ELEKTROTEHNIŠKI VESTNIK 92(3): 77–85, 2025
OVERVIEW SCIENTIFIC PAPER

Scientific Landscape of Inclusive Knowledge Management Processes in STEM Education: A Clustering Approach

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Abstract. Education is one of the fundamental societal values. Therefore, it is crucial that every student, including those with learning difficulties and disabilities, has access to quality education. This paper aims to provide a comprehensive visual overview of scientific publications focused on inclusivity in STEM education. A total of N = 1263 records were retrieved from the Scopus academic database on 16 July 2024. Data were analyzed using VOSviewer software, employing bibliometric mapping techniques such as co-occurrence and co-citation analysis. The co-occurrence analysis (all keywords) revealed seven distinct clusters, while the co-citation analysis (journal publications) identified four. Our approach uses both quantitative and qualitative methods and is also applicable to other areas.

Keywords: text mining, clustering approach, teaching, learning, inclusion, bibliometric analysis

Znanstvena krajina vključujočih procesov upravljanja znanja na področju STEM izobraževanja: pristop na podlagi gručenja

Izobraževanje je ena izmed temeljnih družbenih vrednot, zato je ključnega pomena, da ima vsak učenec, vključno s tistimi ki imajo učne težave ali so drugače omejeni, dostop do kakovostnega izobraževanja. Namen tega prispevka je podati vizualni pregled znanstvenih publikacij, osredotočenih na inkluzivnost v STEM izobraževanju. Iz akademske baze podatkov Scopus je 16. julija 2024 bilo pridobljenih 1263 zapisov. Podatki so bili analizirani z uporabo programske opreme VOSviewer, ki uporablja bibliometrične tehnike, kot sta analiza pojavnosti ključnih besed in citiranosti. Analiza ključnih besed je razkrila sedem različnih gruč, medtem ko je analiza citiranja (znanstvene revije) identificirala štiri. Naš pristop uporablja tako kvantitativne kot kvalitativne metode in je prav tako uporaben tudi na drugih področjih.
Ključne besede: tekstovno rudarjenje, gručenje, poučevanje, učenje, inkluzivnost, bibliometrična analiza

Received 9 September 2024
Accepted 22 April 2025

1 INTRODUCTION

STEM is an abbreviation for science, technology, engineering, and mathematics [21]. Moreover, according to Leporini and Buzzi [18], STEM is a key catalyst in a growing economy. Therefore, it is important to make it accessible to the entire student population - also for those with disabilities. While inclusivity is often associated with providing broad access to education, the term encompasses much more. Inclusivity is not limited to accommodating students with disabilities; it asserts that all educational institutions should strive to create optimal learning environments for every student, regardless of their abilities or disabilities [28]. Nevertheless, there is evidence that the dropout rate can be higher for people with disabilities [27]. Therefore, it is important to pay more attention to this issue.

In the framework of this paper, we focus on the subject of inclusive knowledge management process in the field of STEM. The knowledge management process should be an integrated process that involves the interaction between information technology (IT), people, and techniques to utilize knowledge effectively [29]. In this paper, we use the term knowledge management process, as we want to emphasize that learning is essentially acquiring/giving/organizing/sharing etc. knowledge. Therefore, it is not a one-time event but a process that may last for a long period of time. The research objectives of the study are as follows:

- To provide an overview of the scientific landscape concerning inclusive knowledge management in STEM education (main topics).
- To analyze bibliometric networks to identify influential topics and journals.
- To develop a comprehensive understanding of the impact of technology on inclusive STEM education by integrating qualitative insights and quantitative data to identify key implications that can inform future inclusion educational practices.

The remainder of this paper is structured as follows. Following this introduction (Section 1), we present a literature review (Section 2) on inclusivity and bibliometric analysis in the field of STEM. In Section 3, we describe the steps of the approach and the methods used. Section 4 describes the results and discusses them, while Section 5 draws the key conclusions and provides future research directions and some limitations.

2 Related Works and Background

In the existing literature, several papers that refer to inclusivity in STEM can be found. For example, Sahara et al. [8] dealt with the possibility of supporting deaf students in elementary school, where the key is understanding the special needs of these students. Guralp, McHugh and Hayes [9] researched informal science learning/teaching in socio-economically deprived areas. Savonen et al. [10] provide guidelines for inclusive classrooms where they point out that it is necessary to create a pleasant working environment (e.g., use of interactive quizzes, curriculum testing for color vision compatibility with tools such as ColorOracle*, use of inclusive language as not everyone necessarily knows the basics in STEM, etc.). Ramirez-Montoya et al. [11] mention that open education can enhance inclusive education, helping achieve international goals such as the United Nations' Sustainable Development Goals specified in the 2030 Agenda. Lilly et al. [12] address teachers' challenges in implementing Next Generation Science Standards † in STEM when dealing with both general education classes and inclusive classes. Bertram and Rolka [14] are engaged in inclusive mathematics education. They point out that a typical school with an inclusive setting creates heterogeneous groups in the classroom, so it is typically necessary to take care of differentiation to improve education for all students.

In this research, bibliometric analysis was used, which has many advantages in analyzing large quantities of bibliometric data. Donthu et al. [20] mention that bibliometric analysis is suitable for analyzing large quantities of bibliometric data, i.e. when dealing with a broad-scope review. Bibliometric analysis with the VOSviewer software tool has been used several times to analyze the field of STEM education. Gil-Domenech et al. [21] conducted a co-citation analysis of journals among STEM publications. They also researched the most productive institutions that publish research in the field. In doing so, they analyzed the resources indexed in the Web of Science academic database. In addition, it is possible to find many publications that analyze the STEM field over a certain period. For example, Thu et al. [22] analyzed STEM education research in middle school over a period of time (in 2000 – 2020). Similarly, Zhan et al. [23] analyzed STEM education publications indexed in the Web of Science database in 2004 – 2021. Hsu et al. [24] analyzed hot topics in STEM education in 2011 – 2020. Hernandez-Torrano et al. [30] provide a bibliometric analysis of the literature regarding inclusive education in the years 1994 – 2019.

In the past, bibliometric analysis was also applied to gain insight into the knowledge management process. For example, Mufutumari [25] provided a bibliometric analysis of articles on the knowledge management process in higher education, namely in the years from 2019 to 2024. Their results showed that knowledge management process terminology is not widely used in the existing literature on knowledge management in higher education institutions. Haque et al. [26] analyze the literature on knowledge sharing and student development. Their study demonstrated how the relationship between knowledge sharing and student development has evolved and how it may influence student performance. However, bibliometric analysis for the inclusive knowledge management process in the context of STEM education, at least according to our knowledge, cannot be tracked. In addition, the studies mentioned above mostly use a quantitative approach.

3 Methodology

A mixed-methods approach was employed to comprehensively address the research objectives, integrating qualitative and quantitative steps. This approach allows for analysis, leveraging the strengths of both qualitative insights and quantitative rigor. Mixed-method research integrates both qualitative and quantitative approaches, either iterative or concurrently, to produce a research outcome that is more robust than using either method alone [2]. Figure 1 shows the individual steps of conducting our research.

* https://colororacle.org/

† https://www.nextgenscience.org/

Note, that the approach provided here is a novel methodology developed as part of this research. The approach is divided into a qualitative (grey color) and a quantitative part (blue color). Moreover, in Figure 1, E stands for search engine (in our case, it was the Scopus academic database), and S stands for software (in our case, we used VOSviewer software). The approach can also be applied with the help of other academic databases (search engines) and software.

The Approach (Figure 1) consists of ten steps, which can be briefly summarized as follows:

- **Definition**: reach a consensus regarding the research scope and query that will be used for the literature search.
- **Source mining**: reach consensus on the use of academic databases for literature search.
- **Final set of literature**: download full bibliometric data to get a dataset in a data format suitable for analysis (depending on the software).
- **Clustering**: identify suitable attributes or methods and conduct clustering. This method is exploratory and requires several iterations.
- **Visualization**: analyze different solutions in the clustering framework.
- **Mapping**: choose the most suitable visualization and report the appropriate type.
- **Explanation**: describe the individual clusters and add descriptions of the methods used (such as parameters, number of attributes, etc.).
- **Statistics**: extract more detailed statistics not visible on cluster visualizations (such as all items in a certain cluster, occurrence of keywords, etc.).
- **Sandpit**: integrate findings from the sandpit to literature analysis solutions using clustering. *Sandpit* is a term used in the European project (Global Entrepreneurial Talent Management 4, GETM4) and represents co-creative workshops where participants exchange views, knowledge, experiences, etc. on predefined topics.
- **Implications**: provide practical and theoretical implications (if possible) and guidelines for further work.

In this study, we decided to use the *Scopus* academic database because it includes multidisciplinary scientific literature and provides more coverage than the *Web of Science* academic database [1]. In addition, it should be noted that all the main metadata (e.g., citation information, bibliographical information, abstract & keywords, funding details, and other information) had to be exported for the analysis using *VOSviewer* software. *VOSviewer* software version 1.6.30 [3] was used to analyze these data. *VOSviewer* enables the visualization of bibliometric data from scientific databases and, in this way, provides an insight into the comprehensive picture of the scientific landscape of the researched field. In addition, the added value of using VOSviewer concerning the analysis of bibliometric data is the visual perception of the results and insight into possible connections between sources/authors/keywords, etc. [4]. Namely, the acronym VOS denotes "*visualization of similarities*" [5].

To obtain the broadest overview of inclusive teaching in STEM, the following query to search for scientific publications in the *Scopus* academic database is used:

```
(ALL("teaching␣approach" OR
"teaching␣approaches" OR
"knowledge␣management") AND
ALL(inclusivity OR
inclusion OR inclusive) AND
ALL("STEM"))
```

Based on this query results ($N = 1263$), two methods were used to analyze the final data, namely (1) journal co-citation analysis and (2) keyword co-occurrence analysis. The methodology of the mapping technique is described in more detail by van Eck and Waltman [5], but the two methods can be briefly interpreted as follows:

- **Co-citation** method (unit of analysis = cited sources) was used to identify the most influential scientific journals. As a unit of analysis, instead of all keywords, is it possible to include only author keywords or index keywords. In addition, we also wanted to gain insight into the dynamics of citations between journals. Sources with at least 100 citations were included in the unit of analysis. Co-citation of cited sources (unit of analysis) shows the relatedness of items based on the number of times they are cited together. This co-citation map is built on co-citation links. co-citation link is a link between two items that are both cited by the same document [3].
- **Co-occurrence** method (unit of analysis = all keywords) was used to identify the most frequently used keywords in scientific publications and to identify how keywords relate to each other. Sources whose keywords appear at least five times were included in the unit of analysis. The relatedness of keywords is determined based on the number of documents in which they occur together [3] for a given dataset.

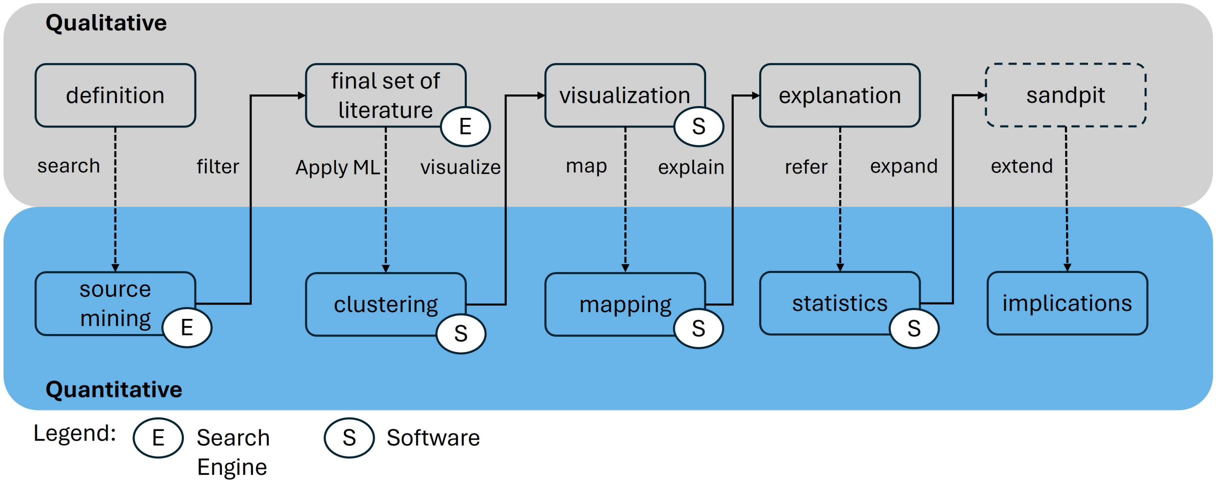

Figure 1. An approach showing the individual steps of conducting our research. The approach is divided into a qualitative (grey color) and a quantitative part (blue color).

4 Results and Discussion

The used query in the *Scopus* academic database returned $N = 1263$ results (sources). The search was conducted on 16.07.2024. However, for the co-occurrence analysis, only 256 keywords met the threshold (i.e., min. number of occurrences of a keyword = 5). Figure 2 is the result of this analysis and shows a bibliometric analysis of the co-occurrence keywords where seven clusters can be seen. To achieve this result, several iterations of mapping or clustering were conducted. Due to the interdisciplinarity of the topic, it is difficult to determine the content of the clusters (based on keyword mapping). Therefore, based on intuition, we selected a map that is sufficiently homogeneous in general, and the clusters are sufficiently heterogeneous. The dataset, additional images and tables with journal citation counts and keyword occurrence can be found here: https://github.com/M16Nebula/Inclusivity-in-STEM.

Each of the clusters is presented in a different color and can be described as follows, from largest to smallest cluster [$C_{KR} > C_{KG} > C_{KB} > C_{KY} > C_{KV} > C_{KT} > C_{KO}$] (numbers in brackets represents keyword occurrence):

The Red cluster (C_{KR}) contains 65 keywords, with "higher education" (59), "innovation" (29) and "sustainability" (26) appearing most often. In C_{KR}, some other terms that can be interesting from the point of view of inclusivity in STEM can be observed, such as leadership (16), creativity (13), entrepreneurship (8), industry 4.0 (8), etc. Ahmad et al. [7] state that with the help of technologies used in Industry 4.0, it makes sense to adapt education according to different student profiles (e.g., different motivations, disabilities, cultural environments, etc.). In this context, they list several supporting technologies such as blockchain (for record of students accomplishments), AI (for establishing intelligent tutoring systems), augmented reality (for people with autism spectrum), etc., to name just a few. Savonen et al. [10] mention that inclusivity improves innovation in data science. Moreover, innovation also means striving for continuous improvement, as changes occur yearly and new educational challenges and opportunities arise with this [13].

The Green cluster (C_{KG}) consists of 57 keywords. The keywords "students" (142), "engineering education" (73), and "knowledge management" (60) appear most often. The terms curricula (52), artificial intelligence (37), computer aided instructions (30), and gamification (10) are also worth mentioning. Mann et al. [6] mention that curricula should be adapted to the needs of students. In this context, it is desirable that the curriculum be revised and that the students' voices be considered. In this case, it makes sense to use peer review because, in this way, it is possible to encourage collegial discussions and improve inclusivity. In addition, it is desirable to use the so-called "smart education approaches" meaningfully, taking advantage of the possibilities offered by technology [15].

The Blue cluster (C_{KB}) contains 54 keywords, with "education computing" (42), "stem" (33) and "science education" (29) being the most frequently mentioned. Other notable keywords include: "equity" (22), "professional development" (15), "personnel training" (13), and "differentiated instructions" (7).

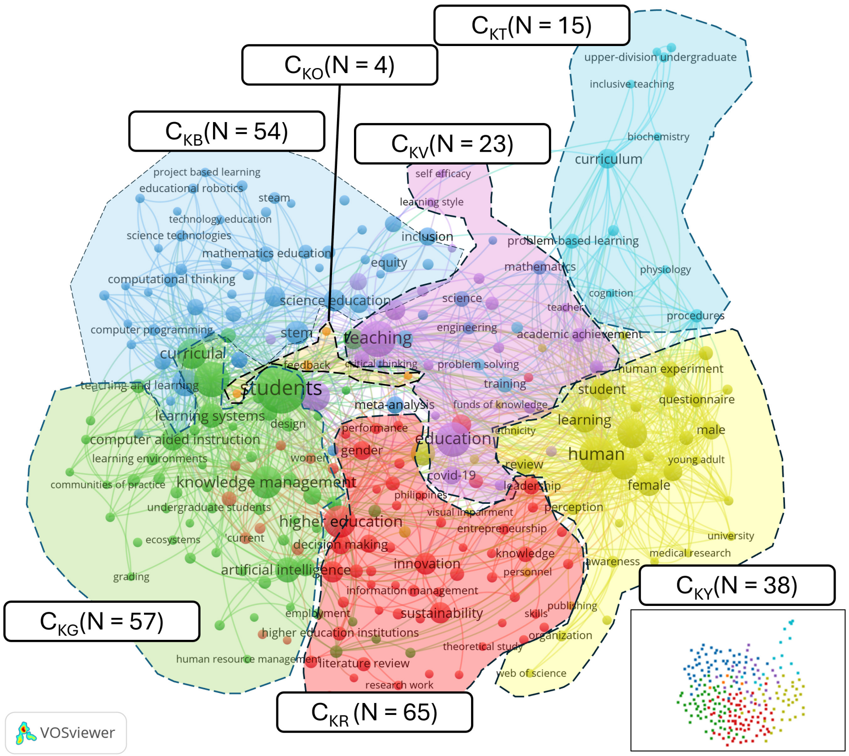

Figure 2. Bibliometric analysis of the co-occurrence keywords in selected publications. The shorter the distance between two nodes, the larger the co-occurrences of the two keywords. Note: N = the number of items in a particular cluster, C = cluster, K = Keyword, letters next to "K" represent colors: B (blue), G (green), O (orange), R (red), Y (yellow), T (turquoise), and V (violet).

There are many challenges when teaching STEM in inclusive classrooms, as the teams are typically mixed (i.e. students with/without disabilities) [12], requiring special support and teacher training.

The Yellow cluster (C_{KY}) includes 38 keywords. Generally, they are related to so-called human aspects. The most frequently mentioned keywords are "human" and "humans" (total N = 124). Additional keywords that we want to mention are: "adult" (22), perception (13), and visual impairment (5). Typically, the population of higher education is diverse, which means that it is necessary to ensure that all students can reach their potential. In the context of inclusivity, especially those with specific learning difficulties [17]. Visual impairment is only one of the disabilities that can cause students learning difficulties. Leporini ad Buzzi [18] mention a few software tools that help the blind in learning mathematics, such as Lambda* and MathSpeak†. Other forms of learning disabilities in STEM include but are not limited to: hearing loss, learning difficulties (such as dyslexia, dyscalculia, etc.) [18], etc. In general, it is necessary to pay attention to each person individually. Students with learning difficulties perceive the course of lectures differently than those with no disclosed learning difficulties [17].

The Violet cluster (C_{KV}) contains keywords generally associated with learning. The most frequently mentioned keywords are: "teaching" (74), "education" (68), and "e-learning" (55). Other terms that are in the cluster and that would be interesting are: "blended learning" (18), "academic achievement" (13), and "learning style" (6). Audette et al. [13] define the term "*culture of care*", stating that the educational process should be carried out in such a way as to support each other since a particularly big challenge in STEM courses is that they are typically taught in large lecture courses - which can negatively affect academic performance and retention. Additionally, they state that it is possible to achieve a community that cares through employee training. Also, within the framework of Sandpit, which took place in South Korea, the focus was on dyslexia as one of the forms of learning difficulties. Preliminary guidelines were drawn up for how processes and materials should be adapted for such students (e.g., instructions for

*https://www.lambdaproject.org/
†https://www.seewritehear.com/accessible-mathml/mathspeak/

the slide composition of, organization of the virtual learning environment, etc.). In addition, in practice, other examples from the industry can be found that provide instructions for the development of so-called inclusive graphical interfaces, such as Apple[‡], IBM[§], SAP[¶], etc.

In the **Turquoise cluster** (C_{KB}), there are 15 keywords in total. The most frequently mentioned keywords are ”curriculum” (24), ”flipped classroom” (16), and ”training” (15). Terms like ”problem-based learning” (14) and ”procedures” (11) are also worth noting. Training regarding technological accessibility (i.e., technology must be accessible) is also mentioned by Ramirez-Montoya et al. [11] and states that open and distance education through technological solutions can help people with disabilities overcome educational barriers. The discussion within Sandpit also showed that it makes sense to educate teachers about various aspects of learning difficulties. As part of this, guidelines were also created for assessing such students (e.g., students with dyslexia are not penalized for spelling, and teachers should avoid similar-looking letters on exams such as ”p” or ”q”, etc.). Asghar et al. [19] mention scaffolding as one of the strategies in the field of STEM education - to break a certain topic into smaller parts and, in this way, possibly facilitate the understanding of the study material.

The Orange cluster (C_{KO}) contains only four keywords: ”feedback” (7), ”educational experiences” (5), ”scaffolds” (5), and ”universal design” (5). Feedback has a dual role in education, namely, firstly, as a feedback mechanism from students to course providers to improve the course and secondly, as feedback from the course provider to the student so that the students can improve [13]. Universal Design for Learning (UDL) is an approach that can maximize learning for all students and prescribes multiple learning resources to motivate students to learn. Originally, the UDL[‖] was intended for students with disabilities [16].

For the co-citation analysis, we included only sources cited at least 100 times. This means that only 55 scientific journals that are connected are included in the visualization (see Figure 3). Each of the clusters is presented in a different color and can be described as follows, from largest to smallest cluster [$C_{JR} > C_{JG} > C_{JB} > C_{JY}$] (numbers in brackets represents citation count).

[‡] https://www.apple.com/accessibility/
[§] https://www.ibm.com/able/toolkit/design/content/
[¶] https://news.sap.com/2023/07/creating-accessible-content/
[‖] https://udlguidelines.cast.org/

The **Red cluster** (C_{JR}) mainly deals with journals that cover the psychological and organizational field of education. The three most frequently cited sources are Sustainability (669), Frontiers in Psychology (250), and Journal of Business Research (236).

In the **Green cluster** (C_{JG}), journals relate mainly to the broader field of education. The most frequently cited sources are Journal of Research in Science Teaching (410), International Journal of Science Education (393), and Teaching and Teacher Education (290).

The **Blue cluster** (C_{JB}) covers mostly journals related to technical aspects of education. The three most frequently cited sources are Computers & Education (607), Education and Information Technologies (340), and Computers in Human Behavior (276).

In the **Yellow cluster** (C_{JY}), there are mainly multidisciplinary journals that cover various research disciplines. The most frequently cited sources are the following: Plos ONE (279), Science (262), and Higher Education (200).

These results of co-citation analysis can serve researchers as a source of information - that is, to know in which sources to look for relevant information related to the topic under discussion. In addition, it enables an insight into how certain disciplines are interconnected (i.e., interdisciplinarity).

5 Conclusions, Future Works and Limitations

This paper discusses selected aspects of inclusive education in the field of STEM. A mixed-method approach was used, meaning, that we combined quantitative and qualitative aspects in researching the topic. As part of the quantitative research approach, a bibliographic analysis of keywords and a co-citation analysis of the most influential journals was carried out using the *Scopus* academic database search results. A qualitative approach was used to complement the quantitative results of the bibliometric analysis. This means that with the help of existing studies, certain keywords were additionally emphasized. Also within this framework, certain findings from Sandpit were integrated, the topic of which was the inclusivity of STEM education for students with dyslexia as one of the forms of learning difficulties. The whole approach gives a comprehensive insight into the scientific landscape.

Future work may focus on developing a comprehensive framework describing learning/teaching strategies for existing learning difficulties and other forms of disabilities. It would also make sense to get a

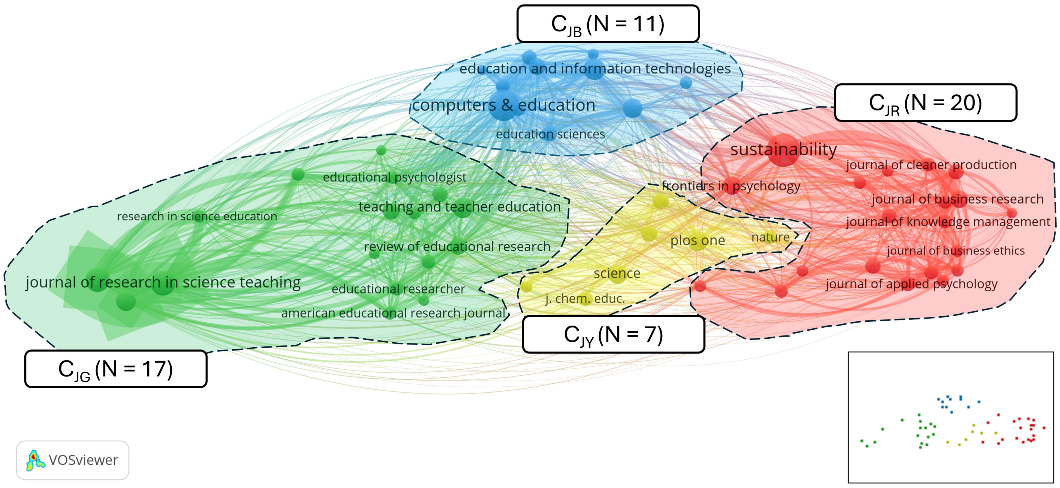

Figure 3. Bibliometric analysis of the journal co-citation. The distance between the two journals in the visualization approximately reflects their relatedness based on co-citation links, and lines represent the strongest co-citation links between journals. Typically, journals that are closer together are more closely related [3]. Note: N = the number of items in a particular cluster, C = cluster, J = journal. Letters next to "J" represent colors: B (blue), R (red), Y (yellow), and G (green).

global insight into the extent to which providers of STEM subjects are familiar with inclusivity/disability concepts. Furthermore, future work may also explore how supporting teachers in incorporating inclusivity into their curriculum impacts their job satisfaction and the academic performance of students.

Despite all the advantages of the mixed-method approach, there are certain limitations to the methods used in this study. First, even though the Scopus academic database includes a very large number of sources, it would be reasonable to extract data from other databases (e.g., Web of Science, IEEE Xplore, ACM DL) as well, because a certain source may be indexed in one database, but not in another. Third, interpretations of the results of the bibliometric analysis are subjective. For this reason, we tried to support the obtained results with scientific literature (i.e., provide content analysis as suggested by Donthu at al. [20]).

6 Acknowledgements

The Global Entrepreneurial Talent Management 4 (GETM4) project is funded by the European Union under the Horizon 2022 Marie Sklodowska-Curie Staff Exchanges programme (Grant Agreement no. 101130572). Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or the Research Executive Agency (REA). Neither the European Union nor REA can be held responsible for them. The work of Damjan Fujs and Tomaž Hovelja was also partially funded by the Slovenian Research and Innovation Agency - ARIS (Grant numbers P2-0426). The authors would also like to thank the anonymous reviewers for their insightful comments, which helped them to improve the paper.

References

[1] Aghaei Chadegani, A., Salehi, H., Md Yunus, M. M., Farhadi, H., Fooladi, M., Farhadi, M., & Ale Ebrahim, N. (2013). A comparison between two main academic literature collections: Web of science and scopus databases. Asian Social Science, 9(5), 18-26. https://doi.org/10.5539/ass.v9n5p18

[2] Malina, M. A., Nrreklit, H. S. O., & Selto, F. H. (2011). Lessons learned: Advantages and disadvantages of mixed method research. Qualitative Research in Accounting and Management, 8(1), 59-71. https://doi.org/10.1108/11766091111124702

[3] Jan van Eck, N., & Waltman, L. (2023, October 31). VOSviewer Manual.

[4] Martins, J., Goncalves, R., & Branco, F. (2022). A bibliometric analysis and visualization of e-learning adoption using VOSviewer. Universal Access in the Information Society, 1-15. https://doi.org/10.1007/s10209-022-00953-0

[5] Van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. scientometrics, 84(2), 523-538. https://doi.org/10.1007/s11192-009-0146-3

[6] Mann, E. Z., Reese, A. N., Madden, M., & Henkel, T. (2024). Facilitating inclusive and equitable curricular changes: A case study of embedded librarianship in a faculty learning community. The Journal of Academic Librarianship, 50(4), 102888. https://doi.org/10.1016/j.acalib.2024.102888

[7] Ahmad, I., Sharma, S., Singh, R., Gehlot, A., Gupta, L. R., Thakur, A. K., ... & Twala, B. (2024). Inclusive learning using industry 4.0 technologies: addressing student diversity in modern education. Cogent Education, 11(1), 2330235. https://doi.org/10.1080/2331186X.2024.2330235

[8] Sahara, B., Mumpuniarti, M., Suwarjo, S., & Syamsuri, M. (2024). Perspectives of Peers as a Microsystem for Supporting Deaf Students in Inclusive Elementary Schools. International Journal of Learning, Teaching and Educational Research, 23(4), 298-319. https://doi.org/10.26803/ijlter.23.4.16

[9] Guralp, G., McHugh, M., & Hayes, S. (2024). Non-formal science education: moving towards more inclusive pedagogies

for diverse classrooms. Center for Educational Policy Studies Journal, 14(1), 105-142. https://doi.org/10.26529/cepsj.1707

[10] Savonen, C., Wright, C., Hoffman, A., Humphries, E., Cox, K., Tan, F., & Leek, J. (2023). Motivation, inclusivity, and realism should drive data science education. F1000Research, 12. https://doi.org/10.12688%2Ff1000research.134655.2

[11] Ramirez-Montoya, M. S., Weber, J. C., Cox, G., & Tenorio-Sepulveda, G. C. (2024). Inclusive Digital Education on Open Platforms: A Case Study of the Complexity of the Future of Education. Computers in the Schools, 1-18. https://doi.org/10.1080/07380569.2024.2322164

[12] Lilly, S., McAlister, A. M., Fick, S. J., & Chiu, J. L. (2023). A comparison of elementary teachers' verbal supports for students in inclusive and general classroom contexts during an NGSS-aligned science, engineering, and computer science unit. Science Education, 107(4), 853-883. https://doi.org/10.1002/sce.21788

[13] Audette, D. S., Bennett, S., Chan, M. C., Chapman, D., Elmendorf, H., & Floyd, J. (2023, July). Building an inclusive community of learners by centering a strong culture of care in large lecture classes. In Frontiers in Education (Vol. 8, p. 1167879). Frontiers Media SA. https://doi.org/10.3389/feduc.2023.1167879

[14] Bertram, J., & Rolka, K. (2022). Teachers' Content-Related Learning Processes: Teachers' Use of Professional Development Content on Teaching Approaches to Inclusive Mathematics Education. Mathematics Teacher Education and Development, 24(1), 39-58.

[15] Tucci, G., Parisi, E. I., Bonora, V., Fiorini, L., Conti, A., Corongiu, M., ... & Arza-Garcia, M. (2020). Improving quality and inclusive education on photogrammetry: new teaching approaches and multimedia supporting materials. International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, 43, 257-264.

[16] Harris, B. N., McCarthy, P. C., Wright, A. M., Schutz, H., Boersma, K. S., Shepherd, S. L., ... & Ellington, R. M. (2020). From panic to pedagogy: Using online active learning to promote inclusive instruction in ecology and evolutionary biology courses and beyond. Ecology and evolution, 10(22), 12581-12612. https://doi.org/10.1002/ece3.6915

[17] Nightingale, K. P., Anderson, V., Onens, S., Fazil, Q., & Davies, H. (2019). Developing the inclusive curriculum: Is supplementary lecture recording an effective approach in supporting students with Specific Learning Difficulties (SpLDs)?. Computers & Education, 130, 13-25. https://doi.org/10.1016/j.compedu.2018.11.006

[18] Leporini, B., & Buzzi, M. (2019). Education and STEM on the Web. In: Yesilada, Y., Harper, S. (eds) Web Accessibility. Human-Computer Interaction Series. Springer, London, 651-674. https://doi.org/10.1007/978-1-4471-7440-0_33

[19] Asghar, A., Sladeczek, I. E., Mercier, J., & Beaudoin, E. (2017). Learning in science, technology, engineering, and mathematics: Supporting students with learning disabilities. Canadian Psychology/psychologie canadienne, 58(3), 238. https://psycnet.apa.org/doi/10.1037/cap0000111

[20] Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. Journal of Business Research, 133, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

[21] Gil-Domenech, D., Berbegal-Mirabent, J., & Merigo, J. M. (2020). STEM education: A bibliometric overview. In Modelling and Simulation in Management Sciences: Proceedings of the International Conference on Modelling and Simulation in Management Sciences (MS-18) (pp. 193-205). Springer International Publishing. https://doi.org/10.1007/978-3-030-15413-4_15

[22] Le Thi Thu, H., Tran, T., Trinh Thi Phuong, T., Le Thi Tuyet, T., Le Huy, H., & Vu Thi, T. (2021). Two decades of stem education research in middle school: A bibliometrics analysis in scopus database (2000-2020). Education Sciences, 11(7), 353. https://doi.org/10.3390/educsci11070353

[23] Zhan, Z., Shen, W., Xu, Z., Niu, S., & You, G. (2022). A bibliometric analysis of the global landscape on STEM education (2004-2021): towards global distribution, subject integration, and research trends. Asia Pacific Journal of Innovation and Entrepreneurship, 16(2), 171-203. https://doi.org/10.1108/APJIE-08-2022-0090

[24] Hsu, Y. S., Tang, K. Y., & Lin, T. C. (2023). Trends and hot topics of STEM and STEM education: A co-word analysis of literature published in 2011-2020. Science & Education, 1-24. https://doi.org/10.1007/s11191-023-00419-6

[25] Mufutumari, N., Kohun, F., & Lesjak, D. (2024). Prevalence of Knowledge Management Processes in Higher Education Institutions: A Systematic Literature Review. Artificial Intelligence for Human-Technologies-Economy Sustainable Development, To-KnowPress, Lublin, Poland, pp. (507-514). 23-25 May.

[26] Haque, M. A., Rahman, Z., Pervez, A. K. M., Banik, P., Aziz, D. A. B., Sarker, B., & Bhuiyan, M. F. K. (2023). Knowledge Sharing and Students' Development: R-Based Bibliometric Study. Asian Journal of Education and Social Studies, 48(1), 144-165. https://10.9734/AJESS/2023/v48i11047

[27] Moriña, A., Sandoval, M., & Carnerero, F. (2020). Higher education inclusivity: When the disability enriches the university. Higher Education Research & Development, 39(6), 1202-1216. https://doi.org/10.1080/07294360.2020.1712676

[28] Berlach, R. G., & Chambers, D. J. (2011). Interpreting inclusivity: An endeavour of great proportions. International Journal of Inclusive Education, 15(5), 529-539. https://doi.org/10.1080/13603110903159300

[29] Gaviria-Marin, M., Merigo, J. M., & Baier-Fuentes, H. (2019). Knowledge management: A global examination based on bibliometric analysis. Technological Forecasting and Social Change, 140, 194-220. https://doi.org/10.1016/j.techfore.2018.07.006

[30] Hernǎndez-Torrano, D., Somerton, M., & Helmer, J. (2022). Mapping research on inclusive education since Salamanca Statement: a bibliometric review of the literature over 25 years. International Journal of Inclusive Education, 26(9), 893-912. https://doi.org/10.1080/13603116.2020.1747555

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