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The NISWATHI Coaching Model for the Social and Personality Competence of Science Teachers: Bibliometric Analysis 2016-2025

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Abstract— *Science education plays a strategic role in developing students' critical and analytical thinking skills, as well as fostering scientific attitudes. However, challenges in classroom management and the limited social and personality competencies of teachers often hinder the effectiveness of science learning. This study aims to analyze the research trends on the application of the NISWATHI Coaching Model in improving the social and personality competencies of science teachers from 2016 to 2025. A descriptive-analytical approach with bibliometric methods was employed, analyzing 1,000 documents indexed in Google Scholar and Dimensions.ai. Data were processed using VOSviewer to map relationships among keywords, authors, and institutions. The findings indicate a significant increase in publications related to the NISWATHI model, peaking in 2022 before slightly declining in subsequent years. Most publications appeared as book chapters and edited volumes, reflecting a conceptual and reflective approach to the model's development. Bibliometric visualization revealed seven major research clusters, including teacher training, instructional innovation, leadership, and adaptation to educational crises such as the Covid-19 pandemic. Keywords such as digital transformation, holistic development, and future teacher emphasize the relevance of technology integration and comprehensive teacher development. These findings strengthen the position of the NISWATHI Coaching Model as a transformative and adaptive approach to enhancing teachers' personality and social competence. The model not only focuses on pedagogical improvement but also on shaping reflective, collaborative, and responsive teacher character aligned with the demands of 21st-century education.*

Keywords— NISWATHI Coaching Model; Social Competence; Teacher Personality; Science Teachers; Bibliometric Analysis.
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1. Introduction

Science education in Indonesia plays a crucial role in developing critical thinking, problem-solving, and analytical skills needed by students to face the challenges of everyday life. Science not only serves to transfer knowledge but also to foster scientific attitudes, rational thinking skills, and the ability to evaluate information objectively. However, science education in Indonesia faces a number of challenges that hinder the achievement of these goals. One major challenge is classroom management. Many science teachers still struggle to create a learning environment that supports students' social development. This is often due to a lack of training or experience in managing classroom dynamics consisting of students with highly diverse characteristics. As a result, the learning process cannot run optimally, and students struggle to grasp complex and abstract scientific concepts. This inevitably results in students' low level of understanding of the science material being taught, which can affect their readiness to face the challenges of the world of science in the future. Therefore, developing the social and personality competencies of science teachers is crucial to improving the science learning process in Indonesia and achieving better quality education [1][2].

The NISWATHI coaching model offers an innovative solution to address challenges in effective classroom management and optimal science learning. This model aims to improve the social and personality competencies of science teachers through a more

applicable, practice-based approach. The NISWATHI model consists of three main elements: the Navigating Inspiring Strategy Workshop, Action Transformation, and Holistic Implementation. Each element has a specific objective and is designed to provide training that emphasizes not only theory but also practical applications that can be directly applied in the classroom. The Navigating Inspiring Strategy Workshop aims to provide teachers with the understanding and skills to design more inspiring and relevant learning strategies to meet students' needs in the digital age. Training that emphasizes active participation, peer collaboration, and reflective practice leads to greater confidence and competence in using technology and designing student-centered lessons [3][4][5]. Action Transformation focuses on changes in teacher behavior and actions that have a more positive impact on the classroom environment and learning. Finally, Holistic Implementation enables teachers to integrate all the elements learned into their daily lives as educators. Through this coaching model, it is hoped that science teachers will not only acquire classroom management skills but also develop social and personality competencies that can improve relationships with students, create a more productive learning environment, and increase the overall effectiveness of science instruction [6][7].

The social competence of science teachers is a crucial aspect of an effective learning process. Teachers with strong social competence are able to build harmonious relationships with students, foster open communication, and manage positive interactions in the classroom. This is crucial because a strong relationship between teacher and students can create a classroom atmosphere that supports students' social development and increases their engagement in learning. Teachers who build harmonious, trusting relationships with students foster open communication, positive interactions, and a supportive climate. This environment supports students' social competence, emotional regulation, and peer relationships, which are linked to better learning outcomes [8][9]. Teachers who are able to understand and respond to students' emotional and social needs can also help students overcome various challenges they may face, both inside and outside the classroom. By building positive relationships and creating a safe and comfortable atmosphere, science teachers can encourage students to participate more actively in learning, thereby deepening their understanding of the material being taught. Therefore, a science teacher's social competence not only serves to improve the classroom atmosphere but also increases student engagement, which in turn influences the effectiveness of science learning itself [10][11].

A science teacher's personality is an equally important variable in determining the quality of classroom learning. A positive and strong teacher personality can create a pleasant atmosphere and build student confidence in participating in learning. Teachers with positive personalities are able to manage classes more effectively, inspire students, and provide the motivation needed to foster their interest in science. Furthermore, teachers with strong personalities can also serve as role models for students, demonstrating how to think critically, face challenges, and solve problems. A positive personality enables teachers to build stronger relationships.

2. Method

This research is descriptive and analytical, aiming to describe trends in the application of the NISWATHI Coaching Model to improve the social and personality competencies of science teachers. The data used in this study were obtained from information sources indexed in Google Scholar, using analysis tools such as Dimension.ai and Publish or Perish. The search was conducted using relevant keywords, including "Coaching Model, Navigating, Inspiring Strategy, Workshop, Action Transformation, Holistic Implementation, on Social and Personality Competence of Science Teachers," "Social Competence of Science Teachers," "Personality of Science Teachers," and "Competence in Science Education." This study analyzed 1,000 documents indexed in Google Scholar from 2016 to 2025. Google Scholar was chosen because it provides extensive access to various scientific publications and conference articles in the field of education and has been consistently proven to provide quality documents, as demonstrated by several previous studies. To ensure data quality and relevance, this study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines in the data screening process, which included document identification, selection, and evaluation. Documents that were irrelevant, duplicate, or did not meet quality criteria were filtered out. Document quality evaluation was based on the number of citations and their relevance to the research topic. After data selection, analysis was conducted using bibliometric and content analysis methods. Using bibliometric methods, this study identified research trends, key themes, and development patterns in studies related to the Coaching Model, Navigating Inspiring Strategy, Workshop, Action Transformation, Holistic Implementation, and Social and Personality Competence of Science Teachers. The analysis was conducted using software such as VOSviewer to visualize the relationships between keywords, authors, institutions, and research fields, which helped uncover key trends and potential underexplored research areas.

3. Result and Discussion

This study aims to describe research trends related to the NISWATHI Coaching Model on Science Teachers' Social and Personality Competencies conducted in the period 2016 to 2025. Research data related to this trend was obtained from scientific publications indexed by Dimensions.ai. The figure below shows the publication trends related to the NISWATHI coaching model during that period.

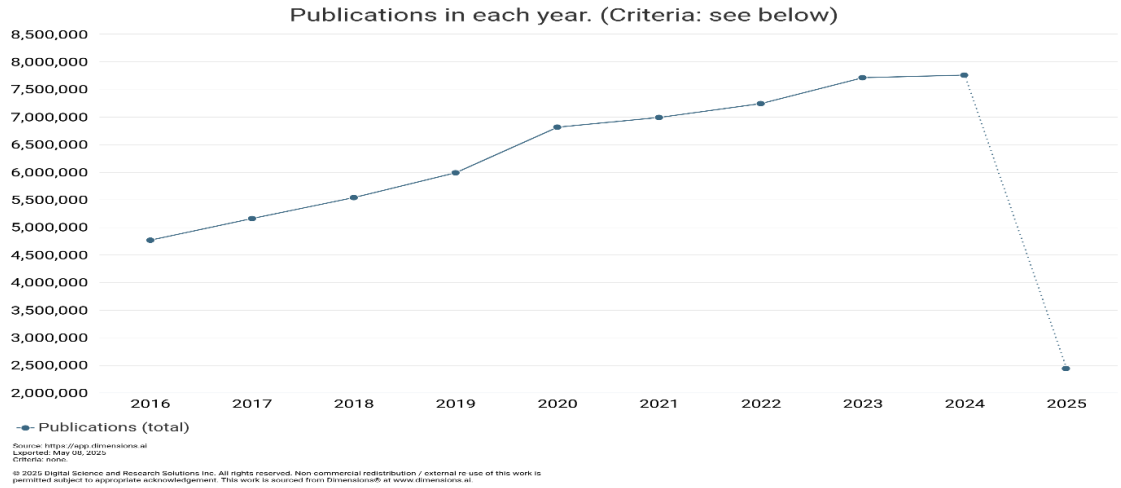

Fig. 1. Research trends related to the NISWATHI Coaching Model on the Social and Personality Competence of Science Teachers 2016-2025

Based on Figure 1, the research trend related to the NISWATHI Coaching Model on the Social and Personality Competence of Science Teachers shows significant fluctuations during the period 2016 to 2025. In 2016, the number of publications was recorded at 4,765,854, indicating that this topic began to receive attention even though it was not widely discussed. The number of publications then increased gradually each year, with 5,158,497 publications in 2017, 5,538,522 in 2018, and 5,988,734 in 2019, reflecting the growing interest in this coaching model in the context of developing the social and personality competencies of science teachers. The peak of this trend was recorded in 2022, with 7,243,216 publications, which showed a significant surge, indicating that the NISWATHI coaching model is increasingly recognized as an important approach in improving the social and personality competencies of science teachers. However, after 2022, this trend declines, with 7,712,539 publications in 2023, and a further projected decline in 2024, with an estimated 7,758,918 publications. This decline may be due to changes in research focus or challenges in implementing this model. By 2025, the number of publications is projected to drop dramatically to 2,439,367, reflecting a decline in interest in this topic, possibly due to saturation or shifting priorities in academic research.

Table 1. Main Sources of Research Trends Related to the NISWATHI Coaching Model on the Social and Personality Competence of Science Teachers 2016-2025

PUBLICATION TYPE	***PUBLICATIONS***
CHAPTER	*10,338*
EDITED BOOK	*4,955*
MONOGRAPH	*1,796*
PROCEEDING	*575*
ARTICLE	*176*
PREPRINT	*19*

Based on Table 1, the research trend on the NISWATHI coaching model for the social and personality competencies of science teachers in the 2016–2025 period shows a wide distribution in various types of scientific publications, with the highest dominance in publications in the form of book chapters, amounting to 10,338 publications, reflecting the high attention to this topic in the academic literature that is thematic and in-depth. Followed by edited books, amounting to 4,955 publications, which demonstrates the importance of a collective approach in compiling various perspectives and research results related to NISWATHI coaching. The publication of 1,796 monographs reflects the existence of specialized and in-depth studies on this topic, while the proceedings of scientific conferences, amounting to 575 publications, indicate that scientific forums remain an important forum for the dissemination of academic findings. The number of 176 scientific articles demonstrates the role of scientific journals in disseminating research results that have gone through the peer-review process, while the number of preprints, which is only recorded at 19 publications, indicates that initial publication before peer review is still not the main choice in this field. Overall, this trend shows that the NISWATHI coaching model is more widely discussed in depth in publications in the form of book chapters and edited books, with significant contributions from monographs, proceedings, and scientific articles, which together reflect a high academic interest and attention to the development of social and personality competencies of science teachers through a coaching approach.

Table 2. Main Sources of Research Trends Related to the NISWATHI Coaching Model on the Social and Personality Competence of Science Teachers 2016-2025

No.	Name	Organization, country	Publications	Citations	Citations mean
1	Andreja Pucihar	University of Maribor, Slovenia	56	551	9.84
2	Mirjana Kljajic Borstnar	University of Maribor, Slovenia	55	550	10.0
3	North-West University	South Africa	54	133	2.46
4	Pascal Ravesteijn	University of Applied Sciences Utrecht, Netherlands	53	547	10.32
5	Roger A Clarke	UNSW Sydney, Australia	52	553	10.63
6	Christian Kittl	-	50	547	10.94
7	Roger W H Bons	Open University in the Netherlands, Netherlands	50	547	10.94
8	Iztok Podbregar	University of Maribor, Slovenia	41	10	0.24
9	Scott T Allison	University of Richmond, United States	33	15	0.45
10	Christopher L Atkinson	University of West Florida, United States	22	3	0.14

Based on Table 2, research trends related to the NISWATHI coaching model on science teachers' social and personality competencies are spread across various institutions and researchers from various countries. The researcher with the most publication contributions is Andreja Pucihar from the University of Maribor, Slovenia, with a total of 56 publications, 551 citations, and an average of 9.84 citations per publication, demonstrating consistency in producing scientific works that have received considerable attention from the academic community. Second place is followed by Mirjana Kljajic Borstnar, also from the same institution, with 55 publications and 550 citations, and an average of 10.0 citations, reflecting the strong contribution of the University of Maribor in developing the study of the NISWATHI coaching model. The North-West University of South Africa is in third place with 54 publications, but only generated 133 citations with an average of 2.46, indicating a high publication volume but relatively low impact. Meanwhile, Pascal Ravesteijn from the University of Applied Sciences Utrecht, the Netherlands, and Roger A Clarke from UNSW Sydney, Australia, produced 53 and 52 publications, respectively, with total citations of 547 and 553, and average citations of 10.32 and 10.63, reflecting significant academic influence. Other researchers such as Christian Kittl and Roger W H Bons also recorded 50 publications and 547 citations, with an average of 10.94, the highest among the top ten researchers, indicating excellent quality and citation power. In contrast, contributions from Iztok Podbregar (41 publications, 10 citations), Scott T Allison (33 publications, 15 citations), and Christopher L Atkinson (22 publications, 3 citations) showed much lower citation rates, with average citations below 1, namely 0.24, 0.45, and 0.14, respectively.

Table 3. Key Citations of Research Trends Related to the NISWATHI Coaching Model on the Social and Personality Competence of Science Teachers 2016-2025

Cites/Years	Year	Author	Title
3492.00	2019	Mertens, D. M.	Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods
12215.00	2024	Joyce, B., & Calhoun, E.	Models of teaching
933.50	2017	Good, T. L., & Lavigne, A. L.	Looking in classrooms
878.00	2020	Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D.	Implications for educational practice of the science of learning and development
370.44	2016	Luckin, R., & Holmes, W.	Intelligence unleashed: An argument for AI in education
620.60	2020	Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M.	Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity
304.50	2017	Wlodkowski, R. J., & Ginsberg, M. B.	Enhancing adult motivation to learn: A comprehensive guide for teaching all adults
405.17	2019	Cameron, E., & Green, M.	Making sense of change management: A complete guide to

			the models, tools and techniques of organizational change
2427.00	2024	Mertler, C. A.	Action research: Improving schools and empowering educators
2313.00	2024	Conte, J. M.	Work in the 21st Century: An Introduction to Industrial and Organizational Psychology

Based on Table 3, the 10 main citations of research trends related to the NISWATHI Coaching Model on the social and personality competencies of science teachers in 2016–2025 show significant contributions from various leading literatures, where the most influential article was written by Joyce & Calhoun (2024) with 12,215 citations emphasizing the importance of learning models in shaping teacher personality; Mertens (2019) raised the integration of diversity through mixed research methods (3,492 citations), while Mertler (2024) highlighted the relevance of action research in teacher empowerment (2,427 citations); contributions from Conte (2024) and Cameron & Green (2019) strengthened the theoretical basis in the context of educational psychology and change management; Darling-Hammond et al. (2020) with 878 citations highlighted the importance of developmental science in building teacher-student social relations, while Rapanta et al. (2020) (620 citations) emphasized the role of teachers in online learning relevant to social competencies in the digital era; Good & Lavigne (2017) and Wlodkowski & Ginsberg (2017) provide perspectives on classroom dynamics and adult learning motivation; and Luckin & Holmes (2016) highlight the use of AI in education to support teachers' social development in the technological era.

Table 4. Main Keywords Research Trends Related to the NISWATHI Coaching Model on the Social and Personality Competence of Science Teachers 2016-2025

Terms	Occurrences	Relevance
Pandemic	10	4.24
Covid	17	3.16
Social science	12	1.96
Alternative strategy	11	1.83
Case study	13	1.7
Holistic development	14	1.55
Future teacher	11	1.52
Chapter	11	1.45
Staff	12	1.41
Digital transformation	16	1.39

Based on Table 4, the data shows ten main keywords that reflect the focus of the NISWATHI Coaching Model research on the social and personality competencies of science teachers. The terms “Pandemic” (relevance 4.24) and “Covid” (3.16) emphasize the importance of the global crisis context in teacher social development, especially during distance learning. “Social science” (1.96) shows the theoretical foundation used, while “Alternative strategy” (1.83) reflects the need for a new approach to support teacher personality development. The keywords “Case study” (1.70), “Holistic development” (1.55), and “Future teacher” (1.52) illustrate the focus on comprehensive and sustainable teacher development. Meanwhile, “Chapter” and “Staff” (1.45 and 1.41, respectively) demonstrate the relationship between academic literature and the influence of institutional support on teaching quality. Finally, “Digital transformation” (1.39) shows how technology integration is a crucial driver in shaping the social and personality competencies of science teachers in the modern era.

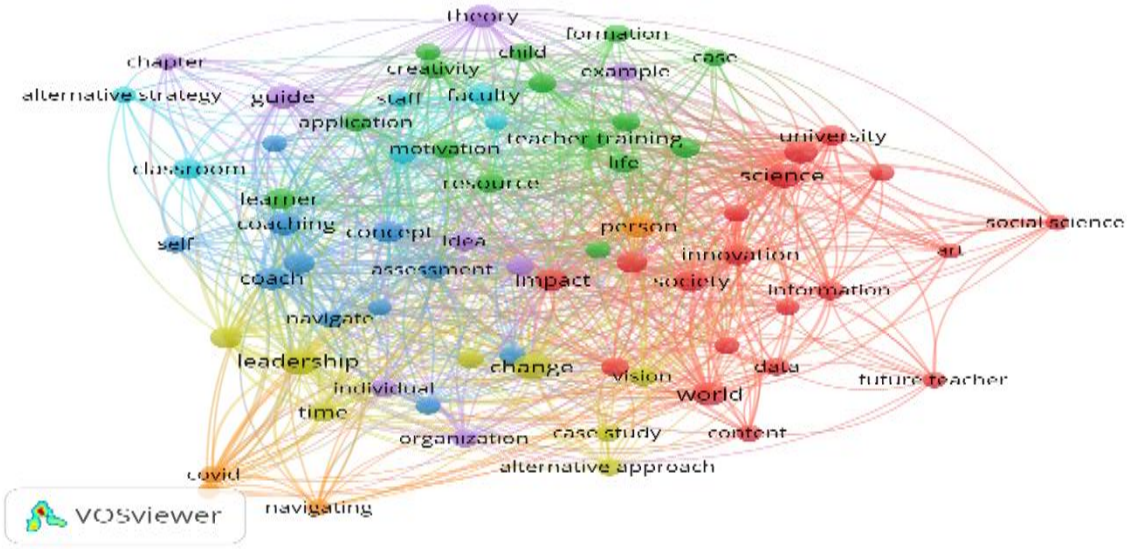

Fig. 2. Research Trend Network Visualization Research trends related to the Coaching Model

Figure 2 shows a network visualization of bibliometric results for the NISWATHI coaching model research related to the social competence and personality of science teachers in 2016–2025. This network is divided into several clusters: The Red Cluster includes “science,” “innovation,” “data,” “university,” and “social science,” highlighting the role of academics and innovation in teacher professional development. The Green Cluster emphasizes “teacher training,” “faculty,” “staff,” and “motivation,” which focus on teacher training and the work environment. The Blue Cluster includes “coaching,” “learner,” “concept,” and “assessment,” emphasizing the process of teacher social development through learning. The Yellow Cluster, with terms like “leadership,” “organization,” and “individual,” highlights the role of leadership and personal change. The Orange Cluster addresses the pandemic context with terms like “covid,” “navigate,” and “time.” The Purple Cluster displays conceptual aspects like “guide,” “chapter,” and “theory.” The cyan or light blue cluster contains terms like "alternative strategy" and "classroom," which refer to innovative learning strategies. This visualization confirms that the NISWATHI coaching model supports strengthening teachers' social and personal competencies through training, leadership, adaptation, and relevant learning strategies.

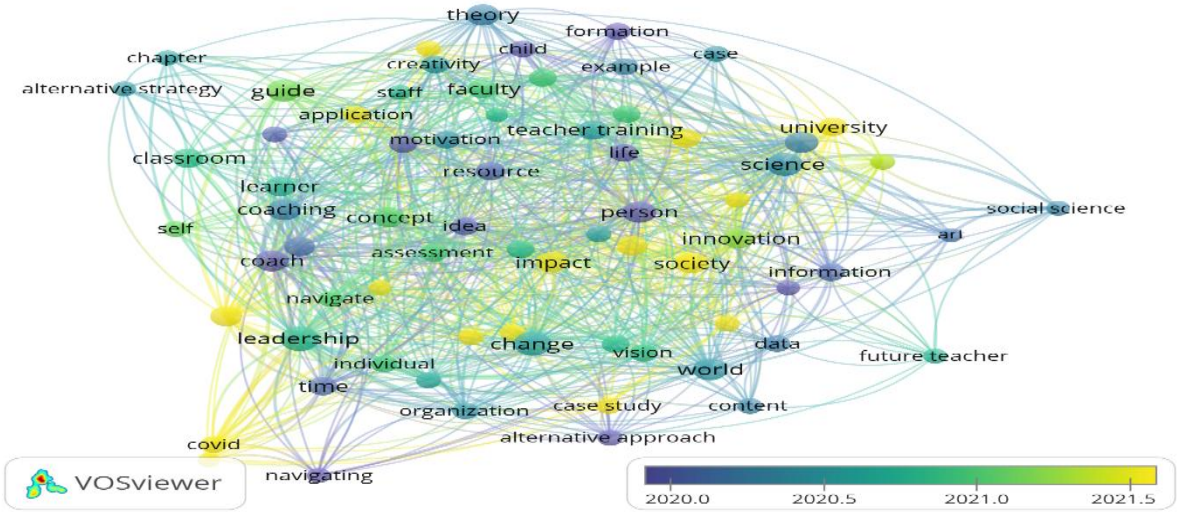

Fig. 3. Visualization of Research Trend Overlay Research trends related to the NISWATHI Coaching Model on the Social and Personality Competence of Science Teachers 2016-2025

Figure 3 presents an overlay visualization of research trends on the NISWATHI coaching model for science teachers' social and personality competencies from 2016 to 2025. The colors in the visualization indicate the temporal development of research topics based on publication year, with blue indicating topics that emerged earlier (around 2020), while yellow indicates more recent topics (around 2021 and later). It can be seen that terms such as "theory," "faculty," "motivation," and "resource" emerged in the early phase of coaching model development, while keywords such as "leadership," "change," "covid," and "science" tend to appear in more recent publications. This indicates a shift in research focus from theoretical frameworks and teacher training to contextual issues such as leadership, post-pandemic adaptation, and science-based learning transformation. This visualization confirms that topics related to teachers' social and personality competencies in the NISWATHI coaching model continue to evolve and respond to more recent educational dynamics.

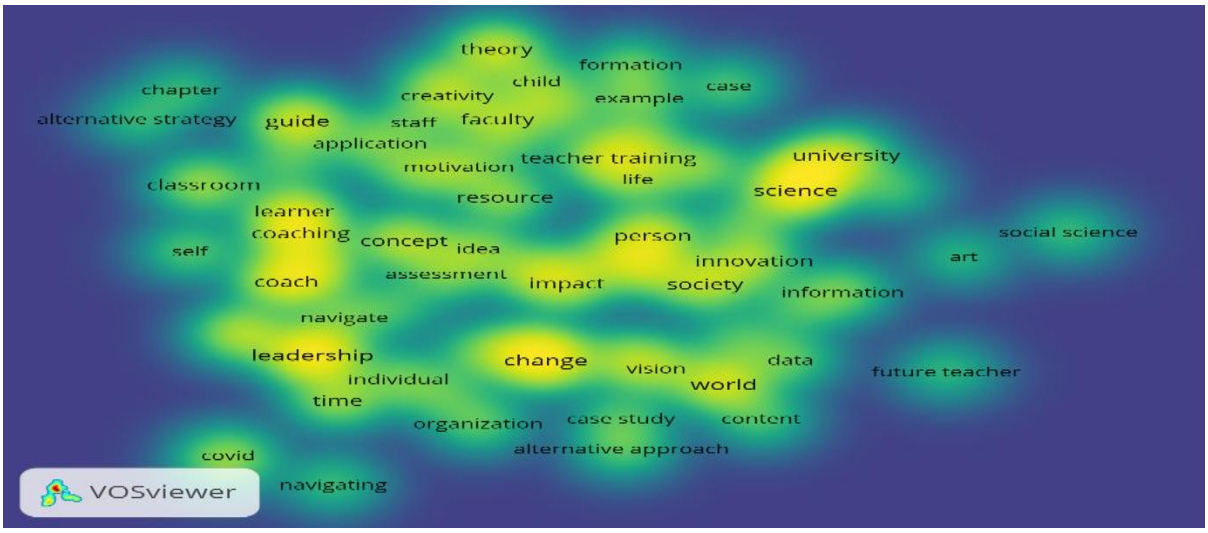

Fig. 4. Visualization of Research Trend Density Research trends related to the NISWATHI Coaching Model on the Social and Personality Competence of Science Teachers 2016-2025

Figure 4 displays a visualization of the research density of the NISWATHI coaching model on science teachers' social and personality competencies. Yellow indicates areas with high keyword frequency or density, while green and blue represent lower density. Keywords such as "leadership," "change," "coach," "coaching," "learner," "science," and "world" are in the bright yellow area, indicating that these topics are the focus of attention in many publications. Meanwhile, keywords such as "covid," "future teacher," and "navigating" are in the blue-green area, indicating these topics are less frequently discussed but remain relevant. This visualization reinforces that the main focus of research is directed at the dynamics of change, the role of leadership, and the coaching process in the context of education and teacher competency development.

The bibliometric analysis revealed a significant increase in research related to the NISWATHI Coaching Model for enhancing science teachers' social and personality competence between 2016 and 2025, peaking in 2022. This upward trend indicates growing global attention toward professional development through coaching, particularly within science education. The surge corresponds with Kraft, Blazar, and Hogan (2018), who emphasized that sustained and reflective instructional coaching effectively improves teaching quality and student achievement [12]. The NISWATHI model comprising Navigating Inspiring Strategy Workshop, Action Transformation, and Holistic Implementation is consistent with the principles of transformational coaching proposed by Cameron and Green (2019), which emphasize behavioral and mindset change as a means of creating more inspiring and impactful learning environments [13].

The dominance of book chapters and edited volumes among the publications suggests that NISWATHI is primarily discussed from a conceptual and reflective standpoint. This demonstrates that coaching development is perceived not only as a technical training mechanism but also as a theoretical approach to strengthening teacher agency [14]. In this sense, teachers are positioned as professional learners who continuously reflect, adapt, and improve their instructional practice through collaboration an idea aligned with Schön's (1983) Reflective Practice Theory, which views reflection-on-action as fundamental to professional growth and effective teaching [15].

Institutional analysis revealed that the University of Maribor is the most consistent contributor to this research area, highlighting Europe's leadership in building professional learning communities (PLCs) as a foundation for effective coaching. This aligns with Snyder, Hemmeter, & Fox (2015), who stated that coaching effectiveness increases when implemented within collaborative and practice-based environments [16]. However, the findings also show that publication quantity does not necessarily equate to influence, as lower citation averages from other institutions underscore the need for stronger methodological and applied dimensions in future studies [17].

Highly cited works, such as Joyce & Calhoun (2024) and Darling-Hammond et al. (2020), emphasize the importance of teaching models that nurture positive teacher–student relationships central to the NISWATHI framework, which aims to improve teachers' social competence and personality traits [18][19]. Social competence refers to teachers' ability to

communicate, empathize, and collaborate effectively [10][11], while teacher personality encompasses integrity, motivation, and emotional stability [20][21]. Together, these attributes foster an inclusive and engaging learning climate that enhances students' motivation and comprehension in science learning contexts.

Key terms such as pandemic, digital transformation, and holistic development highlight the global and contextual influence of the Covid-19 era on teacher professional growth. This finding is consistent with Rapanta et al. (2020), who emphasized the importance of maintaining teachers' social and emotional presence in online education [22]. The Holistic Implementation phase of the NISWATHI model aligns with this need, as it integrates professional, emotional, and social dimensions of teaching practice. Research also supports that holistic coaching contributes to teachers' emotional well-being and strengthens classroom relationships [23].

The bibliometric network visualization identified seven main research clusters: teacher training, innovation, leadership, and adaptability. These clusters demonstrate that the NISWATHI model is multi-dimensional, addressing pedagogical, managerial, and personal aspects of teacher development. This resonates with Manit & Chowwalit (2016), who proposed distributed leadership as a means of achieving sustainable educational change through shared responsibility and collaboration [24]. Moreover, density visualization results highlight "leadership," "science," and "coaching" as central nodes, underscoring their importance as focal points in current global research on professional teacher growth [25].

Overlay visualization results indicate a shift in focus from theoretical constructs of coaching to adaptive issues such as leadership, change, and post-pandemic resilience. This evolution reflects a broader paradigm shift in teacher educationfrom emphasizing pedagogical techniques to building emotional resilience and digital adaptability [26] . Therefore, the NISWATHI model has strong potential to serve as a transformative coaching framework for science teachers, balancing professional, personal, and social dimensions in line with Raley et al. (2024)'s Self-Determined Learning Model of Instruction [25].

These findings confirm that coaching functions not merely as a technical training tool but as an instrument for cultivating teachers' character and professional identity. The NISWATHI Coaching Model conceptually strengthens the constructivist professional development theory, which views teachers as active agents of learning who construct meaning through reflection and experience [27]. Through its action-reflection approach, the model supports the development of teachers' social and emotional capacities, directly enhancing instructional effectiveness and contributing to higher-quality science education in Indonesia and beyond.

4. Conclusion

The research trend on the NISWATHI Coaching Model for science teachers' social and personal competencies increased significantly from 2016 to 2025, peaking in 2022, and then declining. Publications were dominated by book chapters and edited books, indicating a conceptual approach. Bibliometric visualization highlights the focus on teacher training, leadership, and crisis adaptation. Keywords such as digital transformation and holistic development demonstrate the model's relevance in addressing the challenges of modern education. The NISWATHI Model has proven adaptive and effective in developing science teachers' personal and social competencies. Further research is recommended to explore the direct implementation of the NISWATHI Coaching Model in various school contexts and educational levels to practically measure its effectiveness. Furthermore, it is necessary to develop a model that is responsive to technological changes and teachers' needs post-pandemic, as well as to strengthen collaboration between educational institutions and practitioners to expand the impact of coaching on developing teachers' social and personal competencies.

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Place acknowledgments, including information on grants received, before the references, in a separate section, and not as a footnote on the title page.

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