectives on the future and success also influence intergenerational learning patterns. Millennials generally still view academic success as the result of a long process and hard work, while Gen Z places greater emphasis on efficiency and instant results, including in pursuing achievements. This difference in orientation creates significant challenges in creating an inclusive, supportive learning environment that does not impose excessive anxiety or psychological pressure on any one generation.

This study was specifically conducted to map scientific publications discussing pedagogical tensions between Millennials and Generation Z in the context of learning, using a Systematic Literature Review (SLR) approach. The primary focus of the mapping is directed toward identifying and analyzing the development of related scientific publications, the distribution of authors and institutions contributing to this theme, publication trends based on year and region, as well as

mapping the dominant keywords and themes emerging from previous studies. Using VOSviewer and CiteSpace tools, this study also aims to illustrate the thematic relationships and scientific collaboration networks formed among global researchers and institutions.

The core essence of this research is to provide a comprehensive and systematic overview of the scientific landscape surrounding generational tension issues in the field of education, particularly within classrooms, higher education institutions, and digital learning contexts. The results of this study are expected to serve as conceptual groundwork for the development of further studies and contribute to the design of more adaptive, relevant, and inclusive intergenerational pedagogical strategies in the post-digital era. Thus, this study not only fills an academic research gap but also provides practical contributions to the development of intergenerational education policies at the national and global levels.

3. Methods

This study uses a qualitative content analysis method with a Systematic Literature Review (SLR) approach to answer specific questions, namely: how has research on pedagogical tension between Millennials and Generation Z developed in the context of learning as published in reputable international journals indexed by Scopus over the past five years, namely 2019–2024. This question is broken down into several sub-questions, namely: (1) What are the trends in scientific publications related to the theme of intergenerational pedagogical tension based on publication year, region, and authors? (2) How is the collaboration between researchers and institutions mapped in this study? (3) What are the dominant themes and keywords that emerge in publications about pedagogical tension between Millennials and Gen Z? and (4) How can the research agenda be formulated based on the clusters and thematic visualizations identified from the literature review over the past five years?

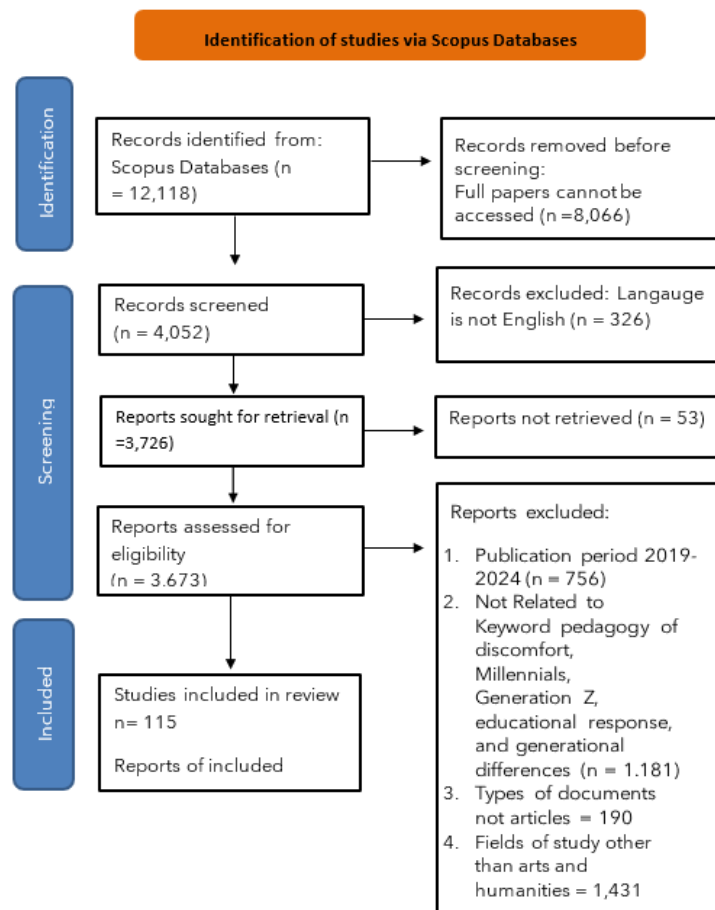


Figure 1. Stages of article retrieval

This research followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, which consists of three main stages: identification, screening, and article inclusion [41]. The identification stage began with data collection through the Scopus database using an official institutional account. The keywords used were “pedagogy of discomfort” OR “Millennials” OR “Generation Z” OR “response” AND “generational,” which were searched in the title, abstract, and keywords (TITLE-ABS-KEY) sections. The initial search yielded 12,118 published documents from 2019 to 2024. These documents were then exported in RIS format for further analysis.

During the screening stage, a filtering process was conducted based on inclusion and exclusion criteria. Articles without full-text access, not from reputable scientific journals, duplicates, or not directly relevant to the topic of cross-generational pedagogy were excluded from the dataset. After this process, 3,673 articles remained suitable for analysis. The final stage, the inclusion stage, involved an in-depth selection process based on relevance to the research theme and metadata completeness. From this process, 115 validated articles were selected and used as the basis for mapping and bibliometric analysis using the VOSviewer tool.

3. Results

Figure 1 shows the increasing trend in the number of publications discussing the topic of pedagogical tension between Millennials and Generation Z in the context of learning discomfort over the past six years (2019–2024). In 2019, there were 10 documents, slightly decreasing to 9 documents in 2020. However, the publication trend saw a significant increase starting in 2021 with 16 documents, rising to 19 documents in 2022, surging sharply to 31 documents in 2023, and slightly decreasing to 30 documents in 2024.

The sharp increase in the number of documents between 2021 and 2023 indicates that intergenerational pedagogical issues, particularly within the framework of pedagogy of discomfort, are progressively attracting the attention of researchers. This may be attributed to the increased intergenerational interaction in both digital and face-to-face classroom settings post-pandemic, which has introduced new tensions in the teaching-learning process.

The decline in the number of documents in 2024, although relatively small (from 31 to 30), may be due to incomplete publication data for the current year or a shift in research focus to other more contextual topics. However, in general, this trend reflects that generational issues in education, particularly between Millennials and Gen Z, remain an important and relevant topic of study to this day.

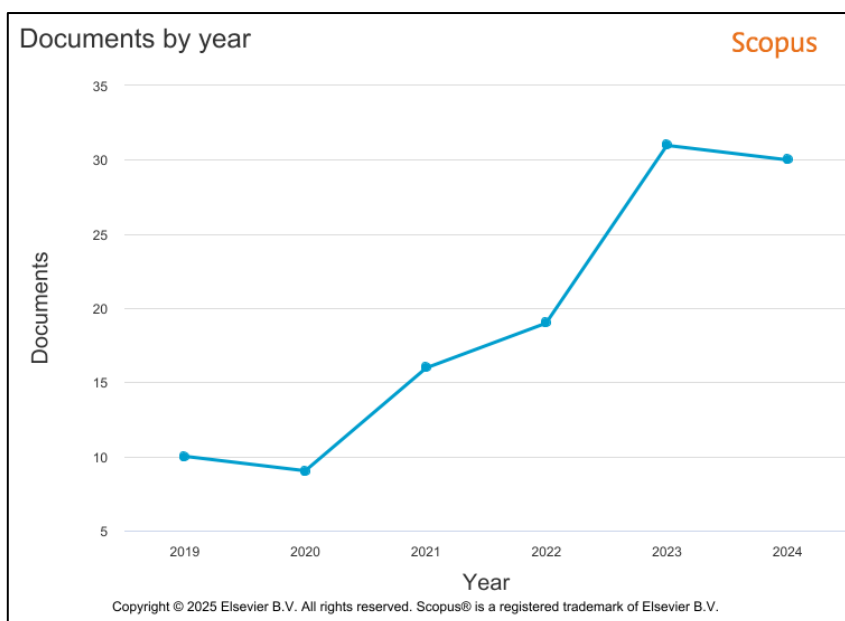


Figure 2. Publication trends for the period 2019–2024

The country most active in publishing scientific studies related to pedagogical tensions between Millennials and Generation Z is the United States, with a total of around 19 documents recorded in the Scopus database. This position shows that the issues of pedagogy of discomfort and differences in learner characteristics across generations are a major concern in the academic discourse of higher education in the United States.

Following in second place is the United Kingdom with around 17 documents, and Indonesia in third place with a significant contribution of 15 documents. Indonesia's participation as a developing country ranked in the top three indicates an increase in local academics' attention to educational challenges faced due to generational differences, particularly in the context of digital transformation, curriculum, and post-pandemic learning approaches.

Other countries such as Spain, the Russian Federation, South Africa, and Turkey each contributed between 5–8 documents, reflecting moderate attention to this issue in Europe and Africa. On the other hand, countries like Germany, Poland, and Australia made relatively smaller contributions (around 3–4 documents), yet still demonstrated participation in this discourse from various parts of the world.

This data shows that studies on pedagogical tensions between generations are not only a focus of countries with established higher education systems, but also an important concern for developing countries undergoing rapid educational transformation. Thus, this topic has evolved into a global issue that transcends geographical boundaries and levels of development, emphasizing the need for adaptive and inclusive pedagogical approaches amid the ever-evolving dynamics of generations.

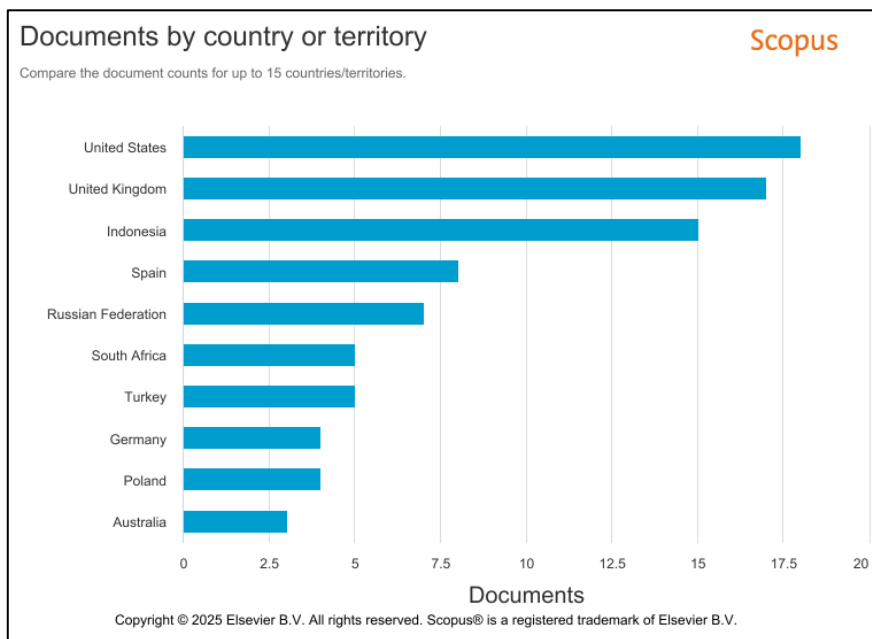


Figure 3. Distribution of publications by country

The “Documents by Author” graph shows that the authors' contributions to studies on intergenerational pedagogical tension are still evenly distributed without significant dominance from any one individual. There are three top authors who have each contributed two documents, namely Gutiérrez-Taño, D., Luka, I., and Volkova, I.I. The consistency of publications from these three authors indicates that they are important figures actively building discourse on the pedagogy of discomfort and intergenerational learning dynamics in educational settings. Further exploration of their works can provide relevant theoretical and methodological insights for this study, particularly in examining how pedagogical approaches can be designed to bridge the differences in characteristics between Millennials and Generation Z.

Meanwhile, other authors such as Aderus, A., Aditonii, A., Adriaans, R., Ahmad, M., Akram, U., Al-Tahat, K., and AlQurashi, F. each contributed one publication. Although quantitatively lower, their

contributions remain important as they reflect the geographical diversity and research contexts that enrich the global discourse on critical education across generations. The presence of names from the Middle East, South Asia, and Southeast Asia also indicates that attention to intergenerational pedagogy issues is not limited to Western countries but has become a cross-cultural and cross-educational system study.

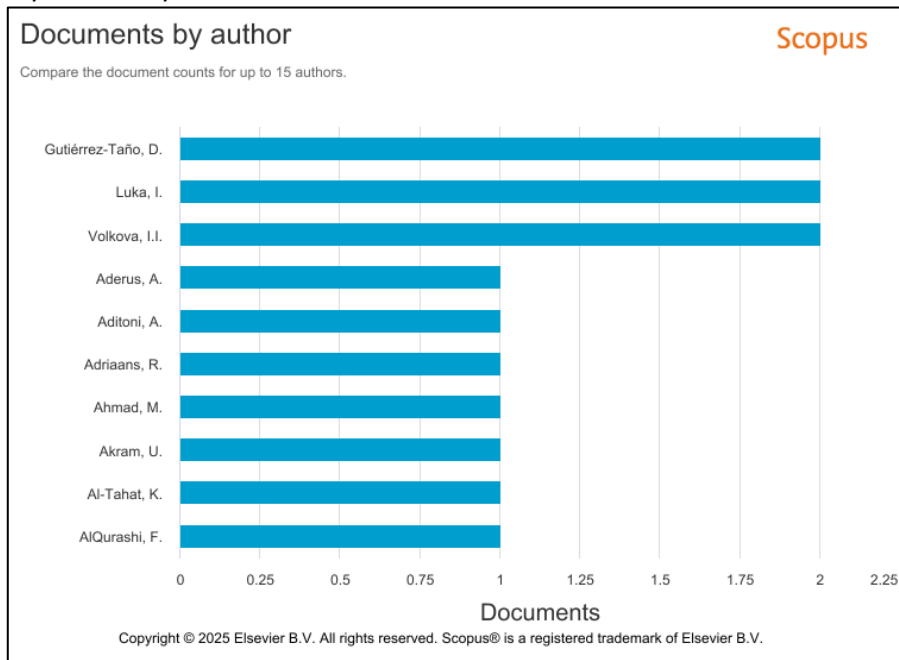


Figure 4. Authors in pedagogical studies between Millennials and Generation Z

Overall, the distribution of authors in this graph reflects that this study is still in its early stages of growth. The absence of dominant figures opens up great opportunities for international collaboration and the strengthening of cross-border academic networks. This also indicates that studies on pedagogical tensions between generations still have ample room for further exploration, both in terms of theoretical approaches, cultural contexts, and relevant educational policy designs. As such, researchers have a strategic opportunity to strengthen the conceptual foundation and expand the scope of research in this emerging field.



Figure 5. Distribution of authors in Pedagogis between Millennials and Generation Z

The bibliometric visualization generated through VOSviewer illustrates the structure of

collaboration between authors in studies of intergenerational pedagogical tension. This map shows that the network of authors is divided into several groups (clusters) with different colors representing thematic and collaborative proximity between researchers. Names such as Gutiérrez-Taño, Desiderio, Akram, Umair, Dailey, Rhonda, and Frost, David M. appear at the center of the network, indicating their important role as connectors or key actors in scientific collaboration. Their strategic positions indicate high involvement in building cross-institutional or cross-national research connections, which are crucial for expanding academic impact and conceptual influence in this field.

Additionally, other groups of authors such as Barr, Ashley B., Al-Tahat, Khalaf, Elaeshi, Mokhtar, and Al-Alaq, Abeer Abdullah form their own clusters with relatively strong connections. These clusters may represent scientific communities sharing thematic focuses or institutional backgrounds, such as contextual pedagogical approaches in specific regions. Other names, such as Knežević, Ljiljana, Karashchuk, Oksana S., and Omilion-Hodges, Leah M., appear more dispersed and on the periphery of the network. This suggests that they may act as individual contributors to specific studies or are just beginning their involvement in this theme without strong cross-author collaboration.

Overall, this map shows that collaboration in research related to intergenerational pedagogical tensions is still fragmented, with many authors working in small groups or individually. However, the presence of a number of central nodes connecting several clusters indicates that collaboration is beginning to grow and has the potential to be strengthened in the future. This visualization also reflects geographical and institutional diversity, with authors from various cultural backgrounds and regions contributing to the discussion, thereby enriching perspectives on generational issues in education.

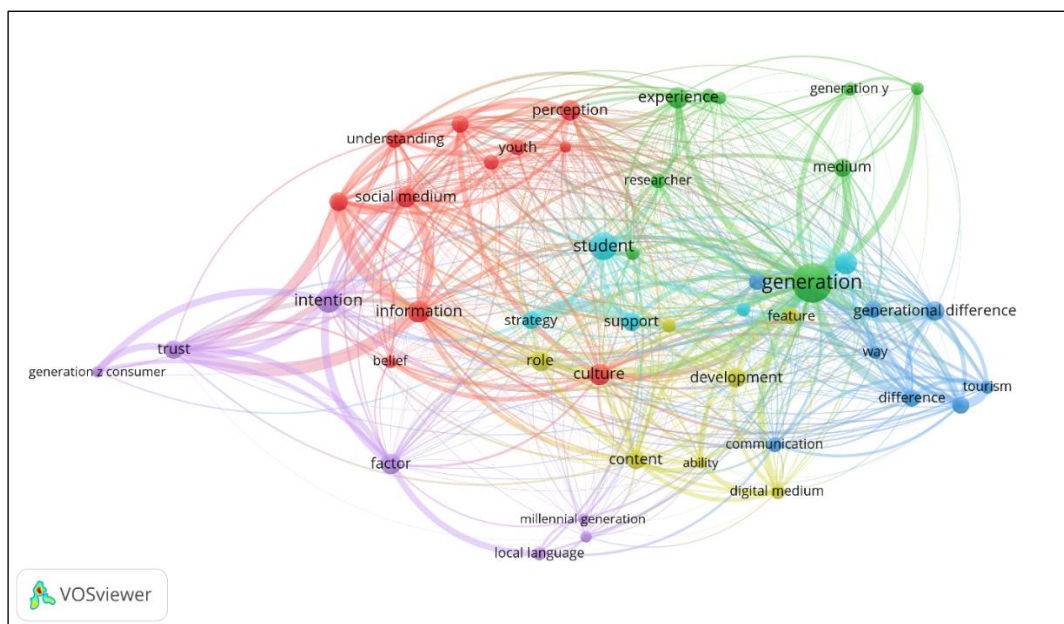


Figure 6. Clustering of concepts in pedagogical research between Millennials and Generation Z

The keyword map visualization generated through VOSviewer reveals the conceptual structure of studies on pedagogical tensions between Millennials and Generation Z. The most prominent term at the center of the network is “generation,” which forms the main node in thematic relationships and has strong connections to various other keywords such as “generational difference,” “student,” “culture,” “communication,” and “experience.” This indicates that the primary focus of the literature is on understanding the differences in characteristics between generations within an educational context and how these differences impact teaching strategies and students' learning experiences.

The keyword “student” also emerges as another major node, indicating that students are the primary focus of attention in pedagogical tensions. In this map, ‘student’ is closely related to words

such as “support,” “strategy,” and “role,” suggesting that the literature highlights the role of teachers or institutions in adapting learning approaches to the needs of new generations, particularly Generation Z. On the other hand, the emergence of terms such as “medium,” “digital medium,” and “social medium” indicates that digital technology transformation is an important factor influencing how the new generation receives and responds to learning.

Interestingly, there are also purple and pink clusters that include terms such as “trust,” “intention,” “belief,” and “generation z consumer.” This indicates the presence of behavioral and psychological dimensions in the study, positioning Generation Z not only as learners but also as subjects in studies of communication behavior, media, and consumerism. Additionally, terms like “culture,” “local language,” and “millennial generation” highlight the sociocultural aspects that are part of generational dynamics and learning.

This visualization shows that research on intergenerational pedagogical tensions is multidimensional—encompassing cognitive aspects (perception, understanding), social aspects (culture, communication), technological aspects (digital medium), and psychological aspects (trust, belief, intention). The dense network between these terms indicates that research in this field does not stand alone but involves close connections between concepts, reflecting a broad interdisciplinary approach to addressing intergenerational educational challenges. Moving forward, strengthening the integration between pedagogical, technological, and cultural dimensions is essential to develop learning strategies that are responsive to changes in generational characteristics and global social dynamics.

Table 1. Keyword Clusters Based on VOSviewer Analysis

Cluster	Number of Keywords	Keywords
Cluster 1	11 items	Belief, Culture, Data Analysis, Gen Z, Information, Institution, Perception, Respondent, Social Medium, Understanding, Youth
Cluster 2	9 items	Covid, Experience, Generation, Generation X, Generation Y, Medium, Pandemic, Researcher, School
Cluster 3	8 items	Activity, Communication, Difference, Generational Difference, Problem, Process, Tourism, Way
Cluster 4	7 items	Ability, Content, Development, Digital Medium, Feature, Place, Role
Cluster 5	7 items	Addition, Factor, Generation Z Consumer, Intention, Local Language, Millennial Generation, Trust
Cluster 6	5 items	Concept, Group, Strategy, Student, Support

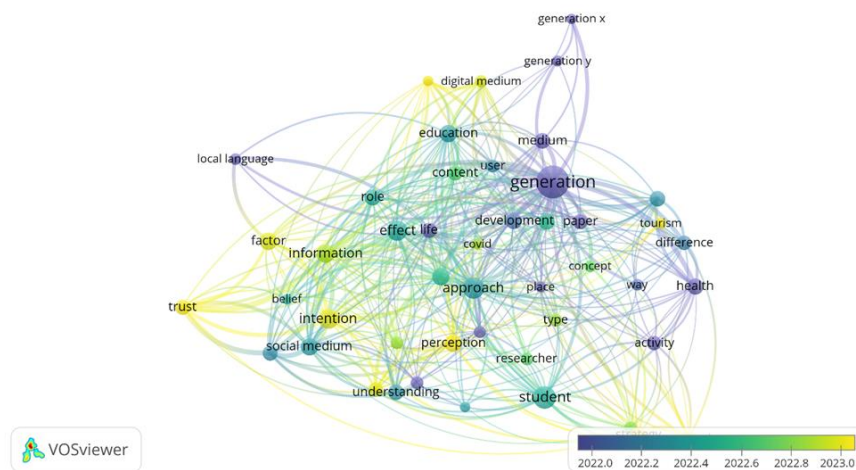


Figure 7. Trend of topics in pedagogical research studies between Millennials and Generation Z

The overlay visualization image from VOSviewer provides an overview of the temporal development of keywords used in scientific publications related to the issue of intergenerational pedagogical tension. The colors in the network indicate the dominant year of appearance for each keyword, with a spectrum ranging from dark blue (early 2022) to bright yellow (approaching 2023). From this visualization, it can be seen that the word “generation,” which is the center of the largest node in the network, has a blue-purple color, indicating that this concept has been a focus since the beginning of data collection. This shows that discourse on generational differences (Generations X, Y, and Z) has long been a concern in literature studies.

Keywords such as “medium,” “generation x,” “generation y,” “covid,” and “researcher” are also predominantly blue, indicating that these terms appear more frequently in early literature around 2022. Meanwhile, words such as “trust,” “intention,” “belief,” and “digital medium” are highlighted in bright yellow, meaning these topics appear more intensely in recent publications toward the end of 2022 and into 2023. This shows a shift in the focus of studies from identifying generations and the pandemic context to more specific issues of behavior and digital technology, such as students' trust in digital media and their intention to learn through online platforms. Other keywords such as “social medium,” “understanding,” and “student” are in the middle with a blue-green color, indicating the continuity of these topics throughout the publication period. Meanwhile, terms like “tourism,” “health,” and “difference” remain blue, indicating their greater role in early discussions that may have been contextual to the COVID-19 pandemic period.

Thus, this temporal analysis shows that the focus of the study has undergone a dynamic shift—from a macro study of generational differences and the impact of the pandemic, to a deeper exploration of contemporary pedagogical issues such as digitization, trust, learning strategies, and the role of social media in mediating intergenerational learning experiences. These findings underscore the importance of a multidisciplinary and adaptive approach in examining educational issues in the post-pandemic era, characterized by technological acceleration and generational complexity.

4. Discussion

The results of this study indicate that the pedagogical tension between Millennials and Generation Z is increasingly attracting attention from various disciplines. The literature analyzed is not limited to education and social sciences, but also includes information technology, psychology, communication, and cultural studies [1], [2], [4]. This underscores that intergenerational learning dynamics in the digital age are a complex issue requiring an interdisciplinary approach. As highlighted by Twenge & Donnelly (2016) and reinforced by Alruthaya et al. (2021), differences in values, learning style preferences, and digital orientation across generations pose significant challenges in designing inclusive and adaptive educational strategies that meet the needs of the times.

A cluster analysis of keywords from the reviewed literature indicates six main themes: (1) culture and perception; (2) learning experiences and generational differences; (3) communication and intergenerational activities; (4) development of digital content and media; (5) Gen Z consumer behavior and local values; and (6) strategies and institutional support [3], [5]. This division shows that discourse on generations transcends age issues, involving factors such as digital communication, media-based learning design, and the influence of social media on learning perceptions.

This is also consistent with findings by Kokoç [44], who states that intergenerational education is now determined by technology and requires flexibility in teaching approaches. In this context, density map analysis shows that terms such as generation, student, medium, and education occupy central positions, indicating the importance of media dimensions and pedagogical approaches [1].

Furthermore, terms such as trust, intention, and belief are beginning to gain prominence in recent literature, underscoring that affective and cognitive aspects also play a role in the effectiveness of digital education [2]. This shows that learning is not only technical in nature but also relates to trust in learning resources and critical intentions regarding the use of technology.

Overlay and heatmap visualizations confirm the shift in themes from discussions of generations and the impact of the pandemic in early 2022 to more specific topics such as technology-based pedagogical strategies and digital learning experiences at the end of 2023 [3]. This aligns with Giroux's [45] perspective, which emphasizes the importance of critical pedagogy capable of responding to contemporary social and cultural dynamics, and positioning young generations as active agents in educational change.

Thus, this study affirms that the pedagogical tension between Millennials and Generation Z is not merely a demographic issue but a result of the interaction between social dynamics, technological developments, and the construction of learning culture. Therefore, future pedagogical approaches need to be inclusive, participatory, reflective, and contextual to the needs of today's digital learners.

5. Conclusions

Studies on pedagogical tensions between Millennials and Generation Z show that this issue has gained widespread attention from various disciplines, including education, psychology, information technology, communication, and social sciences. These findings indicate that research on generational dynamics in an educational context is no longer the exclusive domain of formal education but has evolved into an interdisciplinary discourse encompassing sociocultural, digital, and behavioral perspectives. Bibliometric analysis identifies six main clusters in the literature highlighting issues such as differences in perceptions and values between generations, the role of digital media, learning strategies, and the social context underlying pedagogical tensions. The most dominant cluster is the study of "generation," which is closely linked to concepts such as "student," "education," "approach," and "medium." This indicates that the main focus of the study is on adapting learning approaches to the characteristics and expectations of different generations of learners.

As the use of technology in education increases, the direction of intergenerational pedagogical studies has also shifted toward contemporary issues such as digital learning environments, trust in digital media, and Generation Z students' intentions for technology use. The overlay visualization shows that topics such as "intention," "trust," and "social medium" are beginning to dominate recent literature, indicating that academic attention has shifted from simply distinguishing generational characteristics to understanding how these generations interact with technology in the context of learning. Thus, this study concludes that pedagogical tensions between generations cannot be explained solely through age differences or cultural values, but also through the social and digital constructs that shape the mindset and learning styles of today's generations. Therefore, it is important for educators, policymakers, and curriculum designers to develop more reflective, adaptive, and data-driven approaches in responding to generational challenges in future education.

Author contributions: Suyono designed and planned this study, coordinating research activities, data collection, literature review, data analysis, interpretation of results, and writing an initial draft of the manuscript. Sugiharti contributed to providing a critical revision of the manuscript. Wahyudi Winarjo assisted in and contributed to the final editing of the manuscript. All authors have read and approved the final version of the manuscript.

Competing interests: The authors declare that they have no competing interests.

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