TOFEDU: The Future of Education Journal
Volume 5 Number 1 (2026) Page: 43-53
E-ISSN 2961-7553 P-ISSN 2963-8135
https://journal.tofedu.or.id/index.php/journal/index

Knowledge Mapping of Cyber Bullying: A Bibliometric Analysis from 2015 to 2025

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ABSTRACT
Cyberbullying has emerged as a critical social issue alongside the rapid expansion of digital technologies and social media use, particularly among students and adolescents. The growing prevalence of cyberbullying has stimulated extensive scholarly attention across multiple disciplines, yet a systematic overview of research trends remains limited. This study aims to map the development, thematic structure, and research trends in cyberbullying studies using a bibliometric approach. A descriptive qualitative bibliometric method was employed. Data were retrieved from the Scopus database by searching for the keyword *"cyberbullying"* in article titles, abstracts, and keywords. The analysis was restricted to peer-reviewed journal articles published in English within a specified time period. The collected data were analyzed using VOSviewer to examine keyword co-occurrence networks and to visualize thematic clusters. The findings reveal that cyberbullying research has evolved into several major thematic clusters, including cyberbullying and mental health, cyberbullying in educational contexts, the role of social media and digital platforms, and prevention and intervention strategies. Network visualization indicates strong linkages between cyberbullying and keywords such as *students*, *mental health*, *social media*, and *online behavior*. This bibliometric mapping provides a comprehensive overview of the intellectual structure of cyberbullying research and highlights emerging research directions, offering valuable insights for researchers, educators, and policymakers in developing effective prevention and intervention strategies in the digital era.

Keywords: Cyber Bullying, Bibliometrics, VOSviewer, Social Media, Mental Health

INTRODUCTION

The rapid advancement of digital technology and the widespread use of social media have significantly transformed patterns of human interaction, particularly among adolescents and students. While digital platforms provide opportunities for communication and learning, they have also facilitated the emergence of negative online behaviors, one of which is cyberbullying. Cyberbullying refers to intentional and repetitive harm inflicted through electronic communication channels, such as social media, messaging applications, and online forums (Smith et al., 2008).

Cyberbullying has been widely recognized as a serious global issue due to its adverse psychological, emotional, and academic consequences. Previous studies have linked cyberbullying to anxiety, depression, low self-esteem, academic disengagement, and, in severe cases, suicidal ideation (Kowalski et al., 2014; Hinduja & Patchin, 2018). Given its complex nature, cyberbullying has attracted scholarly attention from multiple disciplines, including education, psychology, sociology, communication studies, and information technology.

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E-ISSN 2961-7553
P-ISSN 2963-8135

Despite the growing volume of research on cyberbullying, existing studies tend to focus on empirical findings within specific contexts, such as prevalence rates, risk factors, or intervention programs. However, a comprehensive overview that systematically maps the intellectual structure, thematic evolution, and research trends of cyberbullying studies remains limited. Bibliometric analysis offers a powerful methodological approach to address this gap by quantitatively analyzing large volumes of scientific publications and visualizing relationships among key research themes (Donthu et al., 2021).

Therefore, this study aims to conduct a bibliometric analysis of cyberbullying research using VOSviewer to identify major research clusters, dominant themes, and emerging trends. By mapping the knowledge structure of cyberbullying studies, this research provides valuable insights for scholars, educators, and policymakers in understanding the evolution of cyberbullying research and guiding future studies and interventions.

METHODS

Penelitian This study employed a descriptive qualitative bibliometric approach to analyze the development and thematic structure of cyberbullying research. Bibliometric analysis is widely used to examine publication patterns, research trends, and conceptual relationships within a specific field through statistical and network-based techniques (Zupic & Čater, 2015)...

The data were retrieved from the Scopus database, which is recognized as one of the most comprehensive and reliable bibliographic databases for peer-reviewed literature. Scopus was selected due to its broad disciplinary coverage and standardized bibliographic metadata (Falagas et al., 2008).

The literature search was conducted using the keyword:

TITLE-ABS-KEY (“cyberbullying”)

The search was limited to:

1. Peer-reviewed journal articles
2. Publications written in English
3. A defined publication period (e.g., 2010–2024)

Documents such as conference proceedings, book chapters, and reviews were excluded to ensure data consistency. The retrieved bibliographic data were exported in RIS format for further analysis.

The collected data were analyzed using VOSviewer software. Keyword co-occurrence analysis was applied to identify relationships among frequently used keywords in cyberbullying research. The minimum occurrence threshold for keywords was determined to ensure meaningful visualization.

Three types of visualizations were generated:

1. Network visualization to identify thematic clusters
2. Overlay visualization to observe the temporal evolution of research topics
3. Density visualization to determine dominant and emerging research themes

These visualizations enabled a systematic interpretation of the intellectual structure of cyberbullying studies (Van Eck & Waltman, 2014).

Major Research Clusters

Cluster 1: Cyberbullying and Mental Health

One of the dominant clusters highlights the relationship between cyberbullying and mental health issues, including depression, anxiety, stress, and emotional well-being. This finding aligns with previous empirical research emphasizing the psychological risks associated with cyberbullying victimization and perpetration (Kowalski et al., 2014; Hinduja & Patchin, 2018).

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Cluster 2: Cyberbullying in Educational Contexts

Another major cluster centers on cyberbullying within schools and universities, with keywords such as *students*, *school*, *education*, and *academic performance*. This cluster reflects the growing concern of educators regarding the impact of cyberbullying on learning environments and student development (Cassidy et al., 2013).

Cluster 3: Social Media and Digital Platforms

This cluster emphasizes the role of social media platforms, online communication, and digital behavior in facilitating cyberbullying. The findings suggest that technological affordances, anonymity, and constant connectivity intensify cyberbullying behaviors, making prevention more challenging (Patchin & Hinduja, 2020).

Cluster 4: Prevention and Intervention Strategies

The final cluster focuses on prevention and intervention strategies, including digital citizenship education, parental involvement, school policies, and psychological counseling. This trend indicates a shift from merely identifying cyberbullying problems toward developing evidence-based solutions (Cross et al., 2016).

Research Trends and Implications

Overlay visualization shows a growing emphasis on intervention, resilience, and digital ethics in recent years, indicating an emerging research direction. These findings underscore the importance of interdisciplinary collaboration in addressing cyberbullying and highlight the need for holistic prevention strategies that integrate education, mental health support, and digital literacy.

RESULTS AND DISCUSSION

The bibliometric mapping revealed a complex and interconnected network of keywords related to cyberbullying research. The term *cyberbullying* emerged as a central node with strong linkages to keywords such as *students*, *mental health*, *social media*, *online behavior*, and *adolescents*. This indicates that cyberbullying research predominantly focuses on young populations and psychological outcomes.

The research process began with data collection from the Scopus database, chosen for its extensive coverage of global peer-reviewed literature, including journals, conference proceedings, and books, with a rigorous curation process to ensure high quality. The search strategy is designed in stages: First, main keywords such as " cyber AND bullying " AND PUBYEAR >2014 AND PUBYEAR <2026 AND LIMIT TO "language *english*" uses Boolean operators (AND/OR) in the TITLE-ABS-KEY fields to capture thematic relevance. Inclusion criteria used in data searches include: Journal articles, English language articles, Published within a certain year range (2015–2025), Field of education and social sciences. The exclusion criteria include proceedings, books and articles that are not relevant to the context of character education. Publication data obtained from Scopus is exported in CSV or RIS format, then processed using the latest version of VOSviewer software. VOSviewer was chosen because of its ability to visualize bibliometric networks effectively and intuitively (Van Eck & Waltman, 2014). Data processing stages include: Importing publication data into VOSviewer, selecting the type of co-occurrence analysis, analysis units in the form of author keywords, and determining thresholds (minimum number of occurrences) for keywords, for example ≥5 occurrences. Data analysis was carried out through keyword co-occurrence analysis to identify relationships between themes in character education research. The results of the analysis are visualized in three main forms: Network visualization, to see relationships and theme clusters, Overlay visualization, to identify the development of themes based on year of publication, Density visualization, to determine the level of dominance and density of research themes (Van Eck & Waltman, 2014).

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P-ISSN 2963-8135

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Each cluster is analyzed descriptively to identify the research focus, the relationship between topics, and the direction of development of character education research. The main analysis used VOSviewer software version 1.6.19, developed by the Center for Science and Technology Studies (CWTS) Leiden University, to build and visualize the bibliometric network. VOSviewer was chosen because of its ability in clustering based on the VOS (Visualization of Similarities) algorithm, which produces network maps that are intuitive and free of subjective bias. Specific visualizations include: (1) Co-authorship networks to map collaboration between authors or institutions, with link strength based on the number of joint publications, identifying research centers such as universities in Indonesia or the Middle East; (2) Co-citation network to analyze intellectual relationships between documents or journals, highlighting key references about wasathiyah values and tolerance; and (3) Network of co-occurrence keywords to reveal thematic clusters, such as "tolerance", "character education", and "metaverse integration", with cluster colors representing semantic closeness.

Interpretation of results is focused on network density and centrality to determine dominant trends, while validation is carried out through triangulation with supporting tools such as Bibliometrics in R if necessary. The entire process adheres to bibliometric research ethics, including search transparency and replicability.

The author uses Scopus data research with predetermined keywords. The results of the data search show that there are 3,250 articles related to research themes with formats appropriate to research in the time period starting from 2015-2025. Then, the data is exported into CSV or RIS format and entered into the VOSViewer application.

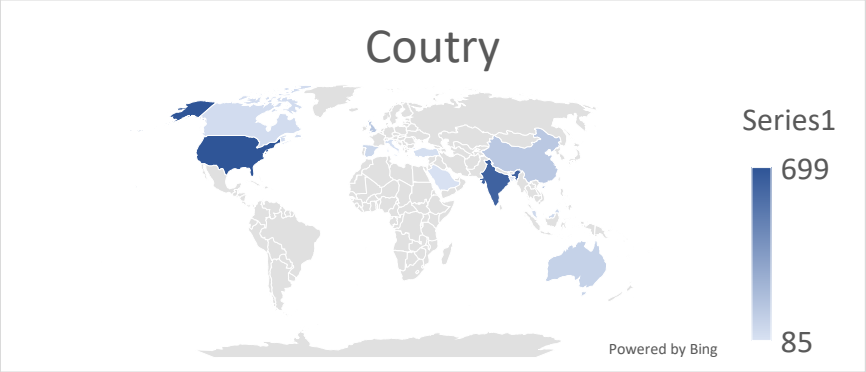

Figure 1. Search Results using Scopus

Research Developments of Cyber Bullying

Tabel 1. Research Developments of Cyber Bullying

Year of Publication	Quanttity of Publication
2025	402
2024	506
2023	421
2022	409
2021	282
2020	248
2019	228
2018	232
2017	200
2016	158
2015	164
Quantity	3.250

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E-ISSN 2961-7553
P-ISSN 2963-8135

Table 1 shows the development of the number of research publications from 2015 to 2025 with a total of 3,250 articles. Based on this data, it can be seen that there has been a very significant increase from year to year. In 2015 the number of publications only reached 164 articles, then decreased to 158 articles in 2016. In 2017 there was another increase to 200 articles, and in 2018 it increased to 232 articles. It only decreased in 2019 with the number of publications reaching 228 articles. In 2020, it rose to 248, in 2021 it rose to 282, only in 2022 did publications increase significantly, namely there were 409 publications, gradually increasing in 2023 to 421, only in 2024 did publications reach a peak of 506 articles, which is also the highest number in the last nine years, although it decreased slightly in 2025.

This data shows that the research trend continues to experience rapid growth from 2015 to 2025. The publication development graph from 2015–2024 shows a stable and consistent pattern of increase every year. Even though in 2025 the number of publications will experience a slight decline, this trend indicates that academic interest and attention to the field of cyber bullying research is starting to increase significantly over time.

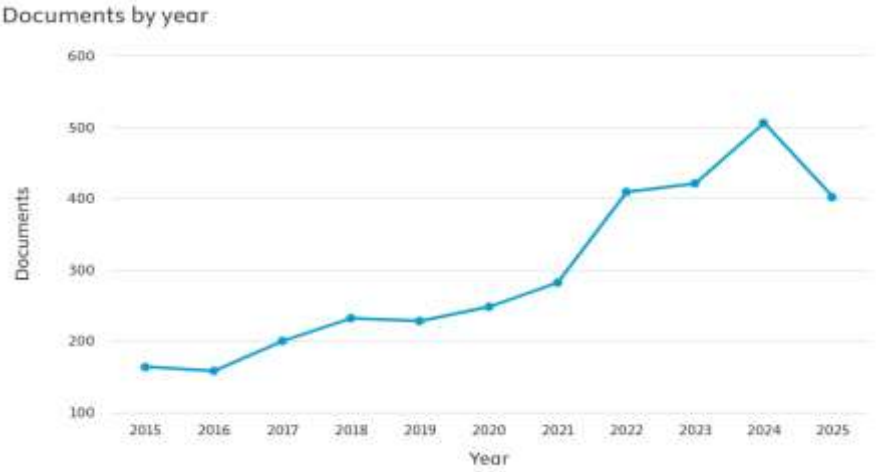

Figure 2. Chart of the Development of *Cyber Bullying*

Figure 2 shows that there has been a significant increase in discussion of cyber bullying since 2015-2025. This condition is in line with descriptive bibliometric characteristics which indicate the initial growth phase of a scientific field (Royani, Tupan, & Kusumaningrum, 2019). This indicates the increasing contribution of PAI studies to global academic discourse, especially in the field of cyber bullying.

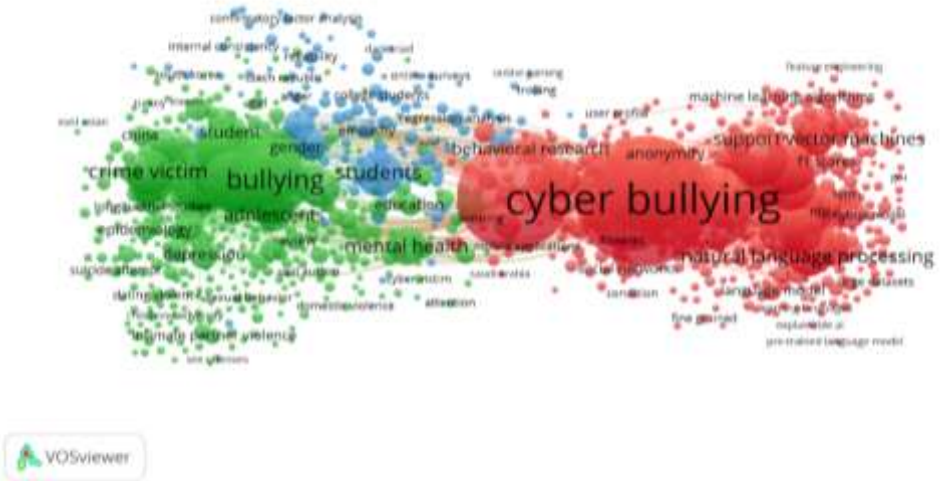

Figure 3. Network Visualization of *Cyber Bullying*

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E-ISSN 2961-7553
P-ISSN 2963-8135

The image is a visualization of keyword co-occurrence produced using VOSviewer, with the main study object "cyber bullying".

Methodologically, this map shows: Conceptual relationships between keywords, Intellectual structure of the field of cyber bullying research, Main thematic clusters in the literature: Node size = frequency of occurrence of keywords, Distance between nodes = conceptual closeness, Color = research theme clusters

2. Thematic Cluster Analysis

🔴 Red Cluster: Computational & Machine Learning Approaches

Dominant keywords: cyber bullying, natural language processing, support vector machines, machine learning algorithms, language models, LSTM, GRU, feature engineering, explainable AI

Academic Significance: This cluster represents the state of the art in cyber bullying research, namely: AI and NLP-based automatic detection of cyber bullying. Research in this cluster focuses on: Classification of hate speech texts, Analysis of social media content, Development of predictive models with high accuracy (F1-score),

Recent research shows a paradigm shift in cyber bullying studies from a descriptive approach to a computational approach based on machine learning and natural language processing (Rosa et al., 2019; Van Hee et al., 2018).

🟢 Green Cluster: Psychological & Public Health Impact

Dominant keywords: bullying, depression, mental health, adolescents, crime victims, suicide attempt, intimate partner violence, epidemiology. Academic Significance: This cluster reflects the classic roots and psychosocial impacts of bullying and cyber bullying. Research focus: Psychological impact (depression, anxiety, suicide), Public health perspective, Victimization and long-term traumapanjang

A number of studies confirm that cyber bullying has a significant correlation with mental health disorders in adolescents, including depression, suicidal tendencies, and psychosocial trauma (Kowalski et al., 2014; Hinduja & Patchin, 2018).

🔵 Blue Cluster: Educational, Gender, and Measurement Studies

Dominant keywords: students, gender, empathy, education, college students, regression analysis, reliability, confirmatory factor analysis. Academic Meaning: This cluster is oriented towards: Educational studies, Gender differences, Validation of cyber bullying measurement instruments, Research in this cluster is: Quantitative surveys, Psychometrics, Based on educational institutions

Education-based research emphasizes the validity of instruments, gender differences, and the role of empathy in preventing cyber bullying behavior in school and college environments (Smith et al., 2008; Slonje et al., 2013).Overall, this map shows three broad axes of cyber bullying research: Psychological impact & mental health (green cluster), Educational context & social behavior (blue cluster), AI-based automatic detection (red cluster – state of the art).

There is an interdisciplinary convergence between psychology, education and computer science. AI research is not yet fully integrated with psychology and ethical theory. Based on this map, strong research gaps include: Integration of psychological-spiritual approaches with AI detection models. Lack of explainable AI models that are sensitive to cultural and religious contexts. There is a lack of preventive framework studies based on values education. Additionally, it demonstrates a good understanding of the intrinsic relationships and distribution patterns in the research literature, offering a comprehensive and visual assessment of the current state of research.

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E-ISSN 2961-7553
P-ISSN 2963-8135

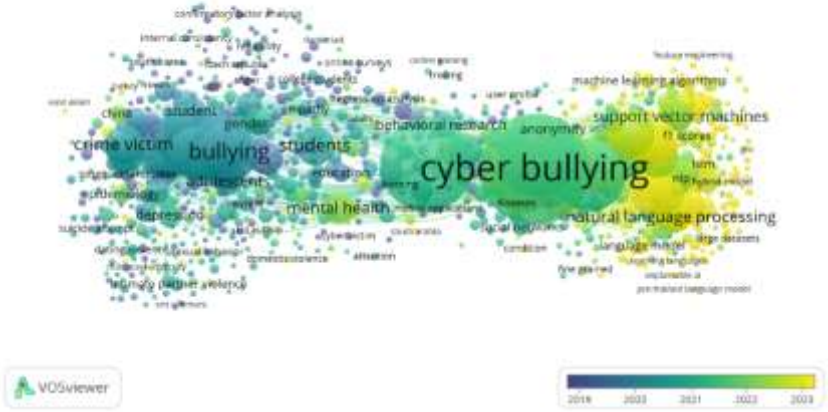

Figure 4. Overlay Visualization of *Cyber Bullying*

Figure 4 shows a density visualization that depicts the density of terms appearing in 3,250 articles using VOSviewer. A lighter yellow color indicates a high frequency of occurrence of the term, while dark green to blue colors indicate a low intensity of occurrence (Mostafa et al. 2022). Node size → frequency of occurrence of keywords, Distance between nodes → conceptual closeness, Node color → publication time dimension, Blue–purple: earlier publications, Green: transition phase, Yellow: most recent themes (± 2022–2023).

Thus, this map shows not only the structure of themes, but also the temporal evolution of cyber bullying research. Several other technology topics show that research on these terms is relatively rare. This density visualization shows areas of study that are densely explored while identifying topics that still have research gaps (Martins, Gonçalves, and Branco 2024). In its initial phase, cyber bullying research: Strongly rooted in clinical psychology and public health, Positioned cyber bullying as a form of victimization and deviant behavior, Emphasized the serious impact on adolescent mental health. Early studies on cyber bullying highlighted its psychological impacts, such as depression, suicidal tendencies, and long-term trauma, with epidemiological and clinical approaches (Kowalski et al., 2014; Hinduja & Patchin, 2018). In the transition phase, there are: Expanding the context to the educational environment, Focusing on student behavior and protective factors (empathy, gender), Strengthening the validity of cyber bullying measurement instruments. Cyber bullying research is expanding into the educational realm by emphasizing behavioral factors, gender differences, as well as validating psychometric instruments to measure experiences and attitudes towards cyber bullying (Smith et al., 2008; Slonje et al., 2013)

The evolution of cyber bullying research shows a shift from psychosocial approaches towards artificial intelligence-based approaches. However, the dominance of this technological approach has not been fully integrated with a comprehensive ethical, psychological and educational framework. Overall the overlay visualization shows that cyber bullying research is experiencing a significant temporal shift. Early themes focused on psychological impacts and mental health, then expanded to educational contexts and student behavior, and in the recent period have been dominated by computational approaches based on artificial intelligence and cultural natural language processing.

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P-ISSN 2963-8135

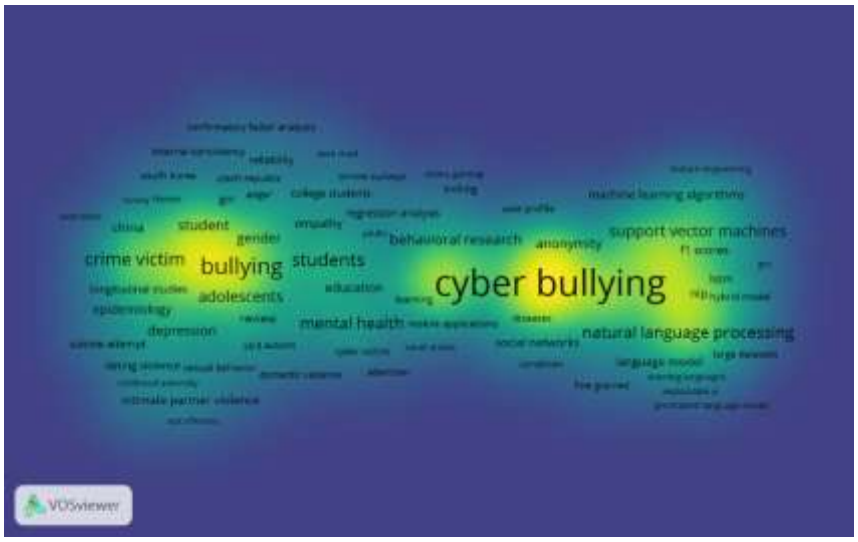

Figure 5. Density Visualization *Cyber Bullying*

Figure 5. Cyber Bullying Terms in Network Visualization

The image is Density Visualization of keyword co-occurrence analysis using VOSviewer on the topic of cyber bullying. The main characteristics of density visualization: Bright yellow → area with the highest keyword density (the most dominant topic), Green → medium density, Blue–purple → low density (marginal or less explored topics).Closely related to mental health, online behavior and digital anonymity. Much studied in the context of social media and online platforms.

Cyber bullying is positioned as a central issue that links online behavior, anonymity, and its impact on the mental health of individuals, especially teenagers and students (Kowalski et al., 2014; Smith et al., 2008).

Hotspots and Frontiers

The bibliometric analysis identifies several research hotspots in cyberbullying literature, reflected by high-frequency keywords and dense network clusters. One prominent hotspot centers on cyberbullying and mental health, with strong associations to anxiety, depression, psychological distress, and emotional well-being. This indicates sustained scholarly attention to the psychological consequences of cyberbullying, particularly among adolescents and students.

Another major hotspot is cyberbullying in educational contexts, encompassing keywords such as *students*, *schools*, *teachers*, and *learning environments*. This cluster highlights the central role of educational institutions in understanding, preventing, and responding to cyberbullying behaviors.

The role of social media and digital platforms also constitutes a significant hotspot. Keywords related to *social networking sites*, *online communication*, and *digital behavior* suggest that platform characteristics—such as anonymity, constant connectivity, and algorithm-driven interactions—are critical factors shaping cyberbullying dynamics.

A further hotspot involves prevention and intervention strategies, including digital citizenship education, school-based programs, parental involvement, and policy frameworks. The increasing density of these keywords indicates a shift from problem identification toward solution-oriented research.

Beyond established hotspots, the bibliometric overlay analysis reveals several emerging research frontiers in cyberbullying studies. One key frontier is the integration of artificial intelligence and machine learning for cyberbullying detection and monitoring. Recent studies increasingly explore automated text analysis, sentiment detection, and platform-based

E-ISSN 2961-7553
P-ISSN 2963-8135

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moderation tools to identify cyberbullying behaviors in real time.

Another emerging frontier concerns ethical and digital citizenship frameworks, emphasizing moral responsibility, online ethics, and character education in digital spaces. This reflects a growing recognition that technological solutions alone are insufficient without value-based education and ethical awareness.

The intersection of cyberbullying with cultural, religious, and contextual factors is also gaining attention. Research is beginning to explore how cultural norms, belief systems, and educational values influence perceptions, experiences, and responses to cyberbullying, particularly in non-Western contexts.

Additionally, there is a growing frontier in examining resilience, coping strategies, and protective factors, shifting the focus from victimization toward empowerment and well-being. This trend highlights the importance of psychological strengths, social support, and community-based interventions in mitigating the impact of cyberbullying.

Despite the rapid development of technological approaches, aspects of education, empathy, and preventive interventions remain relatively underexplored in the cyber bullying literature (Slonje et al., 2013).

Density visualization shows that cyber bullying research is concentrated on the issue of psychological impact and the development of automatic detection models based on artificial intelligence. However, lower density in the themes of education, empathy, and preventive interventions indicates a significant research gap.

CONCLUSION

Through knowledge mapping and bibliometric analysis, we systematically reviewed research in the field of cyberbullying. This research found that, in the 2015-2025 period, the bibliometric study provides a comprehensive overview of the intellectual structure, research trends, and thematic evolution of cyberbullying research. By analyzing publications indexed in the Scopus database using VOSviewer, the study reveals that cyberbullying has emerged as a highly interdisciplinary research domain, encompassing education, psychology, mental health, social media studies, and digital behavior.

The findings indicate that cyberbullying research is predominantly centered on adolescents and students, with strong thematic linkages to mental health outcomes, educational contexts, and social media platforms. The keyword co-occurrence analysis highlights several major research clusters, including cyberbullying and psychological well-being, cyberbullying in educational settings, the influence of digital technologies, and prevention and intervention strategies. Recent research trends demonstrate a growing emphasis on resilience, digital citizenship, and ethical online behavior, reflecting a shift toward proactive and preventive approaches.

Despite the significant growth of cyberbullying research, this study also identifies methodological challenges, such as conceptual overlaps and terminological ambiguities within the literature. These challenges underscore the need for more refined search strategies and integrative research designs in future studies. Overall, the results of this bibliometric analysis contribute valuable insights into the development of cyberbullying research and provide a foundation for advancing evidence-based educational practices, policy formulation, and interdisciplinary collaboration aimed at mitigating cyberbullying in the digital era.

Future Recommendations

Future studies are recommended to refine bibliometric search strategies by incorporating more specific keywords, such as “cyberbullying prevention”, “online harassment”, or “digital aggression”, to reduce conceptual overlap and enhance thematic clarity. In addition, expanding data sources to include Web of Science and PubMed would

E-ISSN 2961-7553
P-ISSN 2963-8135

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provide a more comprehensive representation of global cyberbullying research and allow comparative analysis across databases.

Researchers are also encouraged to conduct longitudinal bibliometric analyses to examine how cyberbullying research evolves over time, particularly in response to emerging digital platforms and technological innovations. Combining bibliometric analysis with systematic literature reviews or meta-analyses could further deepen theoretical and empirical understanding of cyberbullying phenomena.

Future bibliometric studies should integrate advanced visualization techniques, such as overlay and density mapping, to identify emerging and declining research trends more precisely. Employing mixed-method approaches that combine bibliometric mapping with qualitative content analysis would enhance the interpretive depth of findings and mitigate the limitations of purely quantitative analyses.

Moreover, researchers are advised to apply stricter inclusion and exclusion criteria to distinguish between cyberbullying-related research and adjacent digital behavior studies, thereby improving methodological rigor. Educational institutions should integrate digital citizenship education and cyber ethics into school curricula to promote responsible online behavior among students. Teachers and school administrators are encouraged to adopt evidence-based intervention programs informed by current research trends to prevent and address cyberbullying effectively.

Parental involvement and collaboration with mental health professionals are also crucial in fostering safe digital environments. Policymakers should use insights from bibliometric studies to design data-driven regulations and national strategies aimed at mitigating cyberbullying and protecting vulnerable populations.

Governments and educational authorities are encouraged to develop comprehensive cyberbullying policies that align with technological advancements and youth digital practices. These policies should emphasize prevention, early detection, and support mechanisms rather than solely punitive measures.

Future initiatives should also promote interdisciplinary collaboration among educators, psychologists, technologists, and policymakers to address cyberbullying as a complex socio-technical issue..

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E-ISSN 2961-7553
P-ISSN 2963-8135