**JOURNAL IN TEACHING AND EDUCATION AREA**
Vol. 3, No. 2, Tahun 2026 | 365-389
e-ISSN : 3047-7034 | doi: https://doi.org/10.69673/0gzcth97

# MAPPING THE INTELLECTUAL LANDSCAPE OF RESILIENCE AND ACADEMIC STRESS IN HIGHER EDUCATION: A VOSVIEWER BIBLIOMETRIC ANALYSIS

Hafizh Zain Abdillah[1] (hafizh@up45.ac.id), Hairul Anwar Dalimunthe[2] (hairul@staff.uma.ac.id), Fauzi Rahman[3] (fauzi.rahman@umri.ac.id), Ziyadi Ali Ikromi[4] (ikromiali@gmail.com), Basir Jarah Anilon[5] (basir.anilon@msumai.edu.ph)
[1]Universitas Proklamasi 45, Sleman, Daerah Istimewa Yogyakarta, Indonesia
[2]Universitas Medan Area, Medan, Sumatera Utara, Indonesia
[3]Universitas Muhammadiyah Riau, Riau, Indonesia
[4]Universitas Sains Indonesia, Bekasi, Jawa Barat, Indonesia
[5]Mindanao State University, Basilan, Philippines
Correspondent Email: hafizh@up45.ac.id

***ABSTRACT.*** *Resilience and academic stress in higher education are both widely researched, but the intellectual wedges of both have yet to be mapped out. The present study performed a bibliometric analysis of 385 Scopus-indexed documents (2016–2026) by using VOSviewer to visualize publication trends, keyword co-occurrence and temporal overlay patterns. Results show that publication output increased sharply after 2021, coinciding with a move toward broader student mental health and well-being concerns rather than pandemic-specific issues. The most frequent and strongly linked keywords, "resilience" and "academic stress", were in different thematic clusters: resilience was linked to adaptive capacities such as emotional intelligence, and academic stress was linked to clinical outcomes such as anxiety and depression. Research in the field of nursing education and the health profession already has a strong foundation and has been growing, while artificial intelligence and digital learning are new research directions. This descriptive, non-evaluative mapping offers a starting point for future empirical and intervention studies on student well-being in higher education.*

**Keywords**: *Academic Stress, Bibliometric Analysis, Higher Education, Resilience, VOSviewer*

**ABSTRAK**. Resiliensi dan stres akademik di pendidikan tinggi keduanya banyak diteliti, tetapi batas intelektual dari keduanya belum digambarkan. Studi ini melakukan analisis bibliometrik terhadap 385 dokumen yang diindeks Scopus (2016–2026) dengan menggunakan VOSviewer untuk memvisualisasikan tren publikasi, kemunculan kata kunci, dan pola overlay temporal. Hasil menunjukkan bahwa output publikasi meningkat tajam setelah 2021, bertepatan dengan pergeseran perhatian menuju kesehatan mental dan kesejahteraan mahasiswa yang lebih luas daripada isu khusus pandemi. Kata kunci yang paling sering dan sangat terkait, "resiliensi" dan "stres akademik", berada dalam klaster tematik yang berbeda: resiliensi dikaitkan dengan kapasitas adaptif seperti kecerdasan emosional, dan stres akademik dikaitkan dengan hasil klinis seperti kecemasan dan depresi. Penelitian di bidang pendidikan keperawatan dan profesi kesehatan sudah memiliki fondasi yang kuat dan telah berkembang, sementara kecerdasan buatan dan pembelajaran digital adalah arah penelitian baru. Pemetaan deskriptif dan non-evaluatif ini menawarkan titik awal bagi studi empiris dan intervensi di masa depan mengenai kesejahteraan mahasiswa di pendidikan tinggi.

**Kata Kunci**: Analisis Bibliometrik, Perguruan Tinggi, Resiliensi, Stres Akademik, VOSviewer

Article History
Received : 20 Agustus 2026
Revision : 26 Agustus 2026
Accepted : 27 Agustus 20206
Published : 28 Agustus 20206

How to cite: Abdillah, H. Z., Dalimunthe, H. A., Rahman, F., Ikromi, Z. A., & Anilon, B. J. (n.d.). *Mapping the intellectual landscape of resilience and academic stress in higher education: A VOSviewer bibliometric analysis*. Journal in Teaching and Education Area, 3 (2), 365-389. Doi: https://doi.org/10.69673/0gzcth97

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## INTRODUCTION

Universities in different countries are facing more and more complex problems concerning the mental health of their students. There is academic pressure due to a competitive educational environment, increased expectations to learn, time related stressors and difficulties adapting socially. Under these circumstances, students' mental health can be compromised, academic achievement and engagement in learning can be negatively affected, and in extreme cases the risk of burnout and attrition increases (Misra & McKean, 2000; Pascoe et al., 2020). Resilience acts as a protective mechanism for managing academic stressors, allowing resilient students and teachers to positively manage academic stressors, recover from set-backs, and maintain their academic and psychological well-being amidst academic stressors (Cassidy, 2016; Ross et al., 2024). Research on resilience and academic pressure are ongoing in the fields of psychology, education and public health (Li et al., 2024). This area of research gained prominence during the COVID-19 pandemic, which forced a sudden transition to online and hybrid learning, adding to worldwide worries over students' mental health (Li et al., 2024; Pérez-Jorge et al., 2025).

The research on resilience and academic stress has expanded considerably, yet the two are often studied in isolation. Research that brings together these two ideas, especially when considering higher education, is scattered across many disciplines of study and no comprehensive bibliometric study has combined them. This discrepancy is shown by the present bibliometric analysis. The academic stress literature has been mapped for different levels of schooling by certain researchers (Dagli et al., 2024). Some researches have focused on resilience in specific groups of people, such as school instructors or trainee educators (Li & Chen, 2024; Phyo & Kopp, 2026). The relationship between these two conceptions has not been extensively studied among university students and researchers, leading to an imperfect understanding of the interaction, divergence, and influence of stress research and resilience research within the framework of higher education.

The practical stakes of solving this fragmentation are high. A large-scale epidemiological study from the World Mental Health International College Student initiative, including more than 72,000 first-year students in 18 countries, indicates that a significant proportion of this group experiences a diagnosable mental disorder before finishing their degree, with the onset frequently associated with the transition into demanding academic environments (Mason et

al., 2025). Since resilience is theorised as a key protective mechanism for these very adverse outcomes, a fragmented evidence base constrains the field's ability to translate accumulated knowledge into coherent evidence-informed institutional responses. Tracing the evolution of research on resilience and academic stress in relation to each other is, therefore, not just a conceptual exercise, but a step toward consolidating a scattered literature into a usable foundation for policy and practice.

In this regard, this research is intended to carry out a comprehensive bibliometric analysis and knowledge visualization of the resilience and academic stress literature in higher education contexts using VOSviewer. This study aims to address three important questions: first, the publishing trend and growth pattern in this field between 2016 and 2026; second, the thematic clusters and the keyword co-occurrence map that characterize the intellectual landscape of the field; and third, the research themes that represent the historical foundations or rapidly evolving frontiers. The answers to these inquiries are anticipated to contribute to a coherent, evidence-based framework for the discipline that could influence future research pursuits, inform student well-being policies and deepen the theoretical nexus between stress and resilience studies in higher education.

## LITERATURE REVIEW

### *Academic Stress in Higher Education*

Academic stress is defined as the psychological and physiological strain that students suffer as a consequence of the demands of academic life such as tests, due dates of assignments, competitive assessments and the transition to self-reliant adult duties (Misra & McKean, 2000). The event effects cognitive, emotional and behavioral functioning, ranging from decreased focus and motivation to clinically severe levels of anxiety and sadness (Pascoe et al., 2020). The stress in higher education is majorly attributed to the high volume of homework, the uncertainty of job prospects, the financial load and the struggle to balance academic duties with one's personal and social life (Zaheer & Khan, 2022). The field is developing at a rapid pace, with a thematic focus on the mental health of university and medical students in the post-pandemic period (Dagli et al., 2024).

Studies on academic stress have evolved from early psychometric and correlational research to encompassing models that examine stress within the context of protective and adaptive

factors. Today's researchers thus see academic stress not merely as a bad outcome, but as a risk factor which is shaped by an individual's coping methods and resilience qualities (Ross et al., 2024). This reflects a broader trend within educational psychology away from deficiency theories of student problems to strength-based models that focus on children's adaptive capacities, protective factors, and the conditions in which they thrive despite adversity. This transition is the conceptual rationale for analyzing resilience and academic stress in a single bibliometric setting, and not two independent fields of study.

***Resilience and Academic Resilience***

Resilience, broadly defined, refers to the dynamic process of positive adaptation in the context of significant adversity or risk (Masten, 2014). Within the educational domain, academic resilience has been more specifically conceptualized as students' capacity to achieve positive academic outcomes despite facing considerable stressors, setbacks, or disadvantageous circumstances (Martin & Marsh, 2006). The Academic Resilience Scale was developed to operationalize this construct, capturing dimensions such as perseverance, reflective and adaptive help-seeking, and negative affect regulation in response to academic adversity (Cassidy, 2016). Using large-scale cross-national data, academic resilience was further shown to be shaped by an interaction of student characteristics, family background, and school- or institution-level factors such as teacher expectations and a supportive learning climate, underscoring the socio-ecological nature of resilience rather than viewing it purely as an individual trait (García-Crespo et al., 2021).

Evaluatively, the resilience literature in higher education has matured from a narrow focus on individual personality traits toward a more relational and ecological understanding of adaptive capacity. Resilience among academics and students alike should be understood as an interaction between individual resources and the broader institutional environment, rather than as a fixed personal attribute (Ross et al., 2024). Similarly, bibliometric reviews of resilience research in adjacent educational populations reveal a consistent thematic evolution from early trait-based conceptualizations toward more recent process-oriented and systems-based models that incorporate social support, institutional culture, and technology-mediated learning environments (Li & Chen, 2024; Phyo & Kopp, 2026). This trajectory closely parallels developments in the academic stress literature, reinforcing the theoretical justification for a combined bibliometric investigation of the two constructs.

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***Bibliometric Analysis and VOSviewer as a Knowledge Visualization Method***

Bibliometric analysis constitutes a quantitative methodology for systematically examining the structure, evolution, and productivity patterns of scholarly literature within a defined field of inquiry (Donthu et al., 2021; Zupic & Čater, 2015). By analyzing indicators such as publication counts, citation frequencies, co-authorship networks, and keyword co-occurrence patterns, bibliometric methods enable researchers to move beyond narrative literature reviews toward an evidence-based, reproducible mapping of a field's intellectual structure (Aria & Cuccurullo, 2017). One of the most widely used tools for constructing and visualizing such bibliometric networks is VOSviewer, developed at Leiden University, which allows researchers to identify thematic clusters through keyword co-occurrence mapping and to trace the temporal evolution of research themes through overlay visualization (van Eck & Waltman, 2010).

The application of VOSviewer-based bibliometric analysis to psychological and educational research has expanded substantially in recent years, with notable applications ranging from community resilience research to stress among school-aged learners and teacher resilience in educational settings (Phyo & Kopp, 2026; Sood et al., 2024; Yang et al., 2021). These studies consistently demonstrate that keyword co-occurrence and temporal overlay visualizations can reveal both the historically established conceptual core of a research field and its more recently emergent frontiers, information that is difficult to extract through conventional narrative synthesis alone. Building on this established methodological tradition, the present study applies VOSviewer-based bibliometric mapping specifically to the intersection of resilience and academic stress research within higher education, an application that, to date, has not been comprehensively undertaken.

## METHODOLOGY

This study was designed in response to the ongoing divide between academic stress in higher education and resilience research. Based on the two separate constructions, there are considerable conceptual intersections and body of literature arising from the choice of resilience and academic stress in higher education. The concept of resilience as a protective mechanism against the negative effects of academic stress is not well quantified. The bibliometric research design used in this study can systematically map the intellectual structures that connect these two topics (Donthu et al., 2021).

Data were retrieved from Scopus in July 2026 with the query: (TITLE-ABS-KEY (resilience) AND TITLE-ABS-KEY (academic stress) AND TITLE-ABS-KEY (higher education)) AND PUBYEAR > 2015 AND PUBYEAR < 2027. The search found 385 documents that were retained in full as the analytical corpus, without any other exclusion criteria. The query produced a manageable and comprehensive result set which was directly amenable to bibliometric mapping, and thus no further screening for duplicates, language or incomplete metadata was necessary. The corpus included eight document types, with journal articles (n = 313, 81.3%) being the most frequent, followed by book chapters (n = 26, 6.8%), review articles (n = 22, 5.7%) , Conference papers (n = 13, 3.4%), books (n = 7, 1.8%), notes (n = 2, 0.5%) and one editorial and one short survey (0.3%, each). For the purpose of an exploratory field-mapping objective and not a systematic review of empirical evidence, all document types were included in the analysis to maintain the full range of scholarly engagement with the topic.

The data were analysed descriptively and exploratorily, without any inferential statistical testing, consistent with the non-experimental bibliometric design outlined above, using VOSviewer version 1.6.20, in a two-stage analytical procedure. First, author keywords extracted from the final corpus were processed to build a keyword co-occurrence network, with the application of a minimum threshold of five co-occurrences per keyword to ensure the analytical robustness of the resultant map, in line with standard VOSviewer practice (van Eck & Waltman, 2010). The resulting network was examined using VOSviewer's clustering algorithm to identify thematically coherent groups of keywords, which were subsequently interpreted and labeled based on their substantive conceptual content. Second, a temporal overlay analysis was performed using the same keyword network, applying a color gradient corresponding to the average publication year associated with each keyword, in order to distinguish historically established themes from more recently emergent research frontiers. Publication trend and productivity statistics were additionally compiled and tabulated to complement the network-based visualizations and to provide a descriptive overview of the field's overall growth trajectory.

JOURNAL IN TEACHING AND EDUCATION AREA
Vol. 3, No. 2, Tahun 2026 | 365-389
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## RESULTS

### *Overview of Publication Trends*

The bibliometric search identified a final corpus of 385 documents addressing resilience and academic stress within higher education, published between 2016 and 2026 in Scopus. As summarized in Table 1, publication output remained modest and relatively flat between 2016 and 2020, before entering a period of sustained growth from 2021 onward. The data reveal two distinct phases of acceleration: an initial rise in 2021, followed by a brief plateau in 2022, and then a steeper and sustained increase from 2023 through 2026, culminating in the two highest annual outputs of the entire period in 2025 and 2026, which together account for more than half of the total corpus.

**Table 1. Annual Publication on Resilience and Academic Stress in Higher Education (2016-2026)**

| Year | Number of Publications | Percentage (%) | Cumulative Total |
|---|---|---|---|
| 2016 | 2 | 0.52 | 2 |
| 2017 | 1 | 0.26 | 3 |
| 2018 | 8 | 2.08 | 11 |
| 2019 | 12 | 3.12 | 23 |
| 2020 | 8 | 2.08 | 31 |
| 2021 | 26 | 6.75 | 57 |
| 2022 | 22 | 5.71 | 79 |
| 2023 | 35 | 9.09 | 114 |
| 2024 | 48 | 12.47 | 162 |
| 2025 | 121 | 31.43 | 283 |
| **2026*** | **102*** | **26.49*** | 385 |
| **Total** | **385** | **100** | **385** |

*Source: Scopus database (n = 385)*

It should be noted that the 2026 figure in Table 1 reflects a partial year, as data retrieval occurred in July 2026, roughly seven months into the calendar year. Despite this truncation, the partial 2026 count (n = 102) already approaches the full-year 2025 total (n = 121), consistent with the compressed indexing lag typical of Scopus, where a growing share of a given year's output is indexed within its first half once a research area enters a phase of rapid expansion (Chadegani et al., 2013). This pattern should therefore be read as evidence of accelerating field growth rather than a literal year-over-year comparison, and the 2026 count is likely to rise further as indexing continues through the remainder of the year.

Closer inspection of the corpus indicates that the sharp rise recorded in 2025 and 2026 is not attributable to pandemic-related research. The proportion of documents explicitly

referencing COVID-19 in their titles or author keywords, which peaked at 35–45% of annual output during 2021–2022, declined to 9% in 2025 and 2% in 2026. Instead, the recent surge coincides with a rising share of documents explicitly framed around mental health or well-being, which increased from a range of roughly 9–20% across 2018–2024 to 23–24% in 2025–2026. This pattern indicates that the field's recent growth is associated with a broader, sustained framing of student mental health and well-being rather than a short-lived response tied to the pandemic.

The comparatively low and stable publication volume between 2016 and 2020 suggests that resilience and academic stress were, until recently, more frequently studied as separate constructs, with the field's explicit convergence around their intersection emerging predominantly after 2021.

### *Most Productive Sources*

Table 2 presents the ten most productive journals publishing on resilience and academic stress in higher education.

**Table 2. Most Productive Sources in Resilience and Academic Stress Research (2016–2026)**

| No | Journal name | Number of documents | % of total (n=385) |
|---|---|---|---|
| 1 | BMC Medical Education | 15 | 3.90% |
| 2 | Frontiers in Psychology | 13 | 3.38% |
| 3 | Frontiers in Psychiatry | 8 | 2.08% |
| 4 | BMC Nursing | 6 | 1.56% |
| 5 | BMC Psychology | 6 | 1.56% |
| 6 | Plos One | 6 | 1.56% |
| 7 | Frontiers in Education | 5 | 1.30% |
| 8 | Acta Psychologica | 4 | 1.04% |
| 9 | Education Sciences | 4 | 1.04% |
| 10 | International Journal of Learning Teaching and Educational Research | 4 | 1.04% |
| | **Total** | **71** | **18.4%** |

*Source: Scopus database (n = 385)*

Table 2 shows that scholarly output at the intersection of resilience and academic stress is concentrated in health-related and psychology journals, with BMC Medical Education (n = 15; 3.90%) and Frontiers in Psychology (n = 13; 3.38%) as the two leading contributors, followed by eight further journals each publishing between four and eight documents. These ten journals together account for only 71 of the 385 documents (18.4%) in the corpus, with

the rest scattered across some 130+ further journals. This pattern corresponds to the interpretation proffered for Table 1, which is that explicit convergence between the two constructs is a relatively recent phenomenon dating largely from 2021 onwards, and that the field has not yet coalesced around a small set of core outlets. The presence of BMC Nursing among the top ten sources further aligns with the high frequency of the "nursing students" keyword reported in Table 3, underscoring health professions education as a particularly prominent disciplinary context for this line of research.

### *Country Productivity in Resilience and Academic Stress Research*

Table 3 shows the ten most productive countries that contributed to the research on resilience and academic stress in higher education.

**Table 3. Most Country Productivity in Resilience and Academic Stress Research (2016–2026)**

| Rank | Country | Number of Documents | Percentage (%) |
|---|---|---|---|
| 1 | United States | 76 | 19.74% |
| 2 | China | 47 | 12.21% |
| 3 | India | 26 | 6.75% |
| 4 | United Kingdom | 25 | 6.49% |
| 5 | Australia | 24 | 6.23% |
| 6 | Spain | 21 | 5.45% |
| 7 | Malaysia | 17 | 4.42% |
| 8 | Indonesia | 16 | 4.16% |
| 9 | Canada | 12 | 3.12% |
| 10 | South Africa | 12 | 3.12% |
| **Total** | | **276** | **71.69%** |

*Source: Scopus database (n = 385)*

The country-level distribution shows a research landscape dominated by a few high-output systems. The United States alone accounts for almost one-fifth of the corpus (n = 76; 19.74%), with China some way behind (n = 47; 12.21%); together these two countries produce almost a third of all documents, a concentration pattern typical of Scopus-indexed fields where research infrastructure, funding capacity and incentives to publish in English tend to favour a small number of dominant national systems (Chadegani et al., 2013). This top pair is followed by a second tier of countries (India, the United Kingdom and Australia, with 24–26 documents each, or 6.23–6.75%, and Spain, with 5.45%), which form a more evenly distributed mid-range cluster. This tiered structure means that while resilience and academic stress research in higher education has been disseminated beyond the sites of its

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initial production, significant engagement with the topic remains skewed, with a disproportionate concentration within a small number of well-resourced research systems.

The contribution from Southeast Asia is high as well with Malaysia (n=17; 4.42%) and Indonesia (n=16; 4.16%) in the seventh and eighth position respectively. However, in general, countries with more developed research infrastructures dominate. This pattern suggests that anxieties over student resilience and academic stress are not limited to Western, high-income contexts, but are also increasingly salient in higher education systems in the Global South. Canada and South Africa are tied for the ninth and tenth place with 12 documents each (3.12%). This pattern of ties can also be seen for several journals in Table 4, indicating that once the leading contributors are accounted for, productivity in the area of resilience and academic stress research becomes relatively evenly distributed. The top ten countries contributed 276 of the 385 documents in the corpus (71.7%); the remaining documents were distributed among more than seventy other countries and territories. This is characteristic of a field that, while dominated by a few contributors, has attracted geographically diverse scholarly attention.

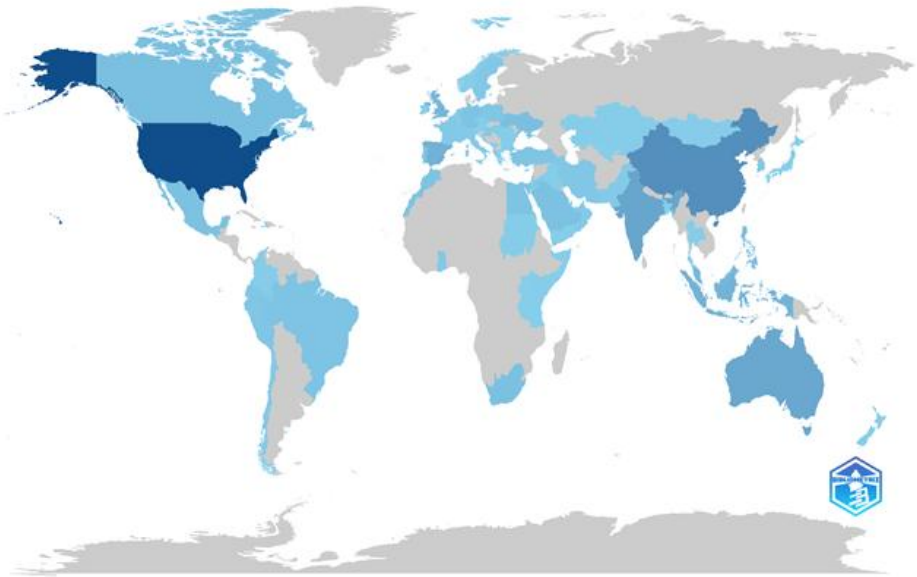

**Figure 1. Country Distribution of Scientific Production on Resilience and Academic Stress Research (2016–2026)**

The choropleth map shown in Figure 1 represents the worldwide distribution of scientific production summarised in Table 3, where darker colour shading indicates higher document numbers. The two most productive countries, the United States and China, are represented by the darkest shading on the map, with a disproportionate share of the corpus (19.74% and

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12.21%, respectively), as in Table 3. A second tier of moderately productive countries – Australia, India, the United Kingdom and Spain – is shown in medium intensity shading, reflecting their mid-range rankings in Table 3.

Outside the top-ranked countries, the map shows a broad swathe of light-blue shading across Latin America, the Middle East, South and Southeast Asia and parts of sub-Saharan Africa (including South Africa) indicating that research engagement with resilience and academic stress is geographically dispersed rather than concentrated in a small group of high-income countries. This pattern lends support to the interpretation provided for Table 3, in that while output remains concentrated among a few dominant contributors, the field has attracted considerable participation across a broad range of countries from different regions and income contexts.

At the same time, large areas of the map, including most of continental Africa, Russia, and parts of Central Asia, are shown in grey, to indicate that there are no indexed publications from these regions. This gap indicates there is room for further research development on resilience and academic stress in higher education in several low and middle income regions. This suggests an imbalance that needs addressing in future comparative or cross-cultural research on student well-being.

***Keyword Frequency and Author Keyword Distribution***

Table 4 presents the ten most frequently occurring author keywords identified in the corpus following thesaurus-based normalization of terminological variants.

**Table 4. Author Keywords in Resilience and Academic Stress Research (2016-2026)**

| Rank | Author Keyword | Occurrences | Total Link Strength |
|---|---|---|---|
| 1 | resilience | 144 | 779 |
| 2 | academic stress | 83 | 474 |
| 3 | higher education | 70 | 349 |
| 4 | mental health | 53 | 264 |
| 5 | covid-19 | 29 | 158 |
| 6 | depression | 24 | 136 |
| 7 | anxiety | 24 | 133 |
| 8 | university students | 23 | 110 |
| 9 | burnout | 22 | 116 |
| 10 | nursing students | 18 | 76 |

*Source: Scopus database (n = 385)*

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The dominance of "resilience" (n = 144) and "academic stress" (n = 83), together with "higher education" (n = 70) and "mental health" (n = 53), confirms that these terms function as the conceptual core of the field, consistent with the centrally positioned, high-degree nodes observed in the keyword co-occurrence network presented in Figure 2. Beyond raw frequency, "resilience" also exhibited the highest total link strength (779), indicating that it co-occurs most extensively with other keywords across the corpus and functions as the most structurally central node in the keyword network, followed by "academic stress" (474) and "higher education" (349). The continued high occurrence of "covid-19," "depression," "anxiety," and "burnout" indicates that the field remains substantially oriented toward the psychological mechanisms and outcomes that connect stress exposure with resilient adaptation, rather than treating either construct in isolation.

***Keyword Co-Occurrence Network and Thematic Clustering***

Figure 2 presents the keyword co-occurrence network constructed from the final corpus, comprising 164 keywords organized into 19 clusters by VOSviewer's clustering algorithm.

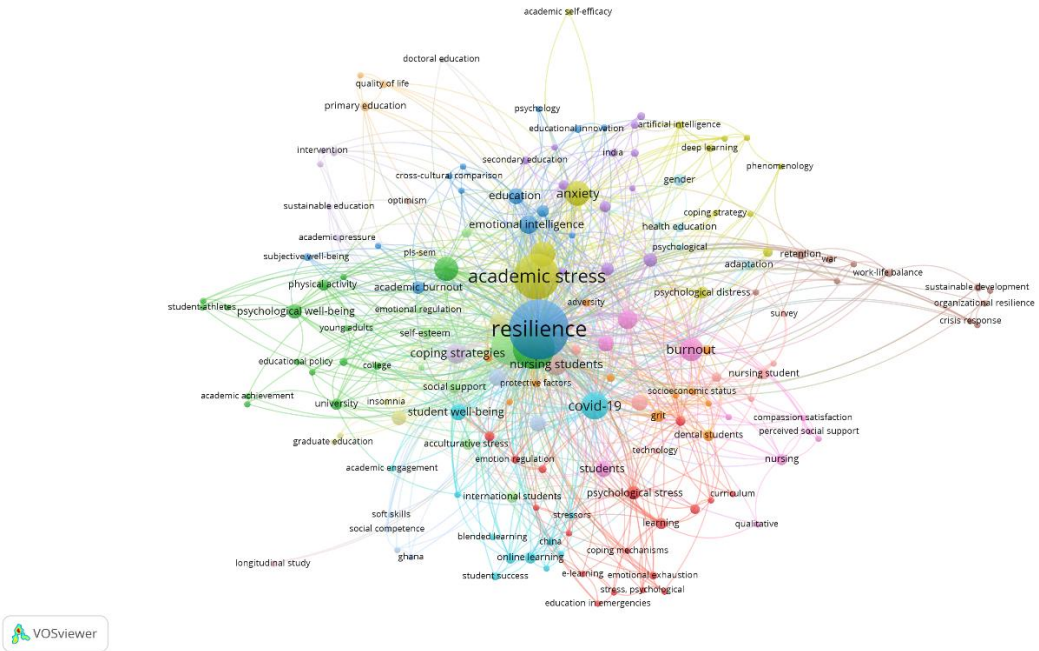


**Figure 2. Keyword Co-Occurrence Network Map of Resilience and Academic Stress Research in Higher Education (2016–2026)**

The ten largest clusters account for 126 of the 164 items (76.8%) and capture the field's dominant thematic structure; the remaining nine clusters are smaller (five items or fewer)

and represent more peripheral sub-themes. Notably, resilience and academic stress, the network's two most frequent and central nodes, were assigned to separate clusters. Resilience (Cluster 3, 14 items) is grouped with academic burnout, cross-cultural comparison, emotional intelligence, mindfulness, psychology, and subjective well-being, framing it as a broad psychological and educational capacity. Academic stress (Cluster 4, 13 items) is instead linked to academic self-efficacy, anxiety, depression, psychological distress, and student mental health, tying it more closely to clinical and affective outcomes.

Beyond these two core clusters, the remaining large clusters reflect distinct sub-themes: a pandemic and burnout-related dimension centered on coping and emotional exhaustion (Cluster 1, 18 items); an institutional and lifestyle-oriented dimension linking higher education, student-athletes, and well-being (Cluster 2, 16 items); a teacher- and institution-facing theme involving covid-19, student engagement, and teacher burnout (Cluster 5, 12 items); a digital- and pandemic-era learning theme involving online learning and student success (Cluster 6, 12 items); a positive-psychology and health-professions theme involving grit, protective factors, and wellness (Cluster 7, 11 items); an organizational framing of resilience involving crisis response, retention, and work-life balance (Cluster 8, 11 items); and two nursing- and medical-education-specific clusters centered on burnout, self-efficacy, and dropout (Clusters 9–10, 10 and 9 items).

The remaining smaller clusters (Clusters 11–19) represent more specialized sub-themes, such as acculturative stress among international students and academic pressure, along with several single- or double-item clusters likely reflecting keywords too infrequent to form larger groupings.

***Temporal Overlay Visualization of Keyword Activity***

Figure 3 presents the temporal overlay visualization of the same keyword network, in which color reflects each keyword's average publication year, from dark purple/blue (earliest, ~2022) to bright yellow (most recent, ~2026).

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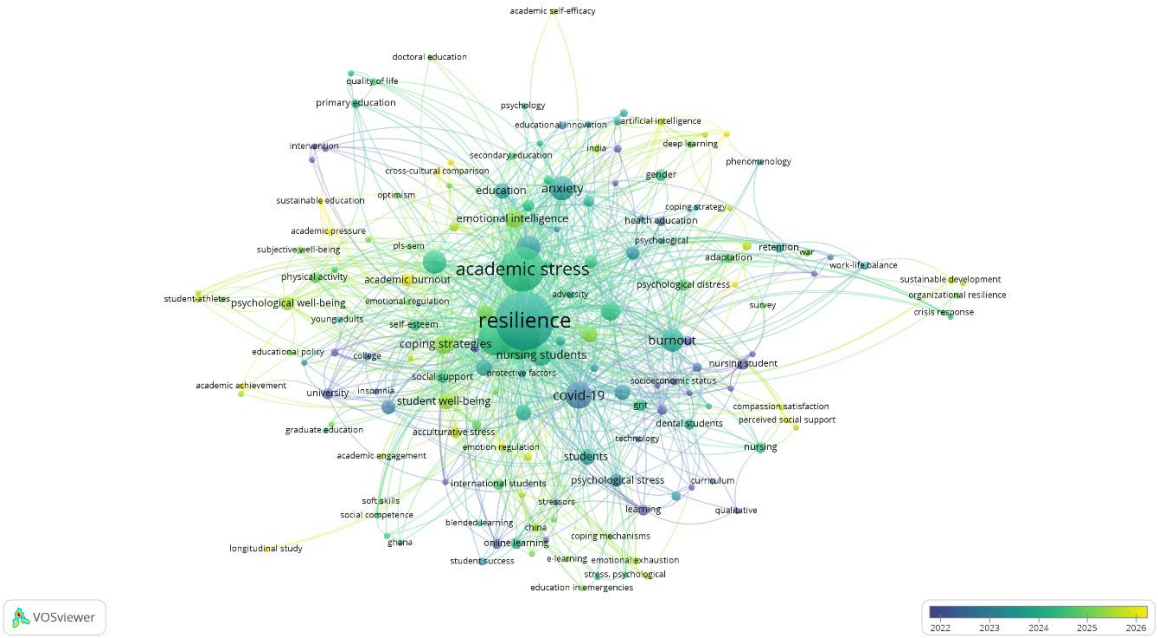


**Figure 3. Temporal Overlay Visualization of Keyword Activity in Resilience and Academic Stress Research (2016–2026)**

The core constructs, resilience and academic stress, appear in intermediate teal-green tones, reflecting their sustained relevance across the full study period rather than concentration in any single year. Notably, covid-19 also displays a teal tone rather than yellow, indicating that pandemic-related research is now an established rather than emerging theme within the field. The most recent keywords (yellow), representing the field's current research frontier, include academic self-efficacy, coping strategy, psychological distress, acculturative stress, grit, e-learning, emotional exhaustion, and education in emergencies, suggesting a shift toward more specific psychological mechanisms and applied educational contexts. The earliest keywords (dark purple/blue) include intervention, gender, phenomenology, curriculum, nursing student, and educational policy, indicating that these thematic angles were more prominent in the corpus's earlier years and have since given way to the more recent themes noted above.

### *Summary of Thematic Research*

The corpus points to three patterns. Publication output grew substantially after 2021, and 2025–2026 alone account for more than half the final corpus. That growth tracks a shift toward broader student mental health and well-being research, not pandemic-specific studies: COVID-19 keywords dropped sharply from their 2021–2022 peak. The field also

organizes around two hubs that don't merge into one theme. Resilience clusters with emotional intelligence, mindfulness, and subjective well-being, framing it as an adaptive capacity. Academic stress clusters instead with anxiety, depression, and psychological distress, framing it as a source of strain. Researchers study the two constructs together constantly, but the clustering keeps them conceptually separate. The temporal overlay shows where the field is heading. Recent keywords (2025–2026) push beyond psychology into technology-assisted learning: artificial intelligence, deep learning, e-learning. They also push into institutional territory: organizational resilience, crisis response, sustainable development, work-life balance. Nursing and medical education stay tightly clustered and productive throughout. The field has outgrown its pandemic origins. What's left is a wider, more differentiated body of work connecting individual psychological resilience to institutional context and the shifting conditions of higher education.

## DISCUSSIONS

This bibliometric analysis asked three questions about resilience and academic stress in higher education: how the field grew over time, how its intellectual structure is organized, and which themes form its historical core versus its emerging frontier. Tables 1–4 and Figures 1–3 show that resilience and academic stress have not converged into a single construct. They remain conceptually distinct, structurally interdependent, and have expanded together into a broader, more differentiated field of student mental health and well-being research.

The publication trend in Table 1 supports the Literature Review's account: for much of the period, researchers investigated resilience and academic stress as separate lines of inquiry (Dagli et al., 2024; Phyo & Kopp, 2026). Output accelerated after 2021 and surged again in 2025–2026, consistent with reports that COVID-19 catalyzed this research area rather than defined its subject matter (Li et al., 2024; Pérez-Jorge et al., 2025). More universities now treat pandemic-era disruption as a closed crisis episode and have converted it into lasting organizational practice rather than an active research problem (Krsmanovic et al., 2024; Regehr & Rule, 2025). COVID-19-labelled keywords declined while mental-health-framed publications rose. The pandemic opened a structural entry point that widened the field's scope toward student well-being, not a temporary topic tied to pandemic-specific research.

The clustering results give a direct answer to the second research question and support the Literature Review's distinction between resilience as an adaptive capacity and academic stress as a risk-laden outcome (Masten, 2014; Ross et al., 2024). Resilience and academic stress co-occur most frequently of any two keywords in the network, yet the algorithm assigned them to separate clusters: resilience groups with emotional intelligence, mindfulness, and subjective well-being; academic stress groups with anxiety, depression, and psychological distress. This pattern matches longitudinal modeling evidence showing that academic stress, emotional intelligence, and mindfulness function as distinguishable, sequentially linked constructs rather than one undifferentiated experience (S. Zhang et al., 2024), and matches intervention research showing that mindfulness-based programs reduce academic stress and burnout while separately strengthening psychological resilience (Chen & Qi, 2025). The field has not yet folded stress and resilience into a single explanatory model, even though its most central studies now examine them as interacting processes within the same investigation. This echoes the meta-ethnographic conclusion that resilience buffers against stress rather than opposing it conceptually (Ang et al., 2021).

Nursing and medical education remain prominent throughout the mapped period, reflected in two dedicated clusters (Clusters 9–10) and the high ranking of "nursing students" among the most frequent author keywords (Table 4). Highly cited work in the corpus documents resilience, well-being, and academic outcomes among undergraduate nursing cohorts across multiple countries (Chow et al., 2018; Hwang & Shin, 2018; Smith et al., 2025; Tan et al., 2024; Van Hoek et al., 2019). Clinical training's structural intensity explains this sub-field's persistence: nursing and allied health students face concurrent academic, clinical, and emotional demands, which make resilience both a research priority and a curricular target. This extends the field-level mapping offered for academic stress research more broadly. Health-professions education is not only a frequently studied population but a structurally distinct, durable node in the resilience-stress network, worthy of continued attention alongside general higher-education populations (Ang et al., 2022; Brewer et al., 2019; Sanderson & Brewer, 2017).

The temporal overlay analysis answers the third research question: it locates the field's current intellectual frontier. Artificial intelligence, deep learning, and e-learning rank among the most recent (yellow-coded) keywords, which shows resilience and stress research

beginning to engage technology-mediated learning as both stressor and coping resource. Recent corpus evidence supports this: generative-AI learning support reduces learning anxiety and academic expectation stress through enhanced self-efficacy (Zhang et al., 2026); digital support and digital competence shape a distinct "digital resilience" among students navigating online learning (Pan & Zhu, 2025); digital fatigue links to academic resilience through the mediating roles of grit and flexibility (An et al., 2025). These developments extend the field's established psychological core rather than replace it (Zivi et al., 2025). Technology has become a new context for the same tension between stress exposure and adaptive capacity, which matches the broader premise that overlay visualization can reveal a field's leading edge before narrative reviews name it (van Eck & Waltman, 2010).

The co-occurrence network's institutional cluster (Cluster 8) links crisis response, retention, and work-life balance, and points to a parallel shift: the unit of analysis is moving from the individual student or academic toward the institution itself. The corpus documents this shift well. Universities developed durable organizational resilience practices in direct response to the COVID-19 crisis (Krsmanovic et al., 2024; Regehr & Rule, 2025). Researchers have reconceptualized academic staff resilience as a response to chronic institutional pressures such as critical peer review and precarious employment (Chan et al., 2021), and, in more extreme settings, to war-related disruption and forced academic migration (Tsybuliak et al., 2024). This institutional turn matches the socio-ecological reframing of resilience in the Literature Review, where individual resources and the surrounding institutional environment jointly shape adaptive capacity rather than adaptive capacity residing solely within the person (García-Crespo et al., 2021; Ross et al., 2024).

The smaller, conceptually coherent clusters addressing acculturative stress and cross-cultural comparison (Clusters 11 onward) mark internationalization as an emerging, still peripheral sub-theme. International students face a distinct configuration of academic and psychosocial stressors tied to life transition and cultural adaptation, which existing resilience frameworks only partly capture (Ansari Lari et al., 2025). This sub-theme sits at the margins of the network rather than at its core. The field's conceptual apparatus, built largely around domestic students and health-professions populations, has not caught up with the internationalized composition of contemporary university cohorts.

JOURNAL IN TEACHING AND EDUCATION AREA
Vol. 3, No. 2, Tahun 2026 | 365-389
e-ISSN : 3047-7034 | doi: https://doi.org/10.69673/0gzcth97

This field's intellectual structure is not a single resilience-stress continuum. It is a constellation of interacting sub-fields: an established clinical and affective core built around anxiety, depression, and psychological distress; a parallel adaptive-capacity core built around emotional intelligence and well-being; a durable health-professions education sub-field; and two expanding frontiers, one concerned with technology-mediated learning, the other with institutional-level resilience. This structural account supports bibliometric mapping's broader value as a complement to narrative synthesis: it renders visible a field's underlying architecture and trajectory in ways traditional literature reviews cannot easily replicate (Aria & Cuccurullo, 2017; Donthu et al., 2021). The sections that follow consider this structure's implications for theory and practice, along with the limitations of the present bibliometric design.

## IMPLICATIONS

### *Theoretical Implications*

Although resilience and academic stress are the most common and most tightly connected keywords in the corpus, they represent two different network clusters. This pattern is consistent with models that conceptualise resilience and stress as related but empirically distinct processes as opposed to opposite poles of a single continuum. The pattern of clustering provides descriptive support for a bidimensional conceptualisation, whereby stress exposure and adaptive capacity are theoretically related, at the level of the organization of the field of study, but distinct in their operationalisation. These readings are in accordance with the risk and protection factor framework described in the Literature Review (Ross et al., 2024; Cassidy, 2016) and with meta-ethnographic evidence that resilience is a stress buffer, rather than the direct opposite of stress (Ang et al., 2021), although this bibliometric mapping does not directly test causal or bidimensional structures, it identifies patterns in the way the field studies those constructs, but not the underlying psychological mechanisms. Current findings on keyword grouping can only provide limited empirical support for stage-based process models, while longitudinal cross-lag evidence on the relationship between academic stress, emotional intelligence, and mindfulness (Zhang et al., 2024) has more direct empirical support.

The results also appear to be consistent with the extension of socio-ecological accounts of resilience beyond the individual and classroom level (García-Crespo et al., 2021). There is

a nascent technology cluster (artificial intelligence, deep learning, e-learning) as well as an institutional resilience cluster (crisis response, retention, work-life balance). Together they suggest a route for future theorising that connects individual psychological resiliency to institutional climate and digital infrastructure. Work beyond this corpus has already started to move in this direction, proposing integrated multi level frameworks that position resilience across micro, meso and macro levels in higher education to workforce transitions (Burke & Scurry, 2024). This provides a template which the present field could adopt to link together the individual, institutional and technological levels of resilience. To empirically test such a multilevel framework would require primary research rather than keyword co-occurrence.

***Practical Implications***

Since the two constructs are in separate thematic clusters in the present analysis, higher education practitioners and administrators may want to consider academic-stress interventions and resilience-building interventions as partially separate, complementary programmatic tracks. Stress-focused programs might still target clinical and affective symptoms such as anxiety, depression, and psychological distress (Pascoe et al., 2020; Misra & McKean, 2000). Resilience-building programs such as, mindfulness training, emotional intelligence development, structured reflective support, have been shown in separate intervention research, rather than in current bibliometric data, to affect both burnout and resilience simultaneously (Chen & Qi, 2025; Zhang et al., 2024); The bibliometric mapping here shows that these themes are actively studied together, not that this specific corpus demonstrates their effectiveness. Students of nursing and other health professions remain an overrepresented population in this literature (Chow et al., 2018; Hwang & Shin, 2018; Smith et al., 2025; Tan et al., 2024), which may require consideration to embed a direct resilience building component into clinical training rather than simply offering as an optional ancillary service. This direction is supported by recent qualitative evidence from nursing instructors themselves, who report that bridging the theory–practice gap through curriculum redesign, rather than relying on self-support services, is better to maintain student resilience through clinical placements (Aryuwat et al., 2025; Van Hoek et al., 2019).

The emerging technology-mediated frontier and the increasing institutional dimension are also of possible policy relevance. Conversely, universities that are growing AI-supported and

online learning settings might find it helpful to track students' digital resilience and AI learning anxiety, a practice highlighted by recent empirical work ((An et al., 2025; Pan & Zhu, 2025; B. Zhang et al., 2026), not necessarily this bibliometric analysis. The current corpus maps the prominence of this theme rather than measuring the outcomes of interventions, but case evidence from the COVID-19 disruption supports continued investment in crisis-preparedness structures, staff well-being policies, and work-life balance measures (Chan et al., 2021; Krsmanovic et al., 2024; Regehr & Rule, 2025). The smaller, but conceptually distinct, acculturative-stress cluster indicates a potential gap: universities with large international student populations may benefit from considering tailored support services for transitional and cross-cultural stressors, an area where existing resilience frameworks appear only partially developed (Ansari Lari et al., 2025).

As well as resilience and stress specific interventions, the broader thematic move in the field toward technology mediated learning and institutional level resilience has ramifications for higher education practice more generally. Curriculum designers and faculty developers may consider developing adaptive capacity through structured reflection, peer support and manageable workload design, as part of general pedagogical practice rather than as a supplemental wellness service located in counselling units. Similarly, as colleges and universities increasingly adopt AI-assisted and online learning tools across disciplines, tracking the effect of these tools on student stress and coping capacity should be a standard consideration in instructional design and educational technology policy, rather than something limited to resilience research specifically. This broader framing situates resilience informed practice within the mainstream of teaching and institutional planning in higher education rather than as a niche concern confined to student mental health services.

## CONCLUSIONS

This study aims to conduct a bibliometric analysis of 385 documents indexed in Scopus, published between 2016 and 2026, in the field of academic resilience and academic stress in higher education. Following 2021, publication activity increased, and this increase was not limited to pandemic-specific concerns but reflected a broader and sustainable framework of student mental health and well-being that outlived the initial COVID-19 research surge. According to the analysis of keyword co-occurrence, the two most central and often related terms in this field are academic resilience and stress, although they are located in different

thematic groups. Resilience and adaptive and affective capacities: emotional intelligence, well-being. Academic stress is then grouped with clinical and affective outcomes: anxiety, depression, psychological distress. Nursing education and the health professions are separate and continuing sub-fields throughout the period studied. The temporal overlap analysis identifies three recent research frontiers: artificial intelligence, digital learning and organisational resilience. Together, these findings paint a picture of the changing and diverse nature of research into academic resilience and stress in higher education. They do not offer a causal or evaluative explanation of the field, but rather a descriptive map. This map can serve researchers as a starting point for developing multilevel integrative models of student and academic well-being and can guide institutional efforts toward developing more targeted and population-specific interventions and policies with contributions that need to be tested through primary empirical research, not only determined by bibliometric mapping.

***Limitations and Directions for Future Research***

This study carries four limitations. First, the analysis was conducted based only on Scopus. Scopus provides broad multidisciplinary coverage and metadata compatible with VOSviewer, but the search missed studies indexed only in Web of Science, PsycINFO, or ERIC. The query itself was not filtered for language, but the indexing coverage of Scopus is structurally biased toward English-language journals and so regionally significant research published in other languages was also likely under-represented in the corpus regardless of the search strategy. Secondly, the bibliometric method is descriptive and not explanatory. Keyword co-occurrence and temporal overlay analyses map thematic association and field evolution but cannot establish causal links between resilience and academic stress, test the effectiveness of interventions, or match the interpretive depth of a systematic review or meta-analysis. Third, there is the question of author-supplied keywords. The terminology differs among disciplines even after the application of thesaurus normalisation and minimum co-occurrence threshold. Emerging or low frequency themes may not have enough co-occurrence counts for distinct clusters. This may have restricted the visibility of the smaller, specialised clusters found in this study (Clusters 11-19). A fourth limitation is directly related to the search strategy: no document-type or screening filter was applied other than the query itself, which resulted in a corpus that included non-article formats such as book chapters,

conference papers, and books, in addition to peer-reviewed journal articles. This may introduce heterogeneity in editorial rigour across the mapped literature.

These limitations point toward several directions for future research. Researchers could pair this bibliometric map with a systematic review or meta-analysis that quantifies the strength and direction of the resilience–academic stress relationship across study designs and populations. The temporal overlay analysis shows a technology-mediated cluster emerging quickly; empirical research should examine how generative AI tools, digital learning platforms, and AI-related learning anxiety shape students' resilience and stress trajectories over time (Zhang et al., 2026; An et al., 2025). Organizational and institutional resilience formed an expanding but still small cluster. Future work should test how specific institutional policies and crisis-response practices causally shape individual student resilience and academic stress outcomes (Krsmanovic et al., 2024; Regehr & Rule, 2025). Acculturative and cross-cultural stress held a persistent but peripheral position in the network. Dedicated bibliometric or empirical studies on international and cross-cultural student populations would clarify whether models built for domestic students generalize to this growing group (Ansari Lari et al., 2025). Future replications may also benefit from applying a document-type filter restricted to articles and reviews, consistent with common bibliometric convention, to test whether the thematic structure reported here holds when non-article formats are excluded. Finally, the corpus underlying this study extends only through mid-2026. Periodic replication in future years would show whether the frontier themes identified here mature into established sub-fields or fade as transient trends.

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