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Navigating the Future in the Brittle Era: A Systematic Literature Review of Academic Resilience and Learning Agility in Shaping University Students' Future Orientation

Menavigasi Masa Depan di Era yang Rapuh: Tinjauan Literatur Sistematis tentang Peran Resiliensi Akademik dan Kelincahan Belajar terhadap Orientasi Masa Depan Mahasiswa

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Abstract

Transformasi yang cepat dan tidak stabil yang menjadi ciri Era Brittle menempatkan mahasiswa pada kondisi ketidakpastian akademik dan karier, sehingga menuntut kapasitas adaptif yang kuat untuk mempertahankan orientasi masa depan yang bermakna dan berkelanjutan. Penelitian ini bertujuan untuk mensintesis secara sistematis bukti empiris mengenai peran resiliensi akademik dan learning agility dalam membentuk orientasi masa depan mahasiswa. Systematic Literature Review (SLR) dilakukan dengan mengikuti protokol PRISMA, dengan menganalisis 55 artikel jurnal terindeks Scopus yang dipublikasikan antara tahun 2010 hingga 2026 melalui pendekatan tematik dan bibliometrik. Temuan bibliometrik menunjukkan adanya peningkatan perhatian akademik terhadap topik ini, yang tercermin dari tingkat pertumbuhan publikasi tahunan sebesar 18,72% dan rata-rata 21,84 sitasi per dokumen, yang menunjukkan semakin tingginya relevansi akademik dari konstruk-konstruk tersebut. Sintesis tematik mengungkap tiga pola utama, yaitu: resiliensi akademik berfungsi sebagai sumber daya psikologis yang memungkinkan mahasiswa mengatasi stres dan hambatan akademik; learning agility berperan sebagai kapasitas proaktif yang mendorong kemampuan beradaptasi, pembelajaran berkelanjutan, dan pemecahan masalah yang efektif; serta integrasi kedua konstruk tersebut membentuk kerangka adaptif yang komprehensif dengan menyeimbangkan stabilitas emosional dan pertumbuhan perkembangan diri. Temuan ini menegaskan pentingnya mengintegrasikan program penguatan resiliensi dan peningkatan learning agility ke dalam kebijakan serta kurikulum pendidikan tinggi guna memperkuat kesiapan psikologis mahasiswa, kemampuan adaptasi karier, dan kapasitas jangka panjang dalam menghadapi ketidakpastian. Kajian ini juga menunjukkan bahwa pengembangan resiliensi dan learning agility secara bersamaan merupakan faktor penting dalam membentuk lulusan yang berorientasi masa depan dan mampu berkembang di tengah lingkungan yang semakin kompleks dan tidak terprediksi.

Kata kunci: Ketahanan, Ketangkasan, Orientasi, Kerapuhan, Sintesis

Abstract

The rapid and unstable transformations characteristic of the Brittle Era place university students in conditions of academic and career uncertainty, requiring strong adaptive capacities to maintain meaningful and sustainable future orientation. This study aims to systematically synthesize empirical evidence on the roles of academic resilience and learning agility in shaping students' future orientation. A Systematic Literature Review (SLR) was conducted following the PRISMA protocol, analyzing 55 Scopus-indexed journal articles published between 2010 and 2026 through thematic and bibliometric approaches. The bibliometric findings indicate a growing scholarly interest in this field, reflected in an annual publication growth rate of 18.72% and an average of 21.84 citations per document, demonstrating the increasing academic relevance of these constructs. Thematic synthesis reveals three dominant patterns: academic resilience functions as a psychological resource that enables students to cope with academic stress and setbacks; learning agility serves as a proactive capability that promotes adaptability, continuous learning, and effective problem-solving; and the integration of both constructs provides a comprehensive adaptive framework that balances emotional stability with developmental growth. These findings highlight the strategic importance of incorporating resilience-building and agility-enhancement initiatives into higher education policies and curricula to strengthen students' psychological readiness, career adaptability, and long-term capacity to navigate uncertainty. The review further suggests that fostering both resilience and learning agility is essential for developing future-oriented graduates capable of thriving in increasingly complex and unpredictable environments.

Keywords: *Resilience, Agility, Orientation, Fragility, Synthesis*

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INTRODUCTION

The twenty-first century is increasingly characterized by volatility, uncertainty, and rapid systemic change, reflecting what many scholars describe as the Brittle Era(Teh et al., 2023). In such an environment, institutions, industries, and career pathways that once appeared stable can quickly become vulnerable to disruption (Cui et al., 2023). University students are among the groups most affected by these conditions because they occupy a critical transitional stage between education and professional life (Semenyshyn & Semenova, 2023). Their academic and career development unfolds amid technological innovation, economic instability, and shifting labor market demands. Consequently, planning for the future is no longer a straightforward developmental task but a complex process that requires adaptability, resilience, and continuous learning (Martin et al., 2023).

The COVID-19 pandemic further intensified these challenges by accelerating digital transformation across higher education systems worldwide (Li et al., 2023). Large-scale disruptions to teaching, learning, and career preparation exposed the fragility of conventional educational structures and heightened uncertainty regarding students' academic progression and employment prospects (Lin et al., 2024). Beyond the pandemic, rapid advances in artificial intelligence, automation, and digital technologies continue to reshape workforce requirements, requiring students to develop competencies that extend beyond disciplinary knowledge (Ding et al., 2024). This large-scale interruption intensified uncertainty regarding academic progression and employment prospects. As a result, students increasingly face difficulties in maintaining confidence, motivation, and clarity regarding their future goals (Evidente & Estimo, 2014).

Within educational psychology, future orientation has emerged as an important construct for understanding how students perceive, plan, and prepare for their future (Tison-Brandon et al., 2024). Future orientation refers to individuals' cognitive representations, motivational commitments, and emotional expectations regarding future life outcomes (Herrera et al., 2024). Research suggests that a positive future orientation is associated with greater academic engagement, persistence, career planning, and psychological well-being, whereas weakened future expectations are linked to disengagement, stress, and dropout intentions (Hutchings & Quinney, 2015). Given the uncertainty characterizing contemporary society, identifying factors that strengthen students' future orientation has become increasingly important.

One psychological factor that has received considerable attention is academic resilience. Academic resilience refers to students' capacity to maintain motivation, adapt to challenges, and achieve academic success despite setbacks, stress, or adversity (Neden et al., 2020). Studies consistently demonstrate that resilient students are better able to manage academic pressures, regulate negative emotions, and sustain engagement during difficult circumstances (Alexander & Bannova, 2020). In higher education settings, resilience has been associated with reduced anxiety, improved coping strategies, and stronger academic persistence (Gause et al., 2024). Resilience therefore functions as a protective resource that enables students to recover from disruptions and continue pursuing their educational goals. However, resilience primarily emphasizes coping and recovery, providing only a partial explanation of how students proactively prepare for future challenges.

Learning agility has emerged as a critical competency for navigating dynamic and uncertain environments. Learning agility refers to the willingness and ability to learn from experience, adapt to unfamiliar situations, and apply knowledge effectively in new contexts (Alexander & Bannova, 2021). Research across organizational, leadership, and educational settings indicates that learning agility promotes adaptability, innovation, self-efficacy, and sustained performance (Pradana & Ekowati, 2024). Students who exhibit high levels of learning agility are more likely to seek feedback, embrace change, experiment with new strategies, and respond constructively to emerging challenges (Backstrom et al., 2022). These characteristics may be particularly valuable in helping students navigate the uncertainties associated with higher education and future careers (Sagala & Ori, 2025a).

Although academic resilience and learning agility are conceptually related, they are often examined independently within the existing literature (Chiang, 2022). Research on resilience frequently focuses on coping with adversity and academic persistence, whereas studies on learning agility are commonly situated within leadership development, innovation, or organizational adaptation contexts (van Nguyen et al., 2025). Within higher education, learning agility has been linked to self-efficacy, resilience, and mental health (Gross et al., 2022). Consequently, limited attention has been devoted to understanding how these two constructs operate together to influence students' future orientation. This separation has contributed to a fragmented understanding of the psychological resources that support adaptive future planning in higher education.

Another important gap concerns the application of the Brittle Era framework within educational psychology. While resilience has been extensively examined across various sectors, including health, transportation, and sustainability studies (Alvarez-Perez et al., 2025). its integration with anticipatory and developmental constructs remains underexplored. The realities of the Brittle Era require individuals not only to recover from adversity but also to anticipate change, learn continuously, and adapt proactively to uncertain futures (Eryarsoy et al., 2022). Institutions that embraced adaptive approaches demonstrated stronger resilience during crisis transitions (Hanh et al., 2025). Therefore, understanding the combined roles of academic

resilience and learning agility is essential for explaining how students develop and maintain a positive future orientation.

The novelty of this study lies in its integration of academic resilience, learning agility, and future orientation within a single conceptual framework. Unlike previous reviews that focus on these constructs separately, this study synthesizes evidence regarding their interrelationships and their collective role in helping students navigate uncertainty. By positioning future orientation as an adaptive developmental outcome shaped by both coping capacity and proactive learning competence, this review provides a more comprehensive understanding of student adaptation in the Brittle Era. Accordingly, this systematic literature review aims to examine the relationships among academic resilience, learning agility, and future orientation, identify key theoretical and empirical trends, and propose directions for future research and educational practice.

METHOD

This study employed a Systematic Literature Review (SLR) using PRISMA guidelines to ensure transparency and reproducibility in the selection and analysis of relevant studies. The literature search was conducted in the Scopus database using a Boolean search string designed to capture studies on academic resilience, learning agility, and future orientation: ("academic resilience" OR "resilience") AND ("learning agility" OR "agility") AND ("future orientation" OR "future perspective" OR "career adaptability"), with the operators AND and OR applied to systematically expand and refine the search scope. The inclusion and exclusion criteria are presented in Table 1. Data were analyzed using a combination of thematic and bibliometric approaches, where bibliometric mapping was performed using VOSviewer to visualize keyword co-occurrence, research trends, and collaboration networks, while Bibliometrix (R-package) supported descriptive analysis of publication trends and citation patterns. To ensure the quality of selected studies, a critical appraisal process was conducted based on criteria including clarity of research objectives, methodological appropriateness, validity and reliability of data, relevance to the research variables, and contribution to the field, with only studies meeting acceptable quality standards included in the final synthesis.

Table 1. Inclusion and Exclusion Criteria

Criteria	Details
Inclusion	1. Peer-reviewed journal articles published between 2010 and 2026.
	2. Articles written in English.
	3. Studies examining academic resilience, learning agility, future orientation, or the relationships among these constructs.
Exclusion	1. Conference papers, book chapters, editorials and gray literature.
	2. Studies that do not address academic resilience, learning agility, or future orientation.

The inclusion and exclusion criteria were established to ensure that the selected studies were directly relevant to the objectives of this review and met appropriate standards of scientific quality. By limiting the review to peer-reviewed journal articles published between 2010 and 2026, the study captured contemporary developments in the literature concerning academic resilience, learning agility, and future orientation while ensuring the credibility of the evidence base. Restricting the dataset to English-language publications facilitated consistency in data extraction and interpretation across studies. Furthermore, focusing on studies that explicitly examined academic resilience, learning agility, future orientation, or their interrelationships enabled a comprehensive exploration of the theoretical and empirical connections among these constructs. Conversely, the exclusion of conference papers, book chapters, editorials, and other forms of gray literature helped maintain methodological rigor by prioritizing sources that had undergone formal peer-review processes. Studies unrelated to the focal constructs were also excluded to preserve conceptual coherence and ensure that the final synthesis remained aligned with the aim of understanding how academic resilience and learning agility contribute to the development of future orientation in educational contexts.

Table 2. PRISMA Flowchart – Study Selection Process.

Phase	Step	Records (n)
Identification	Records identified from Scopus databases on resilience, learning agility, and future orientation.	808
	Records identified from thematic filters for resilience and learning agility.	155
	Records after applying the year filter (<2025)	120
	Records after filtering article type (only journals)	100
	Records after filtering language (only English)	100
Screening	Records screened	100
	Records excluded (not relevant based on abstract/title)	30
	Reports sought for retrieval	70
	Reports not retrieved (full texts not accessible)	5
Eligibility	Reports assessed for eligibility	65
	Reports excluded (based on full-text analysis)	10
Included	Studies included in the final review	55

The study selection process followed the PRISMA framework to ensure transparency and methodological rigor throughout the systematic literature review. An initial search of the Scopus database using keywords related to academic resilience, learning agility, and future orientation identified 808 records. After applying filters for publication year (2010–2026), document type (journal articles only), and language (English), the number of eligible records was reduced to 100. These records were subsequently screened based on their titles and abstracts, resulting in the exclusion of 30 studies that were not relevant to the objectives of the review. Consequently, 70 full-text articles were sought for retrieval, of which 5 could not be accessed. The remaining 65 studies underwent a full-text eligibility assessment using the predefined inclusion and exclusion criteria. Following this evaluation, 10 studies were excluded because they did not adequately address the core constructs of academic resilience, learning agility, or future orientation. Ultimately, 55 studies met all eligibility requirements and were included in the final systematic review and synthesis.

Table 3. Summary of Bibliometric Data.

Description	Results
Timespan	2010–2026
Documents	55
Annual growth rate (%)	18.72
Average citations per document	21.84
Document contents	
Keywords Plus (EN)	248
Author's keywords (DE)	132
Authors and collaboration	
Authors	168
Co-Authors per Document	3.85
DOCUMENT TYPES	
Article	55

The bibliometric analysis indicates that the reviewed studies span the period from 2010 to 2026, with a total of 55 documents analyzed. The annual growth rate of 18.72% suggests a steady increase in scholarly interest in the topic over time. The average number of citations per document is 21.84, reflecting a moderate yet meaningful academic impact within the field. In terms of document content, 248 Keywords Plus and 132 author-generated keywords were identified, indicating a diverse but focused thematic distribution. Regarding authorship and collaboration, the dataset involves 168 authors with an average of 3.85 co-authors per document, demonstrating a moderate level of research collaboration. All documents included in the analysis are journal articles, ensuring consistency in publication type and supporting the reliability of the bibliometric findings.

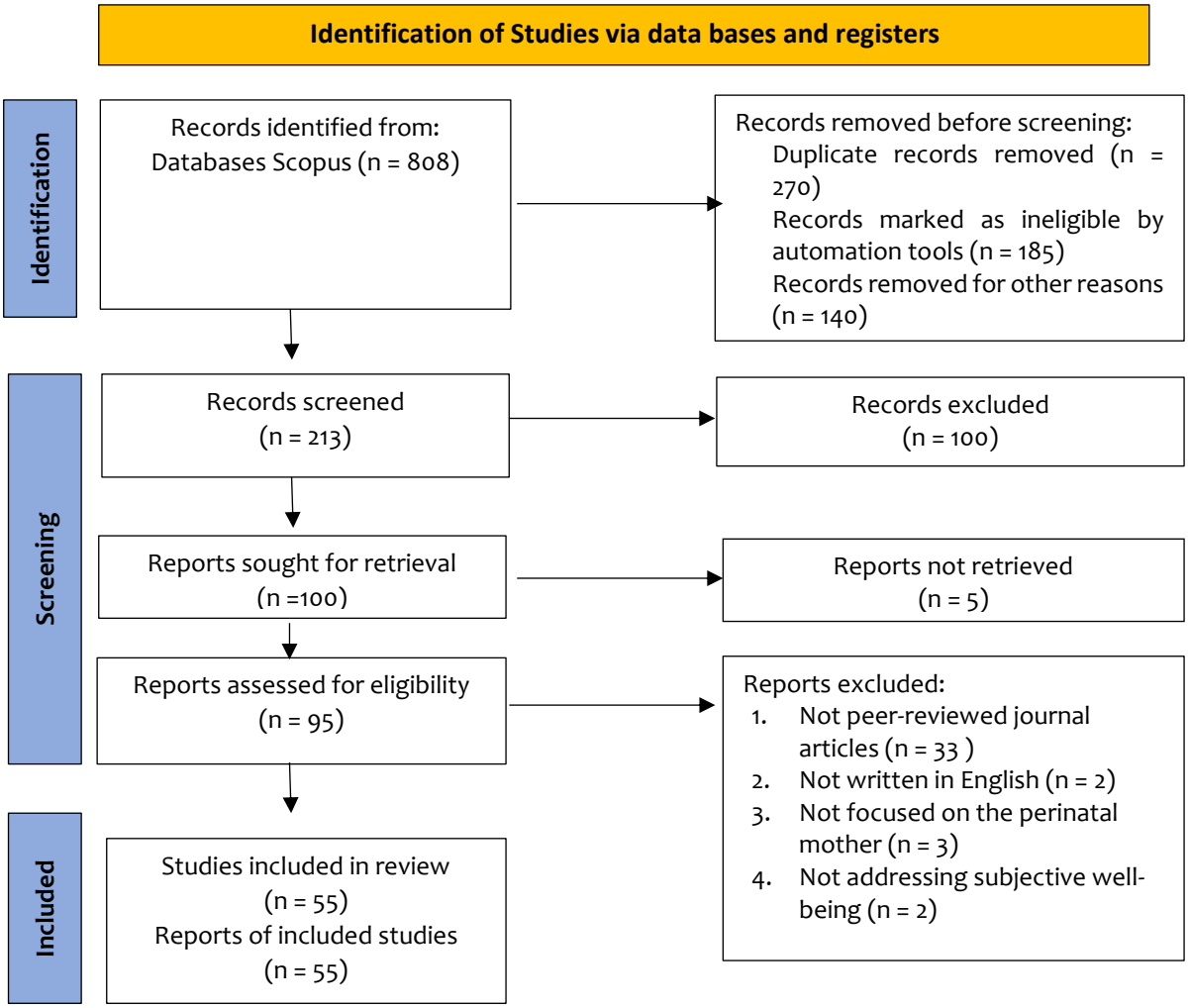

Figure 1. Article Selection

RESULTS AND DISCUSSION

The bibliometric results should be interpreted in light of the analytical procedures employed to ensure data quality and reliability. The dataset consisted of 55 peer-reviewed journal articles retrieved from the Scopus database and screened according to the PRISMA protocol. Prior to analysis, duplicate records were removed and bibliographic data were cleaned through the standardization of author names, keywords, and source information to reduce inconsistencies caused by indexing variations. Bibliometric indicators, including annual growth rate (18.72%), average citations per document (21.84), Keywords Plus (n = 248), and Author Keywords (n = 132), were generated using the Bibliometrix package and Biblioshiny interface in R. Network analyses and visualizations were conducted using VOSviewer, with association-strength normalization applied to improve the comparability of co-occurrence relationships and minimize bias arising from differences in keyword frequency. The inclusion of both Keywords Plus and Author Keywords enabled a broader representation of the intellectual and conceptual structure of the field. These procedures ensured that the bibliometric findings reflected the underlying research landscape on academic resilience, learning agility, and future orientation with greater methodological rigor and analytical robustness.

Publication Trends

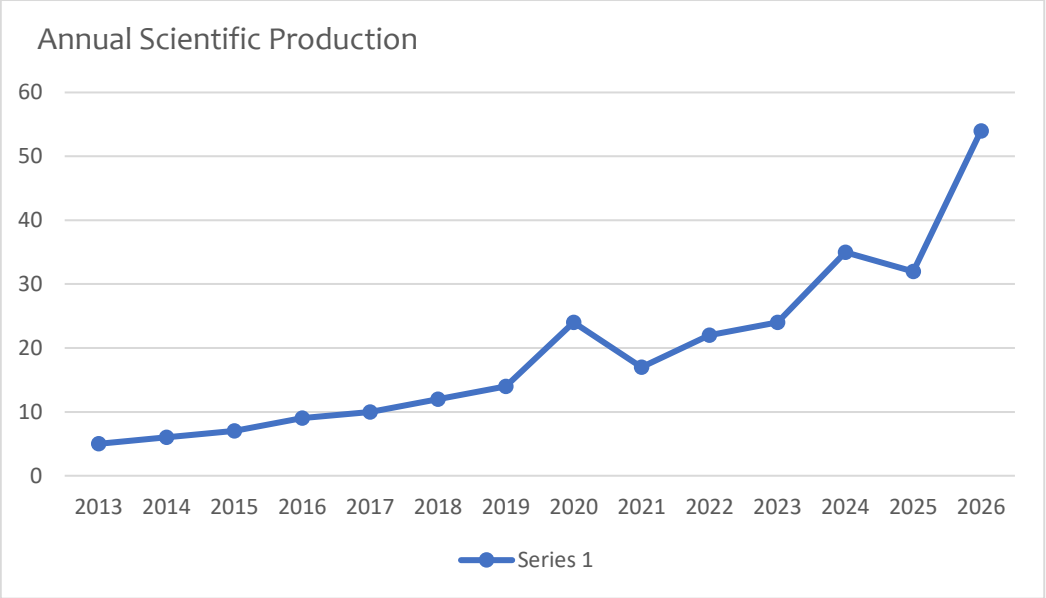

Figure 2. Annual scientific production graph.

The figure on Annual Scientific Production illustrates a consistent upward trend in publications related to resilience, learning agility, and future orientation over the observed period. Beginning with a modest output of five publications in 2013, the number of studies increased gradually each year, reaching double digits by 2017 and continuing to rise steadily through 2019. A significant surge is visible in 2020, where production sharply increased, followed by a slight decline in 2021, which may reflect transitional academic adjustments during that period. From 2022 onward, publication output resumed its upward trajectory, with particularly notable growth in 2024 and a slight fluctuation in 2025. The most substantial increase appears in 2026, where the number of publications peaks dramatically at over fifty documents. Overall, the graph demonstrates accelerating scholarly interest in these constructs, especially in the post-2020 period, suggesting that global instability and rapid systemic change have intensified academic attention toward resilience, agility, and future-oriented development.

Citation Impact

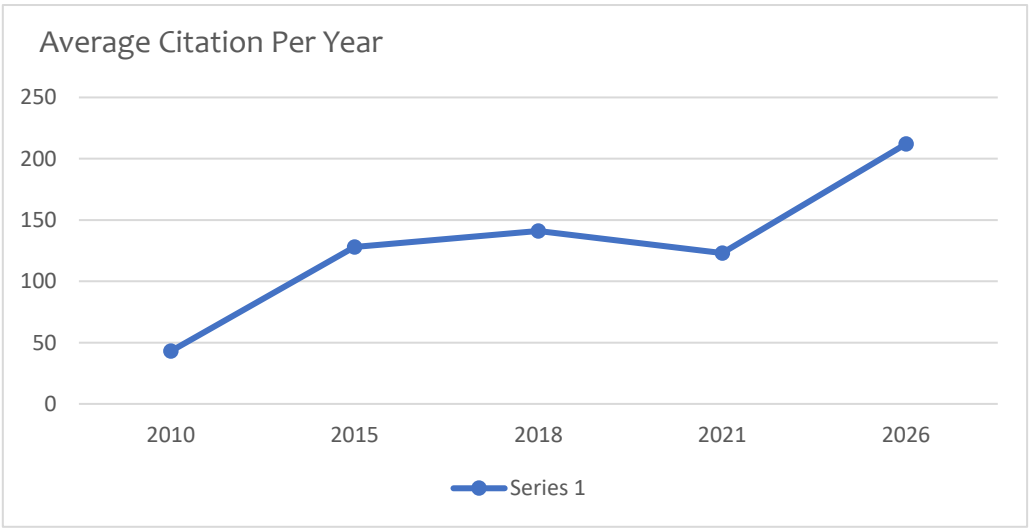

Figure 3. Average Article Citations per Year.

The figure illustrating the Average Citation Per Year demonstrates a generally increasing trend in the scholarly impact of publications related to resilience, learning agility, and future orientation. In 2010, the average citation count was relatively modest, remaining below fifty citations, indicating the early developmental stage of research in this field. A substantial rise is observed by 2015, where the average citation rate more than doubled, reflecting growing academic recognition and engagement. The upward trend continues in 2018, reaching approximately 140 citations, suggesting consolidation and expanding theoretical relevance. A slight decline appears in 2021, possibly due to the

recency of publications during that period, which had less time to accumulate citations. However, by 2026, the average citation count increases sharply to over 200, marking the highest impact level across the observed years. Overall, the graph indicates not only increasing publication volume but also strengthening scholarly influence and intellectual maturity of research in this domain.

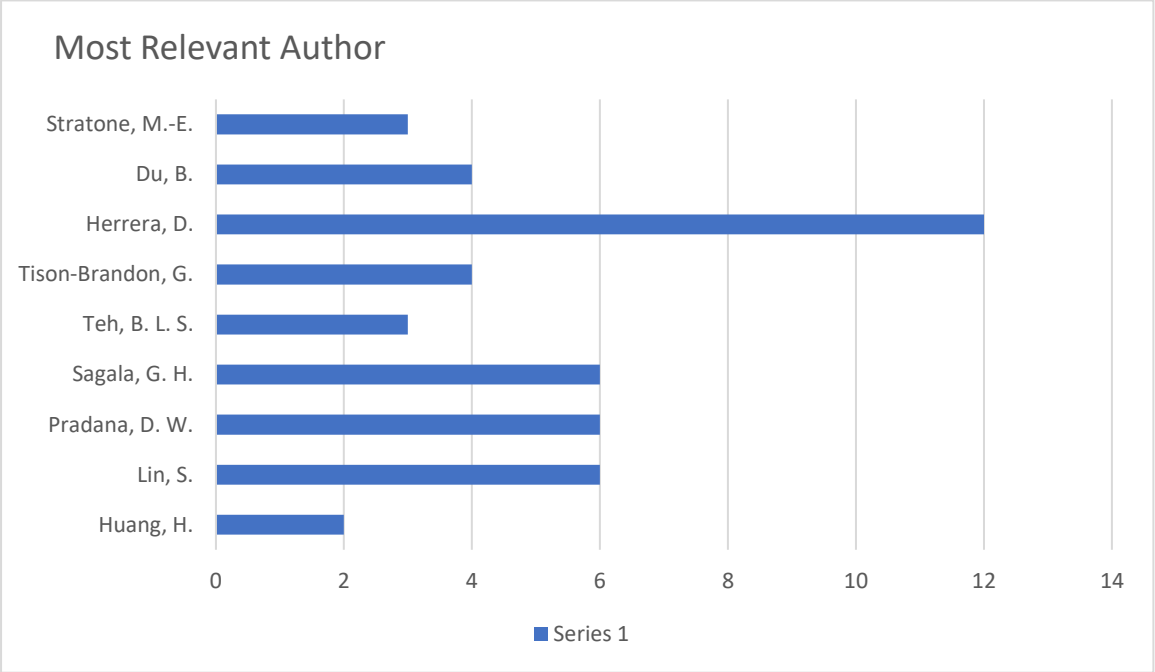

Figure 4. Most productive authors.

The "Most Relevant Author" analysis demonstrates a clear concentration of scholarly productivity among a limited number of contributors within the dataset. Herrera, D. stands out as the most prolific author, with 12 publications, indicating a substantial and sustained contribution to the discourse surrounding resilience, student persistence, and higher education dynamics. Following Herrera, Lin, S., Pradana, D. W., and Sagala, G. H. each contribute 6 publications, reflecting strong and consistent engagement in themes related to resilience, organizational capability, and adaptive transformation. In the mid-tier range, Du, B. and Tison-Brandon, G. each record 4 publications, highlighting their focused yet meaningful scholarly involvement in areas such as academic stress mediation, growth mindset, and educational resilience. Meanwhile, Stratone, M.-E. and Teh, B. L. S. contribute 3 publications each, suggesting steady participation in discussions of organizational agility and psychological resilience in professional education settings, whereas Huang, H., with 2 publications, provides targeted insights particularly into learning agility and mental health pathways in higher education.

Density

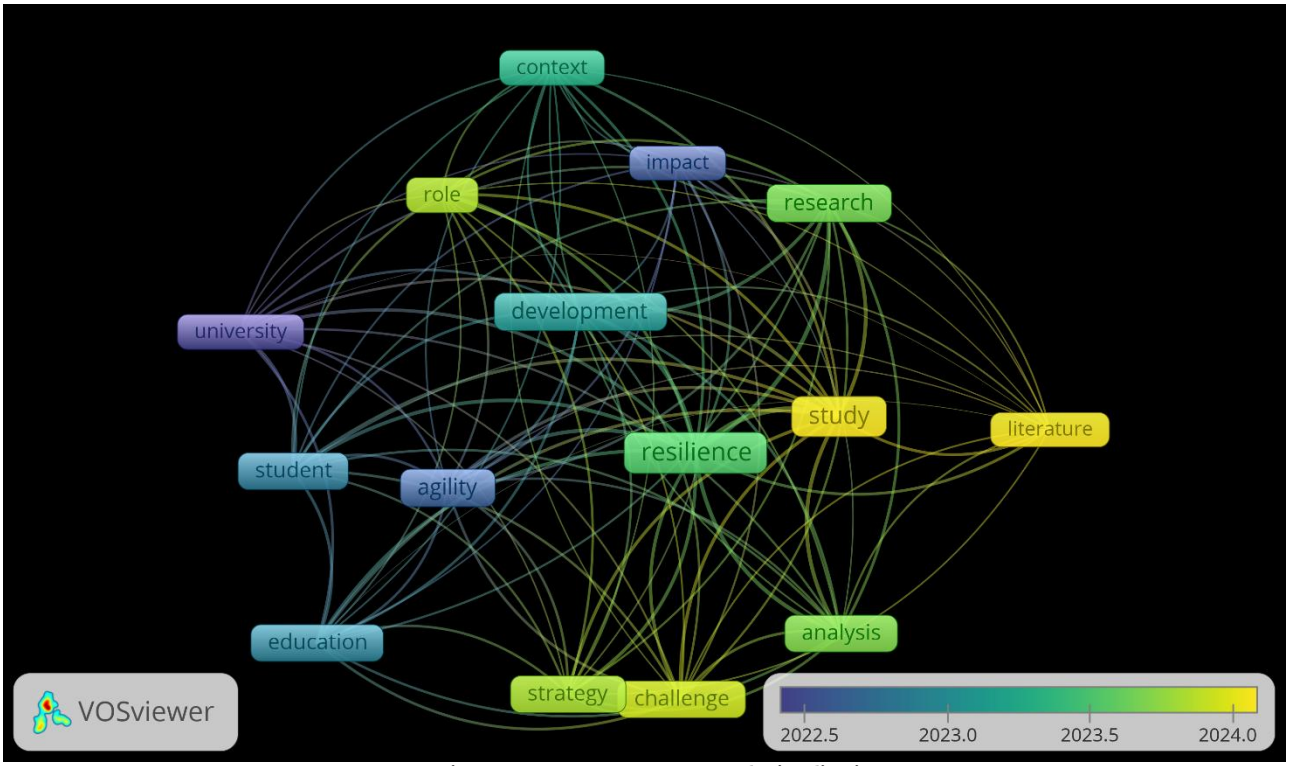

Figure 5. Co-occurrence network visualization.

Thematic evolution and research progression

Word cloud representation

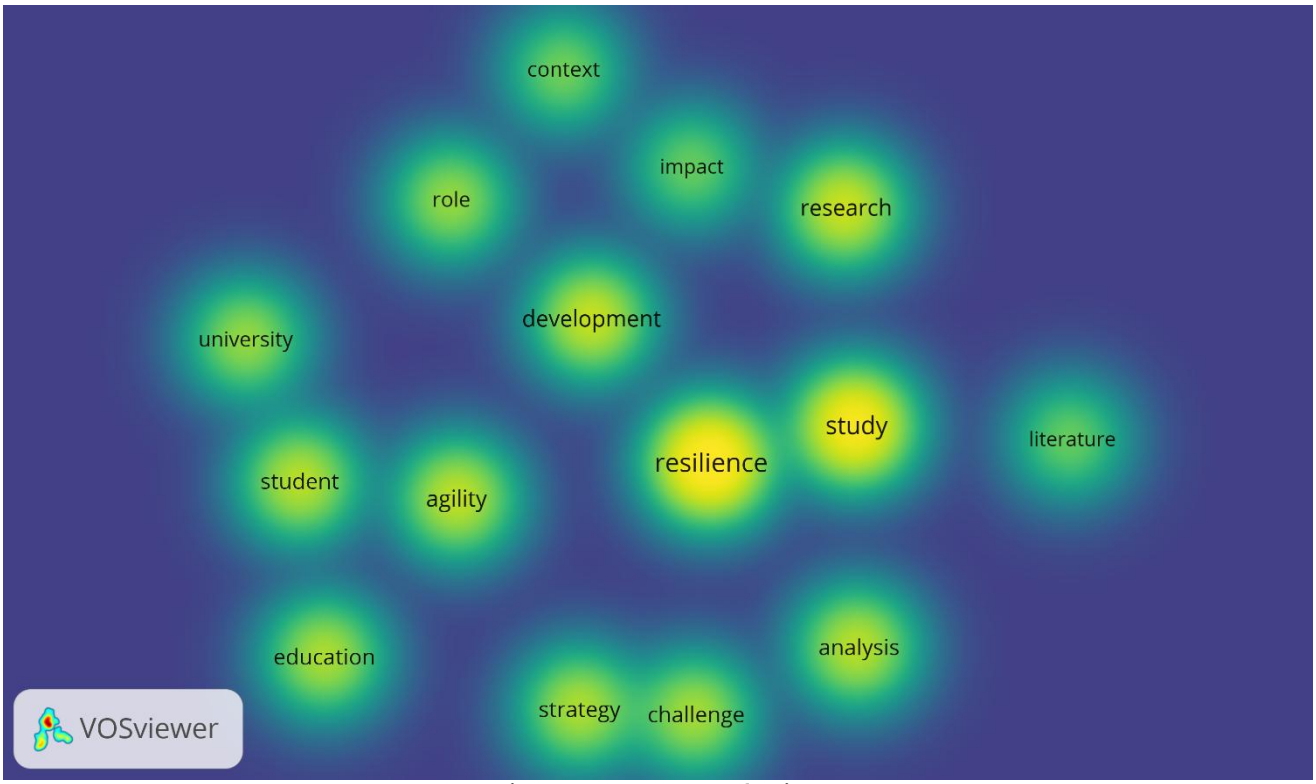

Figure 6. Co-occurrence density map

Based on the results of the systematic literature review that has been conducted, a number of recurring patterns, conceptual alignments, and thematic intersections can be identified across various studies examining academic resilience, learning agility, and future orientation in university students within the context of the brittle era; These findings demonstrate a consistent relationship in which resilience and learning agility

function as adaptive psychological and cognitive resources that strengthen students' capacity to navigate uncertainty, manage academic pressure, sustain motivation, and construct purposeful future plans across diverse higher education settings and sociocultural contexts; The emerging evidence highlights not only the direct influence of resilience and agility on academic persistence and psychological well-being, but also their mediating and moderating roles in buffering stress, enhancing self-efficacy, fostering growth mindset, and supporting long-term goal commitment.

Figure 8. Word Cloud Representation.

Academic Resilience as a Psychological Anchor in the Brittle Era

Academic resilience functions as a psychological anchor that stabilizes students in the midst of the Brittle Era, a period marked by fragility, rapid change, and structural uncertainty (Li et al., 2023). University students today navigate academic pathways that are increasingly influenced by technological disruption, economic volatility, and shifting professional demands. In such an environment, long-term planning becomes more complex and emotionally taxing (Lin et al., 2024). Resilience provides an internal foundation that allows students to remain grounded despite external instability. It acts as a stabilizing force that preserves direction when circumstances appear unpredictable (Ding et al., 2024).

The literature consistently conceptualizes academic resilience as more than mere endurance (Evidente & Estimo, 2014). It reflects a dynamic process through which students adapt positively to adversity while maintaining engagement with their educational goals (Tison-Brandon et al., 2024). Rather than eliminating stress, resilience modifies the way stress is interpreted and managed (Herrera et al., 2024). Students who demonstrate resilience tend to appraise difficulties as manageable challenges rather than catastrophic failures. This cognitive reframing significantly influences how future possibilities are perceived (Hutchings & Quinney, 2015).

In volatile academic systems, disruptions often occur without warning. Sudden curriculum changes, digital transitions, or assessment uncertainties may generate anxiety and confusion (Alexander & Bannova, 2020). Without psychological stability, such disruptions can lead to disengagement or hopelessness. Resilient students, however, are more likely to preserve confidence in their long-term academic trajectory (Neden et al., 2020). They sustain belief in eventual success even when short-term outcomes are uncertain (Lateef et al., 2021).

One crucial aspect of resilience lies in emotional regulation (Gause et al., 2024). The ability to manage anxiety and frustration prevents negative emotions from overwhelming cognitive resources. Emotional regulation supports clarity in decision-making, especially when students must adapt to new learning environments (Alexander & Bannova, 2021). When emotional reactions are effectively managed, students maintain focus on their broader aspirations. This stability safeguards future orientation from being distorted by temporary stressors (Pradana & Ekowati, 2024).

Academic stress is increasingly prevalent in competitive higher education contexts. Performance pressure, financial concerns, and career ambiguity compound emotional strain (Backstrom et al., 2022). In the absence of resilience, these pressures may lead to burnout or withdrawal (Sagala & Ori, 2025a). However, resilience buffers the psychological impact of such stressors by strengthening coping strategies. Students who develop adaptive coping mechanisms demonstrate higher academic satisfaction and sustained motivation (Chiang, 2022).

The buffering function of resilience also influences how students respond to failure. Academic setbacks, such as low grades or rejected applications, can threaten self-esteem and identity (van Nguyen et al., 2025). For some students, these experiences disrupt confidence in long-term goals (Gross et al., 2022). Resilient individuals, however, interpret failure as informative rather than definitive. They extract lessons from negative outcomes and integrate them into improved strategies (Alvarez-Perez et al., 2025).

This reinterpretation of setbacks contributes significantly to sustained hope (Eryarsoy et al., 2022). Hope is closely linked to future orientation because it sustains belief in achievable outcomes. When students remain hopeful, they are more likely to persist in goal-directed behavior (Hanh et al., 2025). Resilience protects hope from being eroded by temporary disappointments. In doing so, it reinforces long-

term academic and career commitment (Krasylnykova et al., 2023).

Motivational persistence is another core dimension strengthened by resilience. The ability to continue striving despite obstacles ensures continuity in educational engagement (Strehl et al., 2025). Persistent students invest consistent effort even when progress appears slow (Morales et al., 2023). This sustained engagement prevents fragmentation of future planning. Over time, persistence consolidates identity and reinforces self-efficacy (Sharma, 2025).

The Brittle Era intensifies uncertainty about professional pathways. Rapid technological change and automation reshape labor market demands (Anarbek et al., 2025). Students may question the relevance of their chosen disciplines or skills. In such contexts, resilience stabilizes confidence in one's capacity to adapt (Abbas et al., 2024). It reassures students that growth remains possible despite evolving external conditions (Albannai et al., 2024).

Identity formation during university years is particularly sensitive to instability. Academic experiences influence self-concept, career aspirations, and social belonging (Du et al., 2025). When setbacks accumulate without coping resources, identity confusion may emerge. Resilience mitigates this risk by reinforcing a coherent sense of self (Stratone & Vătămănescu, 2024). Students maintain continuity in their personal narratives despite environmental volatility (Sousa et al., 2025).

Psychologically, resilience strengthens perceived control. Perceived control refers to the belief that one can influence outcomes through effort and strategy (Edobor & Sambo-Magaji, 2025). When students perceive higher control, they engage more actively in problem-solving behaviors (Abdullatif Ibrahim et al., 2025). This proactive stance reduces helplessness and passivity. Consequently, resilience enhances confidence in navigating uncertain futures (Poenaru et al., 2025).

Resilience also fosters adaptability without compromising stability (Muralidhar et al., 2025). While adaptability often involves change, resilience ensures that change does not dismantle foundational goals (Sedovs et al., 2025). Students adjust methods without abandoning aspirations (Huang & Kou, 2025). This balance between flexibility and consistency is essential in dynamic academic landscapes. It enables growth while maintaining direction.

Social support networks further reinforce resilient functioning (Sidani & Harb, 2025). Support from peers, mentors, and family provides emotional reassurance and practical guidance. Such networks strengthen coping capacity during periods of stress (Ronael & Oruç Ertekin, 2025). Resilient students tend to seek support rather than withdraw. This relational engagement sustains motivation and protects future orientation (Tosi & Marty, 2025).

Cognitive appraisal processes are central to resilient responses. How students interpret events significantly shapes emotional and behavioral outcomes (Gohain & Gohain, 2025). Resilient individuals employ constructive appraisal strategies that emphasize learning opportunities (Cassidy et al., 2025). They avoid catastrophizing or overgeneralizing negative experiences. These cognitive patterns maintain optimism and long-term focus (Kyung-Ah et al., 2026).

Over time, repeated successful coping experiences reinforce resilience (Omar & Md Fadzil, 2026). Each successfully navigated challenge strengthens confidence in future coping ability (Liu et al., 2026). This cumulative effect builds psychological endurance. Students begin to trust their capacity to withstand uncertainty. Such trust stabilizes future planning even in ambiguous contexts (Elgui de Oliveira, 2026).

Resilience also interacts with academic self-efficacy. Students who believe in their competence are more likely to engage persistently (Gross et al., 2022). Resilient coping experiences enhance this belief system. As self-efficacy increases, students approach challenges with greater confidence (van Nguyen et al., 2025). This positive cycle reinforces forward-looking commitment (Gross et al., 2022).

Importantly, resilience does not imply absence of distress. Students may still experience fear or doubt (Alvarez-Perez et al., 2025). However, resilience ensures that these emotions do not dominate long-term outlook (Eryarsoy et al., 2022). Temporary discouragement does not evolve into chronic disengagement. This distinction is critical in maintaining sustainable motivation (Hanh et al., 2025).

Within institutional contexts, resilience can be nurtured through supportive pedagogical practices (Hutchings & Quinney, 2015). Encouraging reflective learning, constructive feedback, and growth-oriented assessment strengthens coping capacity (Herrera et al., 2024). Universities that prioritize psychological well-being indirectly reinforce students' future orientation. Educational environments thus play a role in cultivating resilience as a developmental asset (Hutchings & Quinney, 2015).

Academic resilience is consistently identified as a psychological anchor that stabilizes students in the Brittle Era, characterized by uncertainty, rapid change, and structural fragility (Li et al., 2023; Lin et al., 2024). Across studies, resilience is not merely conceptualized as endurance but as an adaptive process enabling students to maintain goal commitment despite adversity (Poenaru et al., 2025). Comparative evidence shows that while earlier studies Ibrahim et al. (2025) emphasized resilience as coping capacity, more recent research highlights its role in shaping cognitive appraisal and future-oriented thinking (Eryarsoy et al., 2022). This shift indicates an evolution from a reactive to a more proactive understanding of resilience.

However, the literature is inconsistent regarding the extent of resilience's impact. Some studies argue that resilience directly strengthens future orientation through emotional regulation and sustained motivation (Hutchings & Quinney, 2015), whereas others suggest its effect is indirect and mediated by variables such as self-efficacy and social support (van Nguyen et al., 2025). Additionally, contradictory findings indicate that excessive reliance on resilience may

lead to psychological rigidity, where students prioritize endurance over adaptation, potentially limiting responsiveness to changing academic demands (Herrera et al., 2024). This suggests that resilience alone may not fully address the complexity of uncertainty in contemporary higher education.

A critical gap in the literature lies in the limited integration between resilience and forward-looking competencies. While many studies confirm that resilience buffers stress and protects motivation, fewer explicitly examine how it contributes to proactive future construction (Eryarsoy et al., 2022). Moreover, most empirical studies are cross-sectional, limiting understanding of how resilience evolves in dynamic contexts. There is also a lack of contextual diversity, with many studies concentrated in specific educational systems, reducing generalizability. Therefore, while resilience plays a crucial stabilizing role, it requires complementary mechanisms, particularly those enabling adaptability and innovation, to fully support sustainable future orientation (Alvarez-Perez et al., 2025).

Learning Agility as a Catalyst for Proactive Future Construction

Maternal subjective well-being cannot be fully understood without situating it within a broader Learning agility emerges as a central developmental competence that empowers students to move beyond reactive coping and toward proactive future construction (Alexander & Bannova, 2020). In the context of the Brittle Era, where rapid technological shifts and structural uncertainties redefine educational and professional landscapes, students are required not only to endure change but to anticipate and leverage it (Neden et al., 2020). Learning agility represents the willingness and ability to continuously learn from experience and apply insights to novel situations (Lateef et al., 2021). Unlike resilience, which anchors stability in adversity, agility propels movement toward growth and transformation. It therefore functions as a catalyst that stimulates intentional and opportunity-driven future planning (Gause et al., 2024).

At its core, learning agility reflects a dynamic orientation toward continuous improvement (Alvarez-Perez et al., 2025). Students who exhibit high agility do not rely solely on previously mastered strategies. Instead, they actively seek new knowledge, perspectives, and methods to enhance performance (van Nguyen et al., 2025). This orientation transforms uncertainty into a developmental space rather than a threat. By embracing change as a source of learning, agile students cultivate adaptive confidence (Gross et al., 2022).

The Brittle Era intensifies the demand for rapid skill acquisition. Technological advancements, artificial intelligence, and digital ecosystems reshape labor market expectations at an unprecedented speed (Alvarez-Perez et al., 2025). Students must therefore update competencies frequently to remain relevant (Eryarsoy et al., 2022). Learning agility supports this process by encouraging responsiveness to emerging knowledge. It nurtures readiness to engage with unfamiliar tools and interdisciplinary approaches (Hanh et al., 2025).

Cognitive flexibility is a fundamental dimension of learning agility. Flexible thinkers can shift perspectives when encountering complex or ambiguous problems. They are less likely to rigidly adhere to outdated strategies (Krasylnykova et al., 2023). Instead, they evaluate situational demands and modify approaches accordingly (Strehl et al., 2025). This adaptability strengthens problem-solving effectiveness in unpredictable academic environments.

Openness to new experiences further enhances agile functioning (Krasylnykova et al., 2023). Students who display openness are curious, exploratory, and receptive to diverse viewpoints (Hanh et al., 2025). Such characteristics enable them to engage meaningfully with novel academic content and collaborative opportunities (Eryarsoy et al., 2022). Openness reduces resistance to change, allowing smoother adaptation during transitions. It also broadens intellectual horizons and stimulates innovative thinking (Alvarez-Perez et al., 2025).

Agile learners tend to experiment with alternative learning strategies when traditional methods prove ineffective (van Nguyen et al., 2025). Rather than perceiving difficulty as a signal of limitation, they interpret it as feedback for refinement. This experimental mindset supports iterative growth (Gross et al., 2022). Over time, repeated cycles of experimentation and adjustment enhance mastery. The capacity to refine strategies contributes directly to strategic foresight (Alvarez-Perez et al., 2025).

Digital transformation in higher education highlights the relevance of agility (Eryarsoy et al., 2022). Online platforms, virtual collaboration tools, and blended learning models require students to adapt quickly. Those with strong learning agility integrate technological changes into their routines with minimal disruption (Alvarez-Perez et al., 2025). They perceive digital tools as opportunities for expansion rather than obstacles. This adaptability strengthens both academic performance and professional readiness (Gross et al., 2022).

Learning agility is also strongly linked to self-efficacy. Students who trust their capacity to learn new skills approach challenges with confidence (van Nguyen et al., 2025). Each successful adaptation reinforces belief in future adaptability (Sagala & Ori, 2025a). This recursive relationship between agility and self-efficacy sustains motivation. Confidence in one's learning capacity fosters ambitious yet realistic goal setting (Backstrom et al., 2022).

Strategic planning is another outcome associated with agile learning behaviors (Pradana & Ekowati, 2024). Students who actively monitor trends and skill demands are more deliberate in shaping their academic pathways. They select courses, internships, and extracurricular activities that align with emerging opportunities (Alexander & Bannova, 2021). This intentional alignment enhances career clarity. Strategic engagement reduces randomness in future planning.

Proactive competence building is a defining feature of learning agility (Gause et al., 2024). Rather than waiting for formal instruction, agile students independently pursue additional certifications, workshops, or collaborative projects (Lateef et al., 2021). This initiative reflects ownership of developmental trajectories. It signals readiness to invest in long-term professional sustainability (Gause et al., 2024). Such proactive engagement strengthens adaptability across multiple domains.

Innovation orientation further distinguishes agile learners. Innovation involves not only adopting new tools but generating novel ideas and approaches (Lateef et al., 2021). Students who cultivate innovative thinking are better positioned to respond to evolving professional challenges (Neden et al., 2020). They contribute creatively to problem-solving processes. Innovation thus expands the scope of possible futures (Lateef et al., 2021).

Feedback seeking behavior is another indicator of agility. Agile students view feedback as an essential resource for refinement rather than as criticism (Gause et al., 2024). They actively request input from lecturers, peers, and mentors (Lateef et al., 2021). Constructive feedback accelerates learning cycles and sharpens competence. This responsiveness enhances both academic growth and career preparedness (Neden et al., 2020).

Learning agility also fosters interdisciplinary exploration. The Brittle Era increasingly values hybrid skills that integrate knowledge from multiple fields (Alexander & Bannova, 2020). Agile students are more willing to cross disciplinary boundaries (Hutchings & Quinney, 2015). They connect diverse concepts to generate holistic solutions. Such integrative thinking strengthens employability and adaptability (Herrera et al., 2024).

Importantly, agility reduces fear of change by normalizing transition as a constant feature of development (Tison-Brandon et al., 2024). Students accustomed to learning from diverse experiences perceive change as manageable (Evidente & Estimo, 2014). This perception reduces anticipatory anxiety regarding future uncertainty (Firnando & Suhesty, 2024). Instead of avoiding unfamiliar situations, agile learners approach them with curiosity. This orientation transforms uncertainty into opportunity (Ding et al., 2024).

Long-term strategic foresight emerges from repeated agile engagement (Lin et al., 2024). As students continuously adapt, they become more skilled at anticipating shifts. They learn to identify patterns in evolving trends (Li et al., 2023). This anticipatory competence supports informed decision-making. Future orientation becomes proactive rather than reactive (Martin et al., 2023).

Learning agility is increasingly recognized as a critical competence that enables students to move beyond reactive coping toward proactive future construction in uncertain environments (Hanh et al., 2025). Unlike resilience, which emphasizes stability, learning agility promotes continuous learning, flexibility, and opportunity recognition. Comparative studies indicate that earlier research framed agility primarily as a managerial or leadership skill, whereas recent educational research positions it as a core student competency linked to adaptability and employability (Strehl et al., 2025). This reflects a conceptual expansion of agility into broader developmental domains.

Despite general agreement on its importance, the literature presents several contradictions. Some studies highlight learning agility as a strong predictor of future orientation and career adaptability (Chiang, 2022), while others argue that without sufficient psychological stability, agility may lead to fragmented decision-making and a lack of direction (Sagala & Ori, 2025a). In this sense, agility can promote exploration but may also increase uncertainty if not supported by internal regulation mechanisms. Additionally, certain findings suggest that high agility may correlate with over-experimentation, reducing persistence in long-term goals (Eryarsoy et al., 2022), which challenges the assumption that agility is universally beneficial.

A significant gap in the literature is the limited examination of boundary conditions influencing learning agility. Few studies address how factors such as emotional regulation, institutional support, or cultural context shape the effectiveness of agility (Gross et al., 2022). Furthermore, empirical evidence remains fragmented, with inconsistent operational definitions of learning agility across studies. Some treat it as cognitive flexibility, others as behavioral adaptability, leading to measurement inconsistencies. This conceptual ambiguity weakens comparability across studies and indicates the need for a more unified framework.

Synergistic Integration of Resilience and Agility in Shaping Sustainable Future Orientation

The synergistic integration of academic resilience and learning agility represents a comprehensive adaptive system that strengthens sustainable future orientation among university students (Semenyshyn & Semenova, 2023). While resilience provides psychological endurance during adversity and agility promotes proactive growth in response to change, their interaction produces a more holistic developmental framework (Teh et al., 2023). In the Brittle Era, where fragility and unpredictability coexist with rapid innovation, students must be capable of both stabilizing themselves and transforming their strategies (Sharma, 2025). The literature increasingly suggests that neither resilience nor agility alone is sufficient to sustain long-term future orientation. Instead, their dynamic interplay generates a balanced capacity for enduring uncertainty while simultaneously shaping opportunity-driven pathways (Morales et al., 2023).

Resilience and agility operate through distinct but complementary mechanisms. Resilience anchors emotional regulation, perseverance, and coping stability when students encounter setbacks (Strehl et al., 2025). Agility, on the other hand, encourages experimentation, flexibility, and forward-looking adaptation (Krasylnykova et al., 2023). When integrated, these mechanisms prevent psychological stagnation and reactive defensiveness (van Nguyen et al.,

2025). Students are not merely surviving disruption but actively engaging with change in constructive ways. This dual capacity enhances the sustainability of their academic and professional aspirations (Hanh et al., 2025).

Emotional stability serves as the foundational base upon which agile exploration becomes possible. Without psychological security, attempts at innovation may be inhibited by fear or self-doubt (Chiang, 2022). Resilience provides the confidence needed to step into unfamiliar contexts without becoming overwhelmed (van Nguyen et al., 2025). Students who feel emotionally grounded are more willing to experiment with new academic strategies or career directions. Stability therefore facilitates expansion rather than restricting it (Gross et al., 2022).

At the same time, learning agility prevents resilience from becoming purely defensive. While resilience protects against emotional collapse, agility ensures forward movement (Pradana & Ekowati, 2024). Students who rely solely on coping strategies may become focused on maintaining equilibrium without pursuing growth (Backstrom et al., 2022). Agility introduces momentum into the adaptive process by encouraging continuous learning. This integration transforms coping into constructive transformation (Alexander & Bannova, 2021).

The synergy between stability and growth fosters adaptive confidence. Adaptive confidence refers to the belief that one can both withstand disruption and capitalize on it (Gause et al., 2024). Students who embody this dual belief system approach uncertainty with balanced optimism. They neither underestimate challenges nor overestimate threats. Such calibrated confidence strengthens strategic decision-making in ambiguous situations.

Optimism emerging from this integration differs from naive positivity (Neden et al., 2020). It is grounded in demonstrated coping experiences and adaptive learning successes (Lateef et al., 2021). Students who have repeatedly managed stress while acquiring new competencies develop realistic hope. This hope sustains long-term engagement even in unstable environments (Gause et al., 2024). Consequently, sustainable future orientation becomes both emotionally secure and strategically informed (Lateef et al., 2021).

The Brittle Era amplifies the need for simultaneous endurance and innovation. Sudden economic shifts or technological advancements can render previous career plans obsolete. Students who possess only resilience may endure disappointment but struggle to redefine goals (Teh et al., 2023). Conversely, those with only agility may experiment widely without sufficient emotional grounding. The combination of both capacities enables effective recalibration without psychological fragmentation (Cui et al., 2023).

Adaptive career preparedness emerges as a central outcome of this integration (Cui et al., 2023). Students who merge coping strength with proactive skill development demonstrate clearer and more flexible career planning (Semenyshyn & Semenova, 2023). They are capable of adjusting goals without abandoning long-term aspirations (Martin et al., 2023). Strategic planning becomes iterative rather than rigid. This adaptability strengthens employability in rapidly evolving labor markets (Li et al., 2023).

Flexible goal adjustment is a hallmark of synergistic adaptation. When external conditions shift, students reassess priorities while maintaining core values (Lin et al., 2024). Resilience ensures that goal revision does not translate into identity loss (Ding et al., 2024). Agility encourages exploration of alternative pathways aligned with emerging opportunities. Together, these processes preserve coherence in personal narratives (Evidente & Estimo, 2014).

Continuous competence renewal further reflects integrated functioning (Tison-Brandon et al., 2024). Students who combine endurance and agility engage in lifelong learning behaviors. They monitor industry trends, update technical skills, and refine interpersonal competencies (Herrera et al., 2024). Renewal becomes a normal aspect of professional development rather than a reactive response to crisis. This proactive stance supports long-term sustainability (Alexander & Bannova, 2020).

Strategic awareness is enhanced when resilience and agility interact. Students develop the ability to evaluate risks without becoming paralyzed by them (Martin et al., 2023). They assess uncertainties with analytical clarity and emotional balance. Decision-making under ambiguity becomes more structured and deliberate. Strategic awareness strengthens both academic and career outcomes (Li et al., 2023).

Psychologically, integrating resilience and agility supports a growth-oriented identity. Students perceive themselves as capable of enduring hardship while evolving through experience (Lin et al., 2024). This identity fosters intrinsic motivation to pursue challenging opportunities. It reduces avoidance behavior and fear of failure. Growth becomes embedded within self-concept (Ding et al., 2024).

The synergy also reinforces relational adaptability. Students who are emotionally stable and cognitively flexible navigate collaborative environments more effectively (Evidente & Estimo, 2014). They manage interpersonal conflicts with composure while remaining open to diverse perspectives (Tison-Brandon et al., 2024). Such relational competence enhances academic engagement and professional networking. Social capital thus complements personal adaptability (Herrera et al., 2024).

Institutional contexts that promote both resilience and agility produce stronger developmental outcomes (Hutchings & Quinney, 2015). Supportive mentorship, reflective learning environments, and innovation-friendly curricula encourage integrated growth (Alexander & Bannova, 2020). When universities address both psychological well-being and skill adaptability, students benefit from comprehensive preparation (Neden et al., 2020). Educational ecosystems therefore influence the strength of this synergy.

Longitudinally, the integration of resilience and agility predicts sustained engagement beyond graduation

(Cui et al., 2023). Graduates who internalize both capacities are better equipped to handle career transitions and professional disruptions (Semenyshyn & Semenova, 2023). They respond to organizational change with balanced composure and initiative. Career trajectories remain dynamic yet coherent (Martin et al., 2023).

Importantly, sustainable future orientation involves more than ambition. It requires the capacity to maintain hope while adjusting to reality (Li et al., 2023). Resilience sustains hope during setbacks, while agility refines plans in response to new information. This balanced orientation reduces burnout and career regret (Lin et al., 2024). Students develop realistic optimism about their professional futures (Li et al., 2023).

The interaction between coping and growth also influences well-being. Students who endure stress without adaptive expansion may experience stagnation (Semenyshyn & Semenova, 2023). Conversely, those who pursue growth without coping skills may encounter emotional exhaustion (Teh et al., 2023). The integration ensures equilibrium between challenge and recovery. Well-being becomes intertwined with developmental momentum (Martin et al., 2023).

Strategic foresight is strengthened through repeated cycles of resilience-agility interaction (Semenyshyn & Semenova, 2023). Each successful adaptation reinforces confidence in handling future uncertainty (Cui et al., 2023). Students begin to anticipate change rather than merely react to it. Anticipatory thinking becomes embedded within decision-making processes. This foresight supports sustainable planning (Cui et al., 2023).

The integration of academic resilience and learning agility represents a more comprehensive adaptive system for sustaining future orientation in the Brittle Era (Li et al., 2023). Comparative analysis across studies shows a growing consensus that resilience and agility serve complementary functions: resilience provides emotional stability, while agility drives adaptive transformation (Lin et al., 2024). Earlier studies tended to examine these constructs separately, but recent research increasingly emphasizes their interaction as a key determinant of long-term adaptability.

However, contradictions remain regarding the nature of this integration. Some studies propose a synergistic relationship where resilience enhances the effectiveness of agility (Ding et al., 2024)while others suggest a potential trade-off, where excessive focus on stability may inhibit exploratory behavior, and excessive agility may undermine psychological coherence (Tison-Brandon et al., 2024). These conflicting findings indicate that the balance between resilience and agility is not linear but context-dependent.

The most critical gap lies in the absence of integrative models that empirically test the combined effect of resilience and agility on future orientation. Most existing studies examine these variables independently, with limited longitudinal or multivariate approaches. Additionally, there is a lack of research exploring how institutional environments simultaneously foster both capacities. This fragmentation limits theoretical advancement and practical application in higher education.

Table 4. Research gap

Research gap	Existing findings	Future research direction
Lack of Integrative Conceptual Models	Most studies examine academic resilience, learning agility, and future orientation separately. Findings consistently show that resilience reduces academic stress and supports persistence, while learning agility enhances adaptability and proactive skill development. Future orientation is linked to self-efficacy, hope, and social support; however, structural integration among these variables remains limited.	Future studies should develop and empirically test integrative conceptual frameworks positioning resilience and learning agility as predictors, mediators, or moderators of future orientation using Structural Equation Modeling (SEM) or longitudinal modeling approaches.
Methodological Dominance of Cross-Sectional Designs	The majority of empirical studies apply cross-sectional methods, revealing significant positive correlations among resilience, agility, academic achievement, and psychological well-being. However, causal relationships and long-term developmental trajectories remain underexplored.	Further research should employ longitudinal, experimental, or mixed-method designs to examine causal pathways and track the dynamic development of resilience and learning agility over time in shaping sustainable future orientation.
Limited Cultural and Contextual Diversity	Existing research is often concentrated in specific disciplines (e.g., nursing, management, medical education) and particular regional contexts. While contextual factors such as institutional support and digital transformation are acknowledged, cross-cultural validation remains limited.	Future investigations should expand to diverse cultural, disciplinary, and socio-economic contexts to test the generalizability of the resilience–agility–future orientation model and identify culturally specific adaptive mechanisms in the brittle era.

CONCLUSION

Academic resilience and learning agility are complementary adaptive capacities that play a central role in shaping university students' sustainable future orientation in the Brittle Era. The synthesis demonstrates that resilience provides psychological endurance in the face of academic and career uncertainty, while learning agility promotes proactive growth, flexibility, and continuous competence development, and their integration forms a holistic framework for navigating disruption. Despite the increasing volume of publications and strong citation impact, the predominance of cross-sectional designs indicates the need for more longitudinal and experimental studies to examine causal pathways and developmental trajectories over time. Future research is therefore encouraged to construct and empirically test integrative structural models that position resilience and agility as dynamic predictors, mediators, or moderators of future orientation across diverse cultural and disciplinary contexts. Practically, these findings imply that higher education institutions should systematically embed resilience-building and agility-enhancing strategies into curriculum design, student support systems, and career development programs to strengthen students' psychological readiness and adaptive competence in confronting global uncertainty.

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ETHICAL APPROVAL

Ethical approval was not required for this study because it was based exclusively on a systematic review of previously published literature and did not involve human participants, animals, or the collection of primary data.

DECLARATION OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this article.

TRANSPARENCY OF DATA

All data analyzed in this study were obtained from publicly accessible peer-reviewed journal articles indexed in the Scopus database. The search strategy, inclusion and exclusion criteria, and study selection procedures are described in the methodology section to ensure transparency and reproducibility. Additional information regarding the dataset and analytical procedures is available from the corresponding author upon reasonable request.

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AUTHORS' CONTRIBUTIONS

All authors contributed substantially to the conception and design of the study. The authors collaboratively conducted the literature search, screening process, data extraction, bibliometric analysis, thematic synthesis, interpretation of findings, manuscript preparation, and critical revision of the article. All authors reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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