Southeast Asia Early Childhood Journal, Vol. 15 (1), 2026 (21-29)
ISSN 2289-3156 /eISSN 2550-1763
http://ejournal.upsi.edu.my/index.php/SAECJ

EXPLORING FINE MOTOR SKILLS RESEARCH IN EARLY CHILDHOOD: TRENDS AND PERFORMANCE THROUGH BIBLIOMETRIC ANALYSIS

Uzzairah Nabila Ahmad Tazli[1], Nik Rosila Nik Yaacob[2], Rahmawati, S. Pd. I[3]

Department of Early Childhood Education, Faculty of Human Development, Sultan Idris Education University, 35900 Tanjong Malim, Perak, Malaysia[1]
School of Educational Studies, Universiti Sains Malaysia, 11800 USM, Pulau Pinang[1&2]
Universitas Muhammadiyah, Palu Indonesia[3]

uzzairah@student.usm.my[1], nikrusila@usm.my[2] , fai.unismunpalu@gmail.com[3]

*Corresponding Author
Received: 9 Oct 2025; **Revised:** 11 Sept 2025; **Accepted:** 13 March 2026; **Published:** 15 April 2026

To cite this article (APA): Ahmad Tazli, U. N., Nik Yaacob, N. R., & S. Pd. I, R. (2026). Exploring Fine Motor Skills Research in Early Childhood: Trends and Performance through Bibliometric Analysis. *Southeast Asia Early Childhood Journal*, *15*(1), 20-28. https://doi.org/10.37134/saecj.vol15.1.2.2026

To link to this article: https://doi.org/10.37134/saecj.vol15.1.2.2026

ABSTRACT

Fine motor skills are the skills of using small muscles that children need to master as preparation for school. This skill facilitates the mastery of basic skills since preschool, namely reading, writing, counting, and reasoning. The purpose of this paper is to analyse the scientific production on Fine Motor Skills in journals indexed in Scopus. The data is retrieved from the database between 2020 and 2025. Data collection was conducted in August 2025, which identified 303 related research articles about fine motor skills among early childhood. The results obtained by bibliometric analysis from Scopus database and VOSViewer identify the key trends, influential authors and subject areas regarding fine motor skills in early childhood. These research findings demonstrate a significant rise in publications and citations. The analysis also highlights the United States at the leading country of research output, including articles, publications and citations. The obtained results provide fundamental knowledge into research on fine motor skills among children while addressing potential future research.

Keywords: fine motor, children, bibliometrics, VOSviewer, performance analysis, preschool

INTRODUCTION

The early childhood stage, that representing the first six years, is a critical period for development and rapid growth in children, and they need to be equipped with basic skills before school. One of the basic skills that needs to be present for children's school readiness includes fine motor skills. (Morrison & Hindman, 2012; Rohaty Mohd Majzub & Aimah Abdul Rashid, 2012; Avelar, Hull & Middlemiss, 2023). This is because fine motor skills are closely related to children's cognitive skills (Martzog, Stoeger & Suggate, 2019; Osorio-Valencia, Torres-Sánchez, López-Carrillo, Rothenberg & Lourdes Schnaas, 2018). This skill enables children to manage themselves, solve problems, and make simple decisions.

With the development of these cognitive skills, children will find it easier to master basic preschool skills such as writing, reading, and counting. Previous studies have shown that children's fine motor skills (FMS) influence and predict reading development. (Suggate, Pufke, & Stoeger, 2018; McClelland & Cameron, 2019; Barghandan, Dadgar, Raji, Maroufizadeh, 2023).

This means that these skills are very important for children to develop and engage in formal learning. Various activities involving fine motor skills need to be mastered first to help improve academic skills in children. When children enter school with undeveloped motor skills, they are not yet able to learn academic skills (Escolano-Pérez, Herrero-Nivela, Luis Losada, 2020; Fischer, Suggate, & Stoeger, 2022; Katagiri et al., 2021; McClelland & Cameron, 2019; Rohaty Mohd Majzub & Aimah Abdul Rashid, 2012; Avelar et al., 2023). Therefore, children will face problems in learning at the next level, and intervention needs to be carried out to help children who are experiencing developmental delays.

Therefore, teachers, parents and policymakers need to obtain a thorough grasp of the body of knowledge to identify the existing gap from previous research. This information will provide significant implications for the field of education. Bibliometric analysis thereby acts as an essential methodology. Bibliometrics provides a statistical method that employ a quantitative approach for the description, evaluation and monitoring of published research. These methods can be applied to introduce a systematic and reproducible review process and thus improve the quality while identifying research gaps and opportunities for disciplinary advancement (Bornmann & Daniel, 2008; Alhamzah et. al., 2020; Ahmed Alsharif, Norzafir, Rohaizat, Rami Hashem, 2021). Through the analysis of previous publication patterns, key authors and institutions, and subject area, researchers can chart a knowledge-domain map of fine motor skills research in early childhood. This systematic assessment proves vital for leading future research gaps and priorities, guiding pedagogical implementation.

This bibliometric analysis assesses research development in fine motor skills development among young children within social sciences settings. This study aims to provide comprehensive insights into fine motor skills development and learning in early childhood. The findings offer significant guidance and direction for future research incorporating fine motor skills in early childhood, guided by specific research questions:

i) What are the research trends in children's fine motor studies according to the year of publication?
ii) Who and how much has been published in the area of fine motor skills among early childhood with regard to the authors, their affiliated organisations and countries?
iii) What is the dominant subject area published for fine motor skills in early childhood?

METHODOLOGY

Bibliometric defined as the systematic compilation, organization and analysis of bibliographic information obtained from publications which are scientific in nature (Verbeek et al., 2002). Bibliometric study examining scholarly literature for deeper insights into scholarly activity and performance while underscoring their importance for policy development (Moed, 2005). Given that in scientific research, it is important to obtain a comprehensive overview of existing research related to the subject matter. (Bojović, S.,

Matić, R., Popović, Z. et al., 2019). Besides general descriptive statistics like publishing journals, trend of publications in certain years and authors published in the subject area (Wu and Wu, 2017); bibliometrics can also incorporate complex analytical methods like co-citation anaylis, and bibliographic coupling analysis. Hence, this is a bibliometric study that systematically analyses the existing literature using articles indexed in Scopus databases over 5 years from 2020 to 2025 to provide useful insights and a reference for future research. Research indicates that the Scopus database provides more extensive coverage compared to other databases (Pranckutė, 2021). Furthermore, Scopus is an effective indexed database that is capable of exporting bibliographic data across a range of research domains (Zhu & Liu, 2021). Data collection was conducted in August 2025, where 1152 articles were identified based on predetermined criteria. Multiple methods were employed to analyse the data for the research topic. Certain findings were generated directly from Scopus's integrated search analysis, which archives information in CSV format. Supplementary results obtained from VOSviewer were employed to demonstrate research patterns in fine motor skills in early childhood from 2020 to 2025.

Data Search Strategy

To identify the search phrases for article retrieval, the study used a screening sequence. In order to gather 303 publications from 2020 to 2025, the study was started by querying the Scopus database using the online TITLE-ABS-KEY("fine motor skill*"* OR "fine motor development" OR "fine motor learning" OR "fine motor activity"*). The query string was set to look for articles that focus on children as learners using the search phrases (children* OR preschooler* OR toddler). They were further examined to ensure that only English-language articles were included in the criteria. The search focuses on the fields of social sciences, arts and humanities, and psychology. The final refining of the search was utilised for bibliometric analysis focusing only on the article document type. The final search string are TITLE-ABS-KEY ("fine motor skill*" * OR "fine motor development" OR "fine motor learning" OR "fine motor activity" *) AND (children* OR preschooler* OR toddler) AND PUBYEAR > 2020 AND PUBYEAR < 2025 AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (SUBJAREA, "PSYC") OR LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA , "ARTS")) AND (LIMIT-TO (DOCTYPE, "ar")) As of 2025, the study about fine motor skills that focused on children's development and learning in this area from the Scopus database shows 303 articles.

RESULTS

i) What are the research trends in children's fine motor studies according to the year of publication?

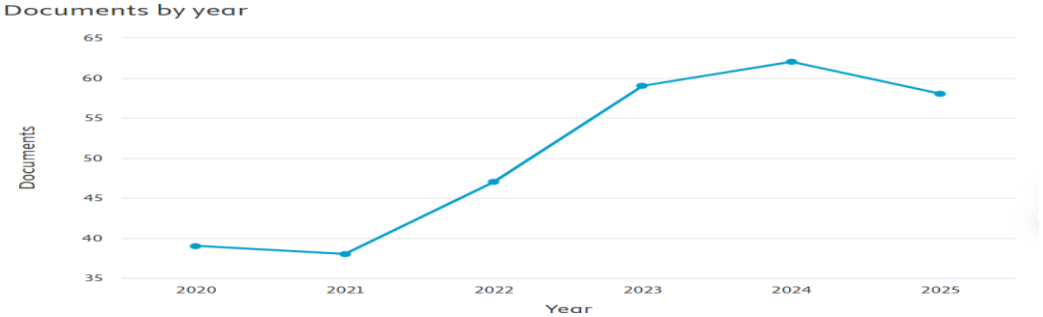

Figure 1: Trend of research in fine motor skills among children by years

Figure 1 shows the overall trajectory from 39 to 58 articles from 2020 to 2025. A total of 303 articles were collected from the Scopus database, which focus on fine motor in early childhood. Between the years 2020 to 2021, publications remained relatively stable but a slight decline occurred in 2021, with publications decreasing to 38 articles from 39 articles in the previous year. The publications in this field experienced a dramatic increase from 2022 onwards, representing 63% increase from the 2021 baseline and reaching a peak of 62 articles in 2024. The number of articles declined to 58 articles in 2025. The analysis suggests that fine motor skills research in early childhood has evolved from specialized niche to a mainstream research area, such as academic readiness, cognitive development and long-term educational outcomes.

i) Who and how much has been published in the area fine motor skills among early childhood with regard to the authors, their affiliated organisations and countries?

By Authors

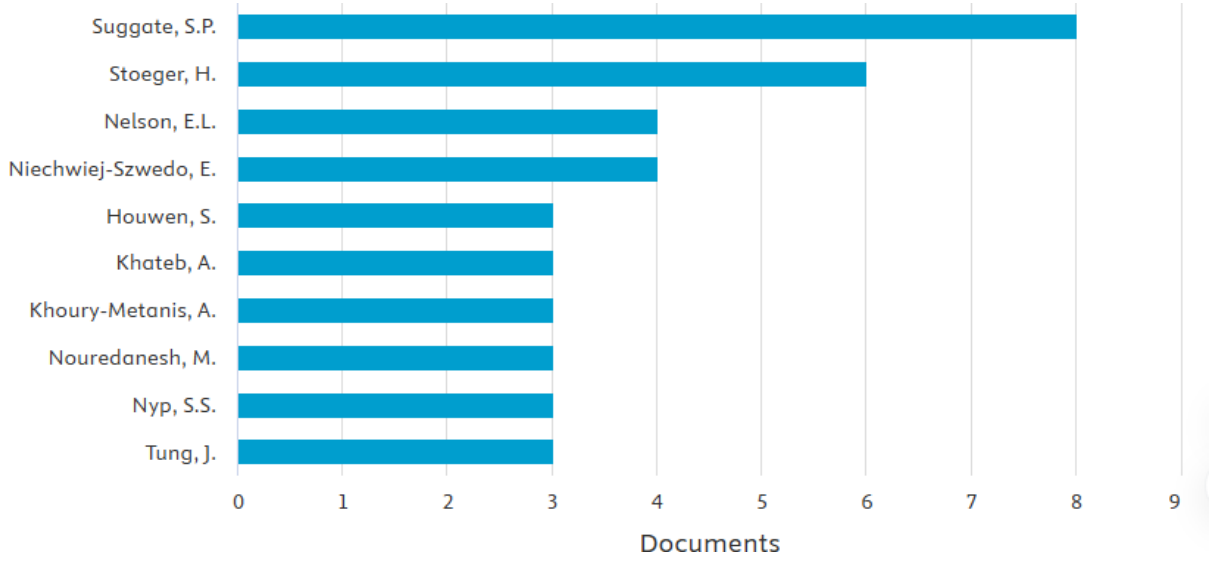

Figure 2: Top authors on fine motor skills among children

Table 1
Number of documents and citations based on author.

Author	Number of documents	Citations
Suggate, S.P.	8	49
Stoeger, H.	6	61
Nelson, E.L.	4	41
Niechwiej-Szwedo, E.	4	41
Houwen, S.	3	15
Khateb, A.	3	17
Khoury-Metanis, A.	3	17
Nouredanesh, M.	3	32
Nyp, S.S.	3	3

continued

Tung, J.	3	32

Figure 2 above reveals highly productive researchers within the fine motor skills in the early childhood domain. The data demonstrate Suggate, S.P. as the most prolific author with eight articles and 49 citations, representing a substantial 13.3% of the top ten authors' collective output in fine motor skills research. Stoeger, H. occupies a prominent position with six articles, followed by two authors, who are Nelson, E.L. and Niechwiej-Szwedo, E., each contributing four articles with 41 citations. The remaining six authors maintain consistent productivity levels with three publications each, which represents 7.5% each of the total articles. The pattern reflects a healthy diversity of perspectives and methodological approaches within the field.

By Institutions

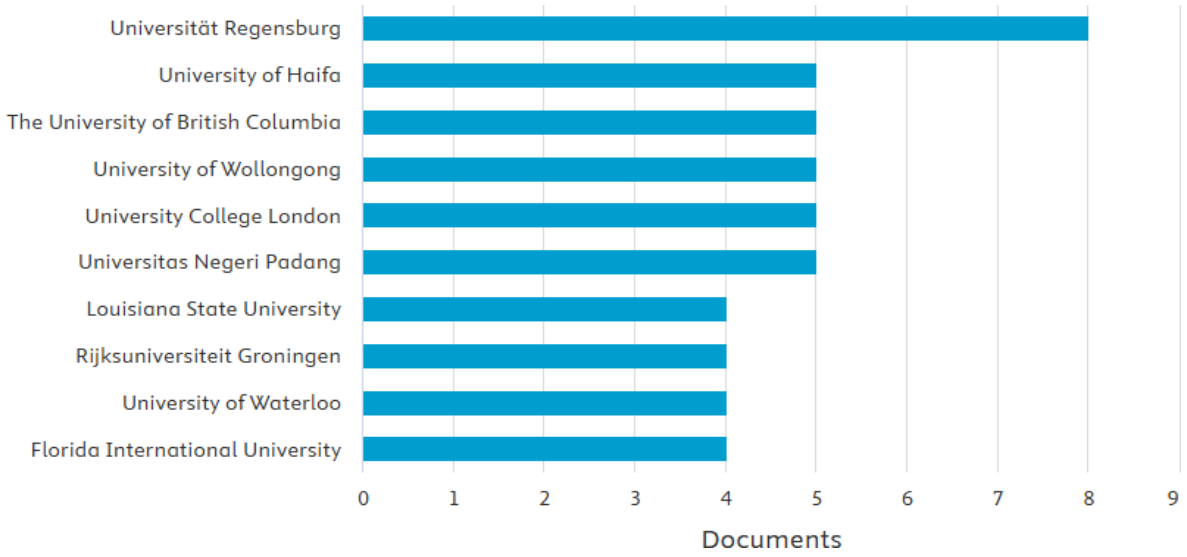

Figure 3: Documents by affiliation

The Universität Regensburg is the primary hub for fine motor research in early childhood, with approximately eight documents, representing 15.1% of the articles published. A notable consistent number of articles includes four institutions, each contributing approximately 5 publications. These are the University of Haifa, The University of British Columbia, the University of Wollongong, University College London and Universitas Negeri Padang. This distribution demonstrates significant international representation, including four continents (Europe, North America, Asia and Oceania), that highlighted the diverse educational and cultural contexts. The Louisiana State University, Rijksuniversiteit Groningen, University of Waterloo and Florida International University each contribute approximately four articles, representing 7.5% for each institution. The pattern reveals the healthy distributed research ecosystem of fine motor skills research.

By Countries

Table 2
Documents by country

Country	Documents	Citations
United States	69	506
United Kingdom	32	284
Germany	25	199
Autsralia	21	112
Canada	17	206
Spain	15	121
Turkey	15	79
China	15	74
Brazil	14	74
Indonesia	14	64

The United States is taking the top spot, contributing approximately 67 publications and 506 citations, which represents 22% of the total output from the top ten countries. The United Kingdom contributed as a secondary research hub for fine motor skills in early childhood, with 32 publications and 248 citations within the past five years. Germany follows with 25 publications and 199 citations. A cluster of countries reveals emerging global interest, with Canada (117), China (15), Spain (15), Turkey (15), Brazil (14) and Indonesia (14) contributing a moderate but significant number of publications. The inclusion of various countries reflects the growing recognition of fine motor skills as a universal developmental concern transcending cultural and economic boundaries, though maintaining a diversifying global research landscape.

i) What is the dominant subject area published for fine motor skills in early childhood?

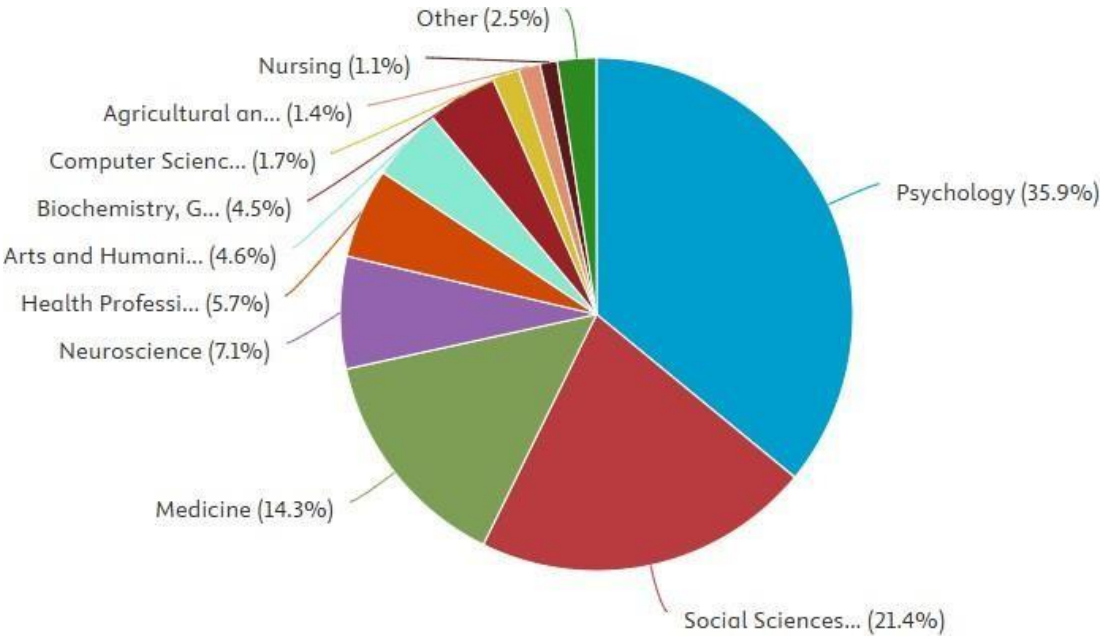

Figure 4: Documents by subject area

Based on the figure above, the research landscape of fine motor skills in early childhood encompasses a multidisciplinary subject area with Psychology emerging as the predominant field, representing 35.9% of the research subject area with 234 publications. This subject area indicates studies in cognitive-motor integration theories, developmental milestones assessment and behavioural interventions in early childhood motor skill acquisition. Social Sciences act as the second major contributor with 139 publications (21.4%), indicating cultural and environmental factors influencing fine motor development. The medical sciences contribute through Medicine with 93 publications (14.3%) and Health Professions with 37 publications (5.7%), reflecting the research in pediatric assessment, occupational therapy and therapeutic interventions. Neurosciences contribute 7.1% with 46 publications indicates growing number of research on brain activity and fine motor skills development. The interdisciplinary subject, including Art and Humanities (30 publications, 4.6%), while Biochemistry, Genetics and Molecular Biology (29 publications, 4.5%) likely encompasses biological perspectives on motor skill acquisition.

The presence of Computer Science (11 publications) suggests innovative technological applications in assessment and intervention methodologies. The smaller but notable contributions from Agricultural and Biological Sciences and nursing demonstrate multidisciplinary research in fine motor skills. These subject area suggests future directions in fine motor skills research in early childhood.

DISCUSSION AND IMPLICATION

The observed trajectory from 2020 to 2025 demonstrates a bustantial paradigmatic shift that suggests that fine motor skills research has transcended its traditional boundaries and emerged as a fundamental pillar within contemporary educational discourse. The emerging contributions from various countries signify the internationalisation of fine motor skills research, potentially driven by growing awareness of early childhood development within the educational systems. The finding reveals a sophisticated interdisciplinary landscape of fine motor skills research that involves early childhood. Social Sciences (21.4%) underscores growing recognition of environmental, cultural, and socio-economic factors influencing motor skill acquisition trajectories.

The results of this bibliometric analysis, highlighting the importance of fine motor skills development for early childhood, reflect the research community's recognition of fine motor skills as a critical predictor of scholastic success, cognitive development Martzog, Stoeger & Suggate, 2019; Osorio-Valencia et al., 2018) particularly as a foundation for literacy (Suggate, Pufke, & Stoeger, 2018; McClelland & Cameron, 2019; Barghandan, Dadgar, Raji, Maroufizadeh, 2023) and numeracy acquisition (Fischer et al., 2022). To ensure that fine motor skills can provide children with a strong foundation for learning, adult guidance serves as a crucial experience that influences their development (Bennison, 2015; Suggate, Stoeger, & Pufke, 2018), including the active involvement of parents in their developmental process.

This research has significant implications for educational policy, which suggests that policymakers should prioritise fine motor skills development within early childhood curriculum frameworks. In line with this, Malaysia's PERMATA curriculum is specifically designed for children under age four, recognising this type of development as key areas that are crucial for holistic development.

This curriculum strongly emphasise on physical development, including listing out milestones and activities to help develop children's fine motor skills and gross motor skills.

CONCLUSION

This research employs bibliometric analysis which is important to provide fundamental information for future research. This study suggests that subsequent research should specifically explore fine motor skills development in early childhood education. Future research should focus on developing assessments and instruments, as well as designing technology-enhanced intervention. In addition, the exploration of how fine motor skills develop at diverse educational contexts are crucial for future research and practice. This ensures that research conducted are align with the needs of children, teachers, families and communities. This bibliometric analysis indicates that research on children's fine motor skills will increasing across various discipline. It is expected that emerging technologies and exploring relationship with various type of development will contribute further to the literature. Future collaborative initiatives should prioritise knowledge transfer through increased interdisciplinary integration. This will ensure that fine motor skills in early childhood research benefits from diverse cultural perspectives and methodological approaches.

REFERENCES

A. Alsharif, A. H., Salleh, N. Z., Baharun, R., Hashem E, "Neuromarketing research in the last five years : A bibliometric analysis," Cogent Bus. Manag., vol. 8, no. 1, p. 1978620, 2021, doi: 10.1080/23311975.2021.1978620. A. F. Abbas, A. B. Jusoh, A. Masod, and J. Ali, "Market Maven and Mavenism: A Bibliometrics Analysis using Scopus Database," Int. J. Manag. Vol., vol. 11, no. 11, pp. 31–45, 2020, doi: 10.34218/IJM.11.11.2020.004. Avelar, D., Hull, D., & Middlemiss, W. (2023). Children's pre-academic school readiness and home learning activities: a moderated-mediation analysis of home visiting. Frontiers in Psychology, 14.https://doi.org/10.3389/fpsyg.2023.1245893

Barghandan, R., Dadgar, H., Raji, P., & Maroufizadeh, S. (2023). The Role Of Fine Motor Abilities In Reading Components: A Cross-Sectional Study In Children With And Without Dyslexia. Iranian Journal of Child Neurology, 17(4), 23–33. https://doi.org/10.22037/ijcn.v17i4.38710

Bennison, A. (2015). Identity as an embedder-of-numeracy: a cross case analysis of four teachers. In K. Beswick, T. Muir, & J. Wells (Eds.), Psychology of Mathematics Education: PME 39 (Vol. 2, pp. 105–112). PME. https://espace.library.uq.edu.au/view/UQ:365338

Escolano-Pérez, E., Herrero-Nivela, M. L., & Losada, J. L. (2020). Association Between Preschoolers' Specific Fine (But Not Gross) Motor Skills and Later Academic Competencies: Educational Implications. Frontiers in Psychology, 11. https://doi.org/10.3389/fpsyg.2020.01044

Fischer, U., Suggate, S. P., & Stoeger, H. (2022). Fine motor skills and finger gnosia contribute to preschool children's numerical competencies. Acta Psychologica, 226. https://doi.org/10.1016/j.actpsy.2022.103576

H. F. Moed, Citation Analysis in Research Evaluation, vol. 9, Springer, 2005, p. 348.

Hindman, A. H., & Morrison, F. J. (2012). Differential contributions of three parenting dimensions to preschool literacy and social skills in a middle-income sample. MerrillPalmer Quarterly, 58(2), 191–223. https://doi.org/10.1353/mpq.2012.0012

I. Zupic and T. Čater, "Bibliometric methods in management and organization," Organizational Research Methods, vol. 8, no. 3, 2015.

J. Zhu and W. Liu, "A tale of two databases: The use of Web of Science and Scopus in academic papers," Scientometrics, vol. 123, no. 1, pp. 321–335, (2020), doi: 10.1007/s11192-020-03387-8.

L. Bornmann and H. D. Daniel, What do citation counts measure? A review of studies on citing behavior, vol. 64, no. 1. 2008.

Majzub, R. M., & Rashid, A. A. (2012). School Readiness Among Preschool Children. Procedia - Social and Behavioral Sciences, 46, 3524–3529. https://doi.org/10.1016/j.sbspro.2012.06.098

Martzog, P. (2015). Feinmotorische Fertigkeiten und kognitive Fähigkeiten bei Kindern im Vorschulalter [Fine motor skills and cogntive development in preschool children] (1st ed.). Marburg: Tectum.

Martzog, P., Stoeger, H., & Suggate, S. (2019). Relations between Preschool Children's Fine Motor Skills and General Cognitive Abilities. Journal of Cognition and Development, 20(4), 443–465. https://doi.org/10.1080/15248372.2019.160786

McClelland, M. M., & Cameron, C. E. (2019). Developing together: The role of executive function and motor skills in children's early academic lives. In Early Childhood Research Quarterly (Vol. 46, pp. 142–151). Elsevier Ltd. https://doi.org/10.1016/j.ecresq.2018.03.014

Osorio-Valencia, E., Torres-Sánchez, L., López-Carrillo, L., Rothenberg, S. J., & Schnaas, L. (2018). Early motor development and cognitive abilities among Mexican preschoolers. In 144 Child Neuropsychology (Vol. 24, Issue 8, pp. 1015–1025). Routledge. https://doi.org/10.1080/09297049.2017.1354979

Pranckutė, R. (2021). Web of Science (WoS) and Scopus: The Titans of Bibliographic Information in Today's Academic World. *Publications*, *9*(1), 12. https://doi.org/10.3390/publications9010012

S. M. R. P. Z. E. A. Bojović, "An overview of forestry journals in the period 2006–2010 as basis for ascertaining research trends," Scientometrics, vol. 8, pp. 1331–1346, 2014.

Suggate, S., Pufke, E., and Stoeger, H. (2018). Do fine motor skills contribute to early reading development? J. Res. Read. 41, 1–19. doi: 10.1111/1467-9817.12081

Suggate, S. P., Pufke, E., & Stoeger, H.. (2019). Children's fine motor skills in kindergarten predict reading in grade 1. Early Childhood Research Quarterly, 47, 248-258 https://doi.org/10.1016/j.ecresq.2018.12.015.

Verbeek, A., Debackere, K., Luwel, M. and Zimmermann, E. (2002), "Measuring progress and evolution in science and technology – I: the multiple uses of bibliometric indicators", International Journal of Management Reviews, Vol. 4 No. 2, pp. 179-211.

Wu, Y.C.J. and Wu, T. (2017), "A decade of entrepreneurship education in the Asia Pacific for future directions in theory and practice", Management Decision, Vol. 55 No. 7, pp. 1333-1350.