INSPIRE HEALTH

Inspire Health Journal
Vol. 1, No. 1, 2026
https://doi.org/10.65718/inspireSS.2026.2003

InspireQuill.org
Inspire Academic Press Inc. (Canada)

Review Paper OPEN ACCESS

Trends in Machine Learning Research on Children's Mental Health and Online Gaming Disorder: A Bibliometric Perspective

Swati Singh [1, *]

[1] Uttaranchal School of Computing Sciences, Uttaranchal University, India
[*] Corresponding Author: swatisingh@uumail.in

Abstract

Mental health of children has become a great concern in this digital age. It is evident from multiple researches that increased use of internet and online gaming addiction enhances the mental problems in adolescents. This study presents a bibliometric analysis using Scopus database of 2,850 publications to explore research themes and trends by studying the network analysis of co-occurring keywords, highest citations of documents and authors in the domain of mental health, gaming disorders in adolescents and implementation of artificial intelligence applications. Further, bibliographic coupling of documents, authors, and organizations was conducted to know the insights of collaborations in research work. Key clusters highlighted research on mental health disorders, machine learning techniques, neurodevelopmental conditions, and digital wellbeing. The results suggested that United States hold the dominant position (documents: 1,122, citations: 61,865), and total link strength: 611). Among all the authors, David Shaffer has highest citations count and International Journal of Environmental Research and Public Health (IJERPH) have published highest count (114) of documents with 2891 citations, whereas Journal of Child Psychology and Psychiatry (JCPP) has got highest citations count (11,246) of 104 published documents. The findings suggest machine learning can be utilized to predict gaming disorders in children and deep learning models can be applied to assess sleep quality, particularly in children with gaming disorders and mental health conditions.

Keywords: Children mental health, gaming disorder, machine learning, health informatics, bibliometric analysis.

1. Introduction

The digital age has transformed childhood experiences, with increase of internet use and online gaming addiction and social media becoming integral part of children's daily life after Covid-19 outbreak [1, 2]. Research suggest that excessive online gaming may lead to symptoms commonly experienced by substance addicts [3]. World Health Organization (WHO) has officially recognized gaming disorder as a mental health condition, emphasizing

Academic Editor: Jaafar Alghazo

Received: 17/04/2025
Revised: 07/06/2025
Accepted: 11/09/2025
Published: 05/01/2026

Citation
Singh, S. (2026). Trends in Machine Learning Research on Children's Mental Health and Online Gaming Disorder: A Bibliometric Perspective. *Inspire Health Journal, 1*(1), 35-46.

the growing need for early detection and intervention [4-9]. After Covid-19 outbreak it is evidently found that both video gaming and internet gaming disorder has been increased significantly, especially in boys [10]. The researchers started focusing on exploring the effect of online gaming on mental health of children [11, 15] and leveraging artificial intelligence and machine learning applications to develop data driven solutions [16] that can detect, and predict the mental health in adolescence [17, 18] to prevent them from severe negative outcomes but only a few focused on predicting the mental health problems in association with gaming disorders [19, 20]. Therefore, it is important to predict online gaming disorders in adolescence at their earlier age as they are more likely to develop the high risk of internet gaming disorders (HRIGD) [21].

In this research paper bibliometric analysis is carried out on scientific literatures in the domain of mental health and online gaming addictions in children, to identify the patterns, themes, and trends in this field [22] since no study till now has focused on finding the research trends in the field of machine learning applications in children mental health and gaming disorders, rather focused on only the internet gaming disorders[23], internet use disorders[24] or internet addiction and mental health among adults[25]. Therefore, seeing the growing use of internet games and gaming disorders in children, this is the first bibliometric study focused on children that used VOSviewer software (version 1.6.18) for constructing bibliometric graphs to obtain below mentioned research objectives:

- To know the most frequent keywords and themes in the domain of mental health and online gaming disorders in adolescents.
- To know which countries, authors, and organizations are working widely in this field.
- To know which countries and authors are working colaboratively in this field.

This research paper is divided into the following sections: Section 2 discusses the methodology used for the conduct of the research focusing on queries used to extract the research studies for the bibliometric analysis from Scopus database. Section 3 discusses the results of bibliometric analysis on the basis of keywords, co-authorship of countries, countrywise cittaions of documents, bibliographic coupling of documents and their cittaions analysis, bibliographic coupling of organizations, and themes and trends in this field of research. Lastly, conlusion was drawn with the discussion of limitations and further scope of research.

2. Methodology

The worldwide literature is extracted from Scopus data repository due to the limited accessibility of the other databases. The researcher applied four search queries, first query was conducted as (“child” AND “mental health” AND (“machine learning” OR “artificial intelligence” OR “deep learning”)), that given 612 documents, second query was conducted as (“child” AND “mental health” AND “online gaming”) that has given 30 documents, third query was conducted as (“child” AND “mental health” AND “internet gaming”) that yields 24 documents, and fourth query was conducted as (“child” AND “mental health” AND “prediction”) that has given highest count with 2,168 documents. All the three search queries were conducted on Title, abstract, and keywords for English language and including all subject areas. English language was chosen by the researcher due to the ease of readability, it may cause of leaving some significant studies written in other languages. The given results from all the three queries then exported in a .csv file with the checked requirements for publication years, author details, organization and affiliation details, keywords, document types, and citations. The datasets were then merged into a single .csv file that resulted in 2,834 entries out of which 214 duplicates and 30 incomplete entries were removed. The final dataset of 2,620 records was used to perform bibliometric analysis of keywords co-occurrences, co-authorships, citations count, country wise citations, bibliographic coupling, emerging themes, and trends using VOSviewer (version 1.6.18) Figure 1.

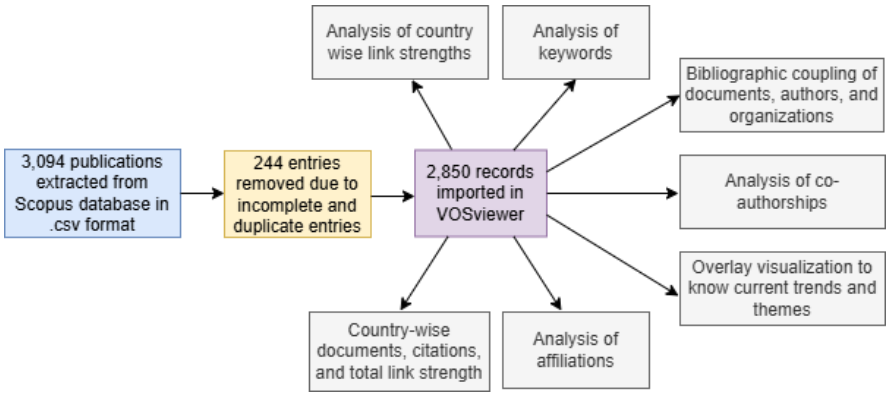

Figure 1. Flowchart representing bibliometric analysis for the research

3. Results

The bibliometric analysis was done on the final dataset of 2,850 entries for co-occurrence of keywords, country-wise citations and co-authorship analysis, author citations, country citations, organization citations, themes and trends analysis.

3.1 Bibliometric Analysis of Keywords

The co-occurring keywords analysis was conducted using the author's keywords that appeared at least five times for better clarity of the graph. Only 349 keywords met the threshold out of 5713. The results has given a graph containing twelve clusters of different colours. At the centre the term "mental health" (total link strength 1066), "depression" (Total link strength 570), "machine learning" (total link strength 409), "children" (total link strength 398), and "adolescents" (total link strength 451) appear prominently indicating their overarching importance and strong interconnection in the literature. Surrounding these core themes are several distinct coloured clusters representing different topical areas. The red cluster is centred around mental health disorders and symptoms, including keywords like "depressive symptoms", "PTSD", "resilience", "cognition", "child development", and "stress", indicating research focused on understanding and addressing various psychological conditions. The orange coloured cluster is associated with machine learning techniques containing terms like "deep learning", "classification", "decision tree", "random forest", and "support vector machine" which are commonly used for diagnosing and predicting mental health conditions. The green coloured cluster represents neurodevelopmental and behavioural studies, with keywords such as "autism", "ADHD", "hyperactivity", "gaming disorder", and "cognitive functions". Additionally, blue and purple clusters focus on digital and social aspects of mental health, including "internet addiction", "mobile phone", "social isolation", and "sleep" highlighting the growing impact of technology on mental well-being Figure 2.

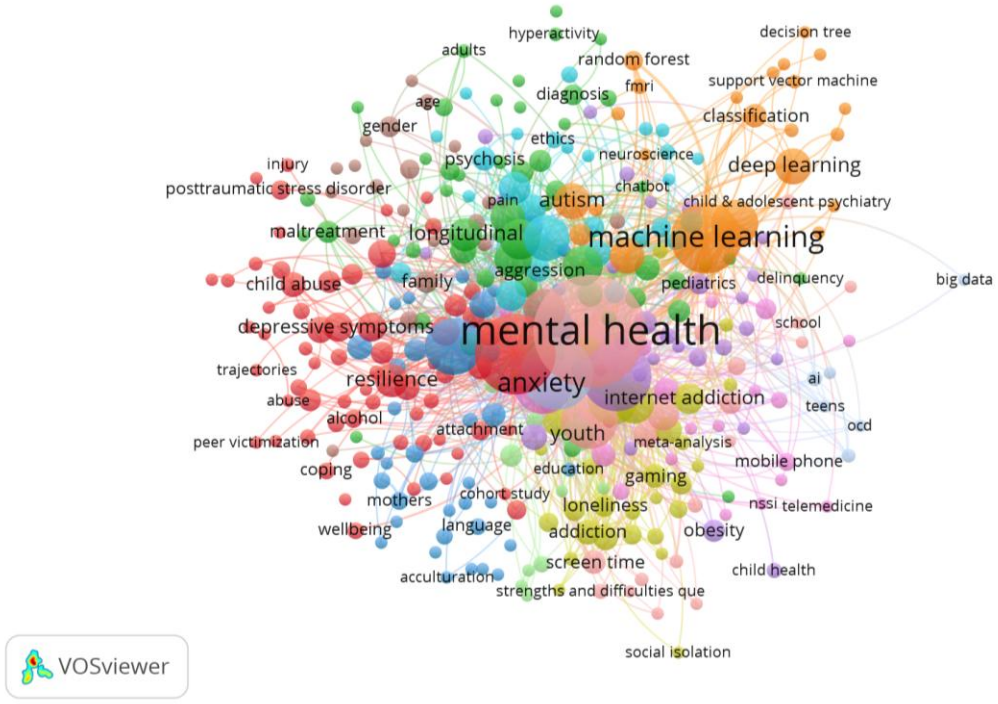

Figure 2. Co-occurrence of keywords in the field of mental health and gaming disorders in children.

The clusters represent that gaming disorder, addiction, and machine learning altogether have very poor link strength which means till now significantly very low work has been done in this area. This keyword analysis helped in knowing the less explored keywords so that more research work can be done on these keywords in future.

3.2 Bibliometric Analysis of Co-Authorship from different Countries

The analysis of co-authorship of countries was conducted using minimum five documents of a country and minimum five citations of a country, presented in Fig. 3(a). Out of 166 countries, 63 met the threshold for the connected graphical representation. United States of America holds a dominant position among all the countries with highest count of documents (1122), citations (61865), and link strength 611. United Kingdom (total link strength 543) holds second position with 449 documents and 25869 citations count, Canada reserves the third position (total link strength 283) with 253 documents and 15556 citations count. Overlay visualization reveals that countries like India, Iceland, United Arab Emirates, and Jordan has started exploring this research domain since 2022 Figure 3(b).

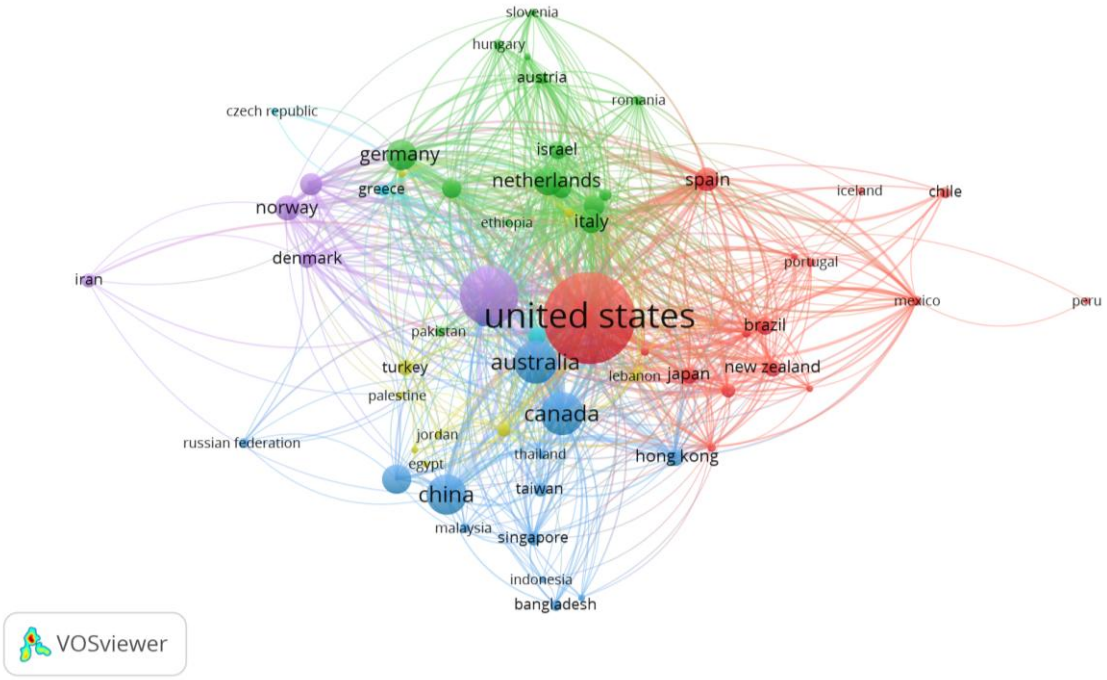

Figure 3(a). Co-authorship of countries in the field of mental health and gaming disorders in children.

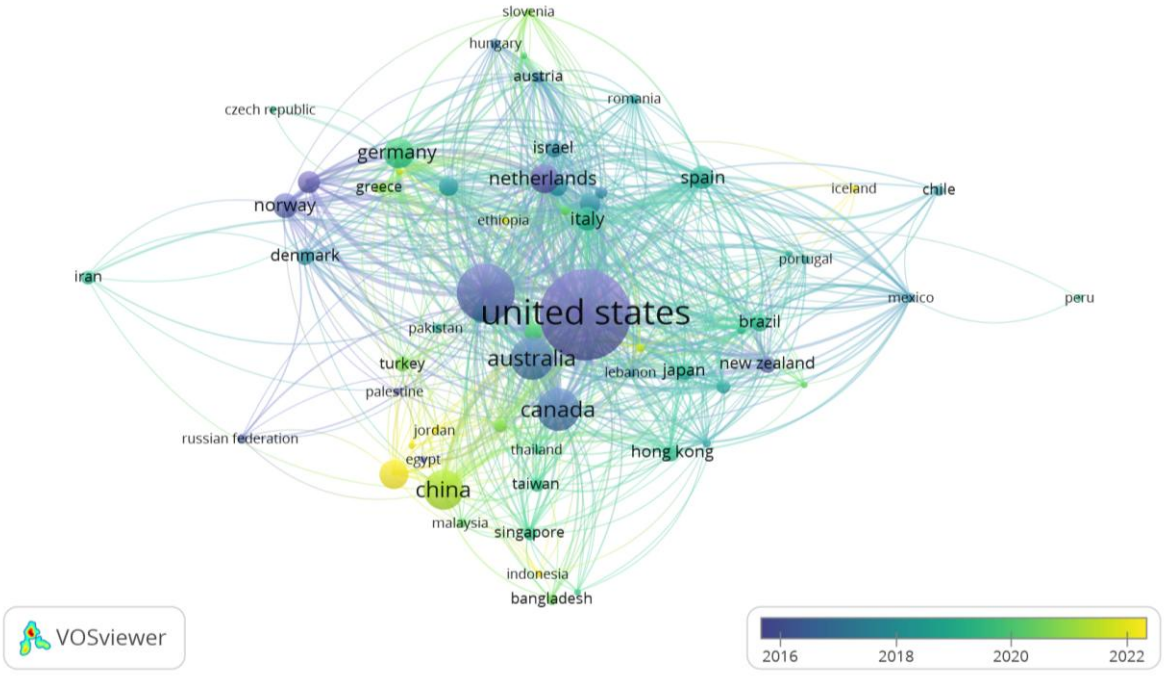

Figure 3(b). Co-authorship of countries in the field of mental health and gaming disorders in children.

Country wise analysis revealed that countries like USA, Australia, Canada are working widely in this field since 2016, whereas Germany, Italy, Brazil, Spain, Hong Kong, and Japan etc, started exploring the mental health and

gaming disorders in children from 2018. Since 2022 China is also doing active researches in this field but India is still lacking. Therefore, this analysis revealed that there is a high need of research in this field in India also.

3.3 Country-Wise Citations and Document Analysis

Figure. 4 shows the year-wise trends since 1980 to till the date of export of dataset. It is observed that the count of publications have been increased significantly in and after year 2019, in this domain whereas maximum citations were received between year 2004-2010. After 2010 there is a rise in documents and citations count in year 2020 which is the year of pandemic, Covid-19.

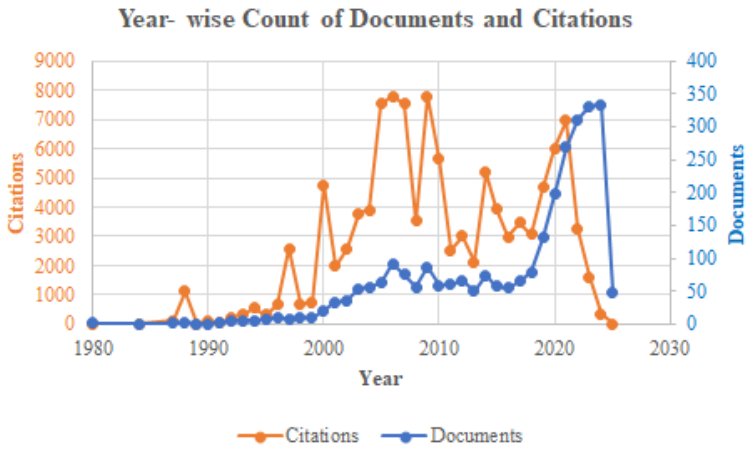

Figure 4. Year-wise count of documents, and citations analysis.

Table 1. represents top ten countries most actively working in the field of artificial intelligence applications in children mental health. United States of America holds the topmost position with 1,122 documents, 61,865 citations, and 611 total link strength. Authors and organizations from other countries shall explore the collaboration in USA, United Kingdom, Canada, and Australia as these countries are the dominant research contributor in this field, this will balance the worldwide research collaboration.

Table 1. Top ten countries with highest count of documents, citations, and link strength

Sr. No.	Country	Documents	Citations	Total Link Strength
1	United States	1122	61865	611
2	United Kingdom	449	25689	543
3	Canada	253	15556	283
4	Australia	242	10965	279
5	Netherlands	121	6936	229
6	China	217	3863	124
7	Italy	79	3818	222
8	Norway	86	3710	137
9	Sweden	56	3344	122
10	New Zealand	42	3066	106

3.4 Bibliographic Coupling of Documents and Citations Analysis

The bibliographic coupling analysis of documents was conducted using minimum 30 citations of a document. Out of 2850 documents, 880 met the threshold for the connected graphical representation Fig. 5. The figure represents that Shaffer D., Fisher P., and Lucas C. appear prominently, suggesting their substantial contributions to the field. These researchers have worked widely in mental health, psychological disorders, and intervention, whereas Lissak G., indicates the focus on issues like screen time and internet use affecting children's physiological and psychological well-being, as his work is often cited in these areas.

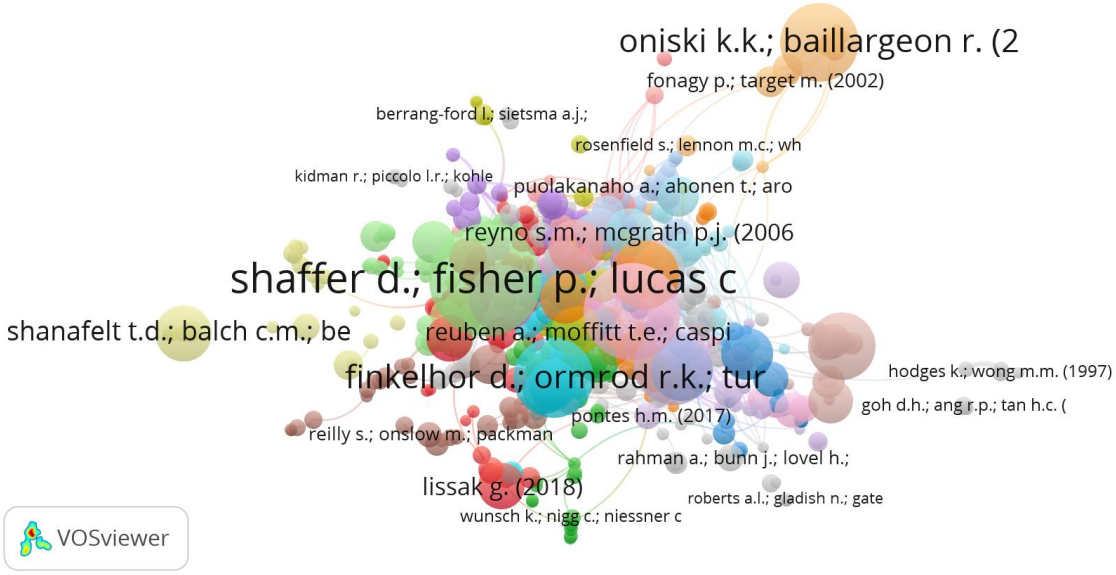

Figure 5. Bibliographic coupling of documents in the field of mental health and gaming disorders in children.

Figure 6(a) and Figure 6(b) represent the graphical representations of highest documents and citations count in a journal using minimum five documents and ten citations per source. Results shows the dominant position of " International journal of environmental research and public health (IJERPH)" with highest count (114) of published documents with 2891 citations, whereas "Journal of Child Psychology and Psychiatry (JCPP)" published 104 documents with highest count of citations (11246).

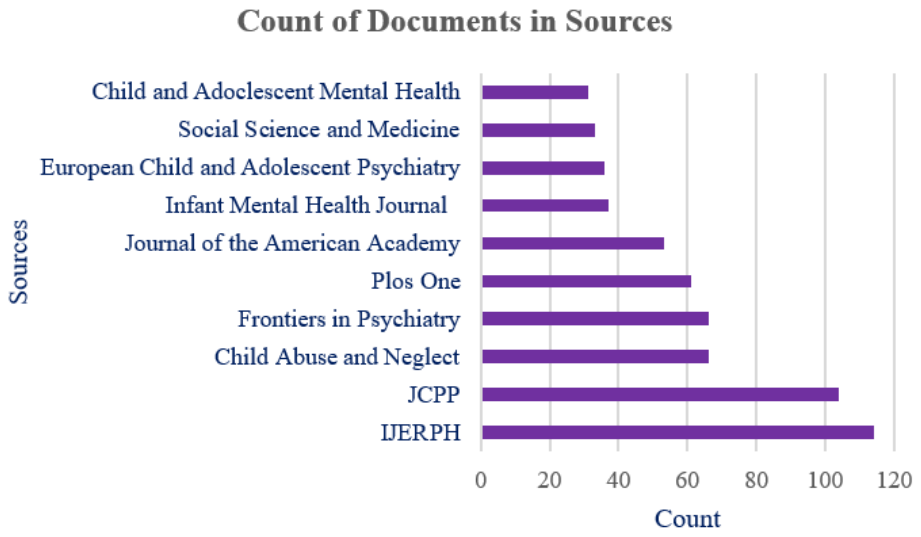

Figure 6(a). Bibliographic coupling of authors in the field of mental health and gaming disorders in children.

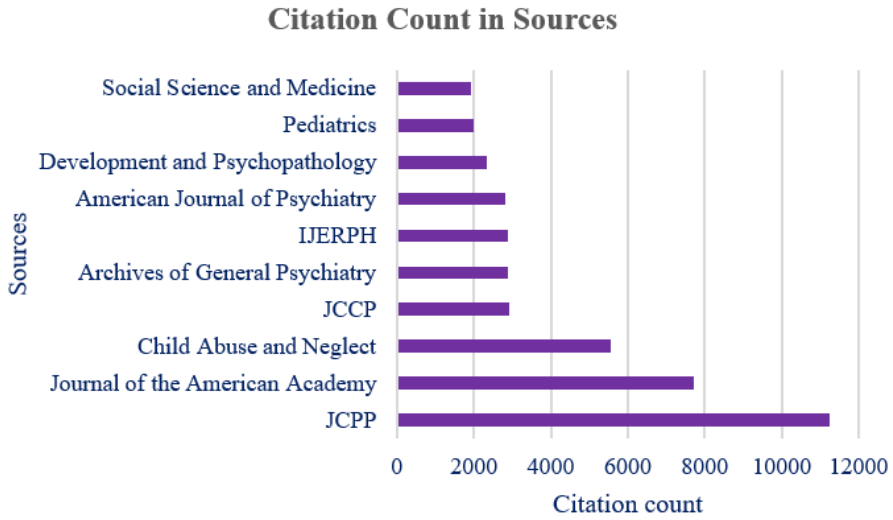

Figure 6(b). Bibliographic coupling of authors in the field of mental health and gaming disorders in children.

3.5 Bibliographic Coupling of Authors Analysis

The bibliographic coupling analysis of authors was conducted using maximum 25 authors per document. Further minimum two documents of an author were selected with minimum thirty citations of an author to get the clear picture of analysis. Out of 2831 authors, 695 met the threshold for the connected graphical representation Fig. 7. David Shaffer achieved highest citations count (2984) , and David Finkelhor holds second position with 2637 citations count.

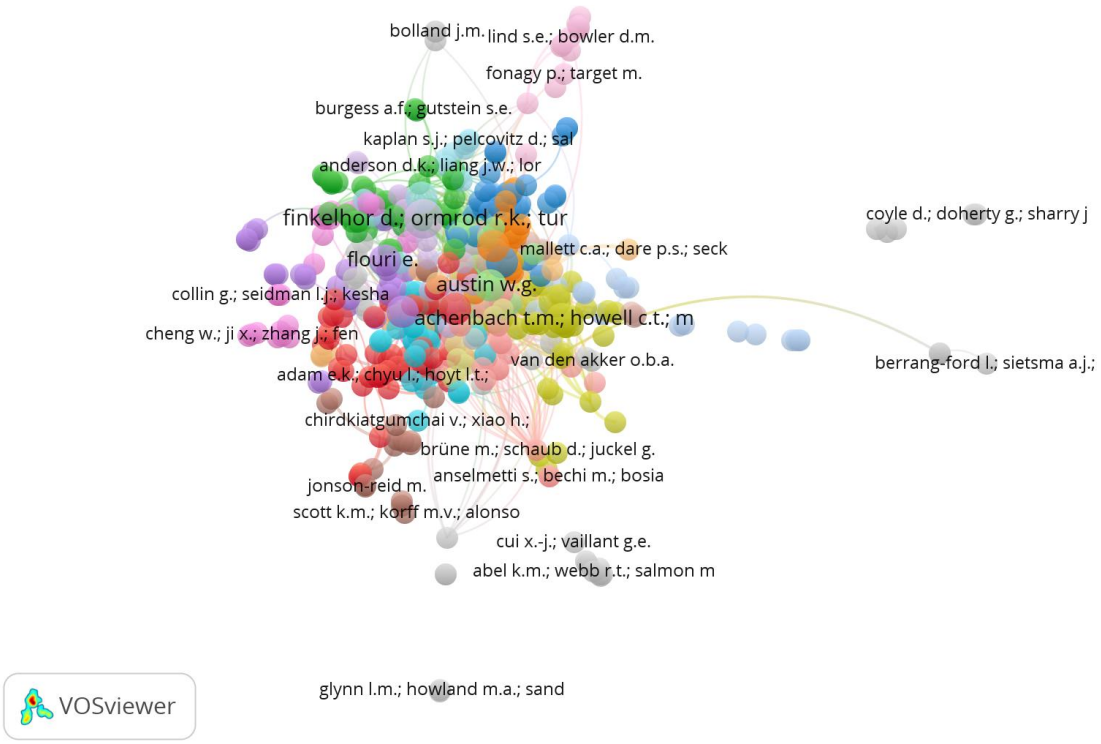

Figure 7. Bibliographic coupling of authors in the field of mental health and gaming disorders in children.

3.6 Bibliographic Coupling of Organization Analysis

The bibliographic coupling analysis of organizations was conducted using minimum three documents and citations per organization, that included 113 organizations out of 9371 in graphical representation Figure 8.

Figure 8. Bibliographic coupling of organizations in the field of mental health and gaming disorders in children.

3.7 Bibliographic Analysis of Themes and Trending Keywords

Bibliographic analysis of themes and trending keywords can be done through keywords relationships. Fig. 9 consist the overlay visualization of trending keywords shown in yellow colour that reveals the research trends in current years. One key trend is the use of artificial intelligence for mental health diagnostics, as evident from strong links between “machine learning”, “deep learning”, and “classification”. Another notable trend is the concern over digital well-being and internet addiction, particularly among youth as indicated by the close connections between “screen time”, “social isolation”, and “mobile phone use”. Machine learning can be utilized to predict gaming

disorders in children as there is no direct connection is observed between these keywords. Additionally, deep learning models can be applied to assess sleep quality, particularly in children with gaming disorders and mental health conditions. Another possible research direction is exploring the impact of screen time and digital addiction on sleep quality, especially in adolescents.

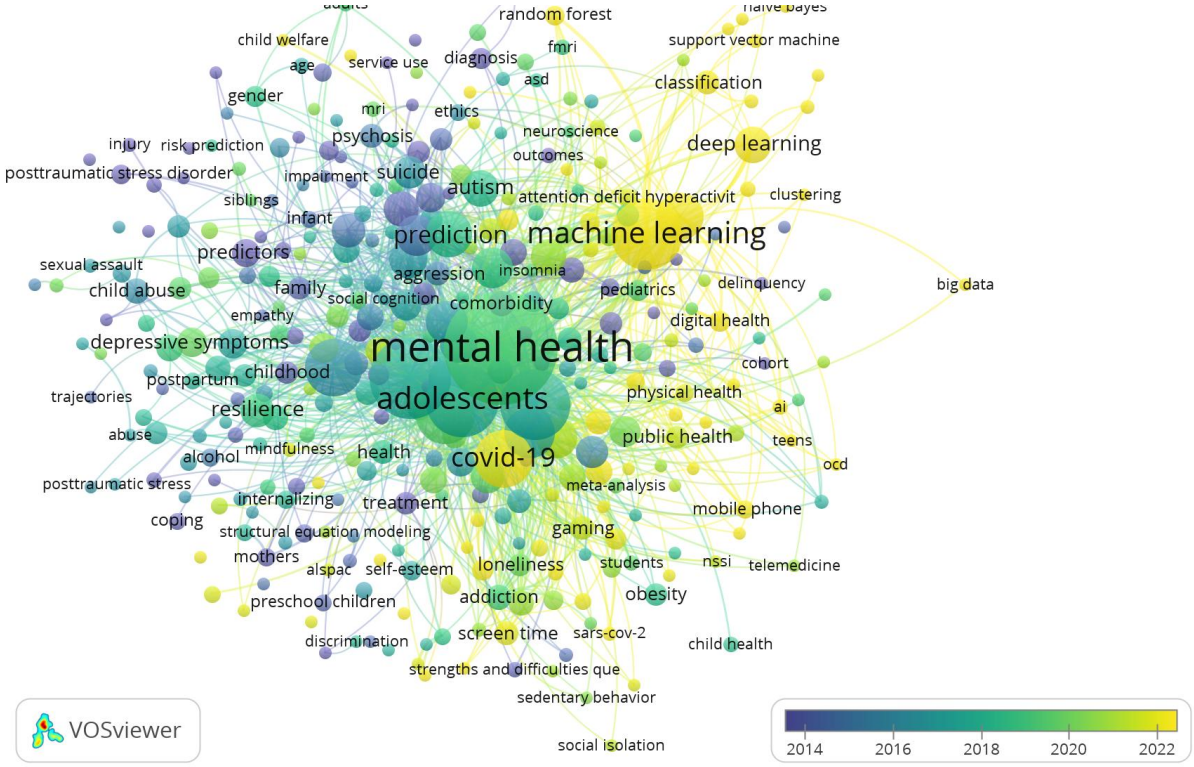

Figure 9. Overlay visualization representing year-wise trends of keywords co-occurrence in the field of mental health and gaming disorders in children.

4. Conclusion

In this research total 2850 publications were extracted from Scopus database using keywords “mental health”, “child”, “adolescence”, “gaming disorders”, “artificial intelligence”, and “machine learning” to conduct bibliometric analysis of author-wise keywords co-occurrence, co-authorship of countries, bibliographic coupling of documents, organizations, and authors to identify which countries, authors, and organizations are working widely in this domain. This analysis underscores the growing intersection of artificial intelligence and children’s mental health research highlighting key themes, leading contributors, and emerging trends. The study identifies that there is a significant rise in publications post-2019, particularly during the COVID-19 pandemic. The study identifies digital well-being, mental health, and online gaming disorders in children as dominant research areas, with the United States as a leading global contributions. Bibliographic coupling analysis revealed that, among all the authors, David Shaffer achieved highest citations count, whereas International Journal of Environmental research and Public Health (IJERPH) has published highest number of documents whereas the Journal of Child Psychology and Psychiatry (JCPP) had the most citations. It is important to note that conclusions drawn from bibliometric analysis are based on the patterns of publication and keyword co-occurrence rather than empirical evidence of causal relationships as in case of “screen time” and “digital addiction” emerge as frequently studied

topics, but bibliometric data alone does not establish that increased screen time predicts digital addiction. Instead, the prominence of these effects is a growing concern within the research community about their potential interrelationship. Future research should build on these topics by conducting empirical studies to examine causal mechanisms between screen time exposure, gaming behaviours, and mental health outcomes in children. Additionally, advanced artificial models could be employed for early detection and prediction of mental health risks, provided they are validated with robust, longitudinal datasets.

Data Availability Statement
Not applicable.

Funding
This work was supported without any funding.

Conflicts of Interest
The author declares no conflicts of interest.

Ethical Approval and Consent to Participate
Not applicable.

References

[1]. Putra, P. Y., Fithriyah, I., & Zahra, Z. (2023). Internet addiction and online gaming disorder in children and adolescents during the COVID-19 pandemic: A systematic review. *Psychiatry Investigation, 20*(3), 196–204.
[2]. Suthar, S. A. (2020). Increasing screen time and gaming impact on children's mental health during the COVID-19 lockdown. *Research Review International Multidisciplinary Journal, 6*(June), 8–13.
[3]. Kuss, D. J., & Griffiths, M. D. (2012). Online gaming addiction in children and adolescents: A review of empirical research. *Journal of Behavioral Addictions, 1*(1), 3–22.
[4]. Guerada, K. (2021). Impact of online games on children's mental health. *Journal La Medihealtico, 2*(1), 13–19.
[5]. Singh, M. (2018). Compulsive digital gaming: An emerging mental health disorder in children. *Indian Journal of Pediatrics, 86*, 171–173.
[6]. Hou, C., et al. (2022). Children's mobile gaming preferences, online risks, and mental health. *PLOS ONE, 17*(12), 1–18.
[7]. Singh, A., Ali, A., Choudhury, M., & Gujar, N. M. (2021). Online gaming and its association with emotional and behavioral problems among adolescents: A study from Northeast India. *Archives of Mental Health, 21*(2), 71–76.
[8]. Shazreen, N., Kamal, Z., & Wok, S. (2020). The impact of online gaming addiction on mental health among IIUM students. *International Journal of Heritage, Art and Multimedia, 3*(11), 1–20.
[9]. Purwaningsih, E., & Nurmala, I. (2021). The impact of online game addiction on adolescent mental health: A systematic review and meta-analysis. *Macedonian Journal of Medical Sciences, 9*(F), 260–274.
[10]. Király, O., Potenza, M. N., & Demetrovics, Z. (2022). Gaming disorder: Current research directions. *Current Opinion in Behavioral Sciences*, 1–7.
[11]. Huang, Y., Wu, R., Huang, Y., Xiang, Y., & Zhou, W. (2024). Investigating the mechanisms of internet gaming disorder and developing intelligent monitoring models using artificial intelligence technologies: Protocol of a prospective cohort study.
[12]. Khoziasheva, A. (2024). Building the neural network-based system for identifying the gaming addiction level in children and adolescents. In *Eurasian business and economics perspectives* (pp. 21–38).
[13]. Mohan, S., Khanagwal, S., & Meena, J. (2024). Effect of online gaming on mental health using machine learning techniques.
[14]. Infanti, A. (2024). *The use of machine learning to improve internet-related disorders*.
[15]. Zhang, Y. (2022). *Screen media use among children and adolescents: Applications of supervised and unsupervised machine learning and sentiment analysis* (Doctoral dissertation).
[16]. Olawade, D. B., Wada, O. Z., Odetayo, A., David-Olawade, A. C., Asaolu, F., & Eberhardt, J. (2024). Enhancing mental health with artificial intelligence: Current trends and future prospects. *Journal of Medicine, Surgery, and Public Health, 3*, 1–10.
[17]. Id, A. E. T., Id, R. C. M., Larsson, H., Lundström, S., Lichtenstein, P., & Kuja-Halkola, R. (2020). Predicting mental health problems in adolescence using machine learning techniques. *PLOS ONE, 15*(4), 1–13.

[18]. Sumathi, M., & Poorna, B. (2016). Prediction of mental health problems among children using machine learning techniques. *International Journal of Advanced Computer Science and Applications, 7*(1), 552–557.
[19]. Hasan, T., Sultana, S., & Sattar, A. (2024). Prediction of Bangladeshi urban children's mental health for the effect of mobile gaming using machine learning. *International Journal of Advanced Science, Engineering and Information Technology, 14*, 859–865.
[20]. Ferreira, F. D. M., et al. (2021). Predictors of gaming disorder in children and adolescents: A school-based study. *Brazilian Journal of Psychiatry, 43*(3), 289–292.
[21]. Jeong, H., Yim, H. W., Lee, S., & Lee, H. K. (2021). Preschool exposure to online games and internet gaming disorder in adolescents: A cohort study. *Frontiers in Pediatrics, 9*, 1–8.
[22]. Passas, I. (2024). Bibliometric analysis: The main steps. *Encyclopedia, 4*(2), 1014–1025.
[23]. Zhang, M. W. B., & Park, S. Y. (2023). A bibliometric analysis of research into internet gaming disorders in Korea.
[24]. Le, H.-B. T. (2024). A bibliometric review of research on internet use disorders since 1996 to 2024.
[25]. Bhukya, A., & Lakshmana, G. (2025). Internet use, internet addiction, and mental health among adult population: A bibliometric analysis. *Journal of Technology in Behavioral Science*.