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Make A Match Learning Model on Learning Outcomes in Elementary Schools: A Bibliometric Analysis

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ABSTRACT

This article will map the architecture and detect trends in scholarly papers on the Make a Match (MaM) Learning Model in Elementary Schools from 2020 to 2025. The goals of this study are to examine annual publication growth, identify the most prolific journals, map significant keyword networks, and detect new topic trends in this literature. The study employed bibliometrics. Data were obtained using Publish or Perish software from Google Scholar, Crossref, and OpenAlex by searching the keywords "make a match," ("hasil belajar" or "learning outcome"), and ("sd" or "elementary school"). We reviewed and examined 130 items from 582 documents. VOSviewer created network, overlay, and density visualizations. The results showed that: (1) Publication Growth: There was a significant and accelerating increase in publications, reaching a peak in 2024 (36 documents, or 28%). (2) Central Focus: The main keywords are “Learning Outcomes” (56 occurrences, TLS 77) and “Make a Match” (52 occurrences, TLS 65), confirming a strong relationship between the two variables. (3) Topic Concentration: The density visualization highlights the two highest concentration areas: “learning outcomes” with “mathematics” and “make a match” with “make a match learning model.” (4) Development Trend: The overlay visualization shows a shift from basic studies (blue/green, 2022–2023) to topic specialization, which is shown by the rise of terms like "Islamic education" (yellow, 2023–2024). This study empirically supports the Make a Match Learning Model as the best pedagogical intervention to improve primary school learning outcomes in 2020–2025. These findings outline the mathematics focus and provide new topic development opportunities for future academics and practitioners.

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1. INTRODUCTION

Elementary education serves as the fundamental basis for cultivating students' character, knowledge, and essential skills, preparing them for subsequent educational stages (Ratnaningsih, 2016; Surtini & Muhtar, 2024). Elementary school pupils are in the concrete operational stage of psychological development (Haniah et al., 2023;

Oogarah-Pratap et al., 2025), characterized by the emergence of logical thinking while remaining closely connected to tangible objects and necessitating physical exercise for stimulation. An effective elementary school learning process must incorporate play, movement, and social contact to sustain motivation and address youngsters' limited attention spans (Aseery, 2024; Clemente-Suárez et al., 2023). Conventional pedagogical approaches, such as lectures, are essential for imparting fundamental concepts in an organized fashion. To attain optimal outcomes, a range of interactive methodologies is required to accommodate the dynamism of contemporary education and the varied demands of learners (Kerimbayev et al., 2023; Zhou, 2025). This method not only facilitates students' comprehension of the material but also cultivates emotional and social competencies, including emotional regulation, collaboration, and respect for others. These two qualities are essential to cultivate from elementary school as a basis for character development and preparedness for learning.

The necessity for this educational innovation is becoming progressively critical with the enactment of the Independent Curriculum in Indonesia (Hidayat et al., 2025; Hunaepi & Suharta, 2024; Vitasari et al., 2025). The Independent Curriculum prioritizes student-centered learning and the enhancement of the Pancasila Student Profile, which specifically requires the cultivation of 21st-century competencies, including cooperation, communication, and critical thinking (Limbong et al., 2024; Zainuddin et al., 2025). This paradigm shift imposes a considerable obligation on educators to implement learning methods that foster active engagement and constructive relationships among students (Pramesworo et al., 2023). Moreover, the Independent Curriculum promotes flexibility in method selection, enabling educators to tailor tactics to local settings and student attributes, so enhancing the overall quality of teaching (Fauzan et al., 2023; Masjudin, 2024). Consequently, creative educational approaches are required to enhance student engagement and improve learning results.

The Cooperative learning model has emerged as a highly effective strategy to address the issues of the Independent Curriculum and the characteristics of primary school children (Farman et al., 2024; Mawardah et al., 2025). The core tenet of the cooperative model is positive interdependence, wherein individual achievement is linked to collective success, promoting mutual assistance and active engagement among students (Atradinal & Ockta, 2024; Kebede et al., 2025). This model immediately enhances the cultivation of collaboration abilities (Shvets et al., 2024; Slavin, 2022), essential in the digital era, where students are required to collaborate in teams to accomplish intricate tasks and get equitable learning results. The cooperative learning model fosters inclusive education, ensuring that each student has an equal opportunity to participate, thereby diminishing learning disparities and establishing a positive classroom atmosphere (Cañabate et al., 2021; Zhou & Colomer, 2024). One of the cooperative learning models that is the focus is make a match.

The Make a Match model is one of the most relevant and commonly utilized forms of cooperative learning in primary schools (Arni et al., 2024; Kusumaningtyas & Mirtasari, 2024). This concept is intended to emulate an educational game that incorporates both physical activity and cognitive exercises concurrently, enhancing the

learning experience for students through increased engagement and challenge. Make a Match, with its straightforward syntax of pairing question/concept cards with answer/definition cards, offers numerous advantages that have rendered it a favored subject of research in elementary schools (Dewi et al., 2025). This model may cultivate an engaging and dynamic learning environment through its gamified elements, thereby enhancing student motivation and enjoyment, which has been demonstrated to improve interest and educational outcomes (Viyayanti & Dwikoranto, 2021). It can enhance student collaboration and interaction, both among peers and with educators, rendering the learning experience more dynamic and inclusive for all learners (Alaida, 2025; Widjanarko & Pranoto, 2024). It cultivates a culture of mutual support and collaboration among students, leading to equal educational outcomes, wherein those in need receive greater aid from more proficient peers. It can also cultivate students' ability to study autonomously, identify solutions, and articulate viewpoints while enhancing communication skills, so rendering the learning process more significant and fulfilling the anticipated educational objectives, particularly in understanding topics. This benefit is more pertinent in the post-pandemic era, as students want activities that may rejuvenate the spirit of learning through engaging gaming features. This renders Make a Match an efficacious model for enhancing learning results across diverse areas (Juliani et al., 2021; Viyayanti & Dwikoranto, 2021).

Although there has been a rise in scientific publications regarding the Make a Match Learning Model's effects on primary school learning outcomes from 2020 to 2025, the majority of the material consists of localized experimental research or case studies. These studies emphasize direct classroom outcomes, including learning inputs and outputs, although they fail to offer a systematic review of the evolution of Make a Match Model research concerning learning outcomes at the national level. As a result, a detailed knowledge map outlining the trajectory and trends of research on this model remains inadequately defined in the existing literature, despite preliminary data from sites like Google Scholar suggesting a notable rise in study interest. This signifies that, while advancements at the micro level are being made, synthesizing knowledge from diverse studies necessitates a more comprehensive approach to grasp the overall impact of these investigations. This circumstance is substantiated by prior bibliometric analyses that have effectively delineated various educational models, including Game-Based Learning in Islamic Religious Education, Problem-Based Learning (PBL) in Social Studies, the utilization of games as a pedagogical medium, Contextual Teaching and Learning (CTL), and cooperative learning broadly within elementary education. Nevertheless, none have explicitly examined the Make a Match Model about learning outcomes in elementary schools within the 2020-2025 timeframe, despite the existence of experimental studies connected to Make a Match, such as those in the archiving subject conducted by Fauhah and Rosy (2021). Consequently, bibliometric analysis serves as a strategic approach to reveal latent potential within the current literature while offering an empirical foundation for the advancement of cooperative learning models in elementary education.

This study employed bibliometric analysis as the principal tool to address the macro-level literature deficit. Bibliometrics is a quantitative research methodology ideally suited for quantifying and delineating the trends of scientific publications over a designated timeframe (Klarin, 2024; Pessin et al., 2022). This method's value lies in its capacity to convert thousands of disparate metadata entries (acquired from Google Scholar through Publish or Perish (PoP) files) into a coherent knowledge map utilizing VOSviewer software (Al Husaeni & Al Husaeni, 2022; Martins et al., 2024). VOSviewer is a software application created by Van Eck and Waltman in 2010 at Leiden University in the Netherlands (Bukar et al., 2023). This study employs network and density visualization to provide an objective and quantifiable overview of the trajectory of Make a Match research, encompassing an analysis of keyword co-occurrence and citation distribution that elucidates relationships among studies. This method facilitates the amalgamation of data from diverse sources, yielding more thorough and dependable outcomes for longitudinal research.

This study possesses significant academic urgency in delineating the patterns and trajectories of research advancements regarding the Make a Match approach and its impact on learning outcomes in primary schools from 2020 to 2025. The findings of this analysis are anticipated to serve as a substantial scientific reference that directs future research trajectories while also offering practical help for educators and policymakers in comprehending optimal learning models to enhance student learning outcomes. This research is anticipated to promote the overall advancement of basic education by emphasizing innovative options that correspond with national educational objectives. This study seeks to delineate the overarching dynamics of scientific papers about the Make a Match learning model and its impact on learning outcomes in elementary schools during the 2020–2025 period. This study specifically examines publishing trends and significant journals and determines predominant keywords to address the gap in the literature.

2. METHOD

This study uses descriptive quantitative and bibliometric methods. This research analyzes numerical data from scholarly papers on the Make a Match learning model and its impact on primary school learning outcomes from 2020 to 2025; hence, this descriptive quantitative method was used. The data contains publications, keywords, and journals. The data will be statistically processed and presented descriptively to provide a methodical, factual, and accurate overview of research on the issue.

Bibliometrics is used to discover the most productive authors, dominant institutions, and relevant journals and publishers by analyzing research trends over time. Keyword mapping and research topic density are mapped using bibliometric analysis to determine the direction of research on the Make a Match learning paradigm and its impact on primary school learning outcomes. Thus, this research is bibliometric-based quantitative descriptive research that analyzes publishing trends, prominent keywords, and principal journals. The findings are expected to trace the progress of research on the Make a

Match learning model and elementary education learning outcomes and provide a foundation for future research and learning strategies.

This analysis included all 2020–2025 scientific literature on the Make a Match learning approach and elementary school learning outcomes. Google Scholar, Crossref, and Open Alex databases were used because they contain broad scientific literature coverage, simple search methods, and easy access to articles from indexed journals. Publish or Perish (PoP) software was used to organize published publications to improve search results. Our research sample came from a national Google Scholar article screening utilizing Publish or Perish (PoP) software. For 2020–2025, "Make a Match," "Learning Outcome," and "SD" or "Primary School" were used for screening. The sample articles were published in accredited national journals, directly applied the Make a Match learning model to elementary school learning outcomes, were full-text, and were within the research period. This selection method revealed several national papers eligible for analysis to demonstrate research trends on the Make a Match learning paradigm in Indonesian primary schools.

This study used secondary data to document data. Google Scholar, Crossref, and Open Alex searches yielded pertinent scientific papers, which were compiled using Publish or Perish (PoP) software version 8. Data collection begins with 2020–2025 Publish or Perish publications. These publications were exported into Research Information System (RIS) format, which includes authors, year, title, volume, edition, pages, DOI, keywords, and institutional affiliation (where available). Mendeley was used to compile, and export Publish or Perish findings in RIS format. VOSviewer analyzes trends using bibliometric maps. Network, overlay, and density representations show analysis results. A bibliometric approach is used to analyze the collected data to show publication trends, dominant keywords, primary journals, and research developments related to the Make a Match learning model on elementary school learning outcomes for 2020–2025.

This study used Google Scholar, Crossref, and Open Alex journal databases for bibliometric analysis. Data were obtained using Publish or Perish (PoP) software to obtain metadata of relevant scientific articles from 2020 to 2025 using the keywords “Make a Match” and “Learning Outcome” and “SD” or “Primary School.” Bibliometric analysis was used to describe publishing trends, identify prominent keywords, and identify the main journals for the Make a Match learning model on elementary school learning outcomes. The number of publications, keyword frequency, and journal frequency were analyzed using Mendeley and VOSviewer to map collaborative networks and bibliometric visualization. This quantitative literature study uses secondary data from Google Scholar, Crossref, and Open Alex-indexed scientific journals. This approach should give a systematic summary of studies on the Make a Match learning model and primary school learning outcomes during the previous five years and suggest future research.

Documentation is the main data collection tool in this project. The Google Scholar database contains research publications about the Make a Match learning methodology and elementary school learning results. Publish or Perish (PoP) software searched,

downloaded, and managed article metadata like title, author, year of publication, number of citations, keywords, and institutional affiliation.

This documentation provides notes and records of secondary data from scholarly articles. Data was handled and analyzed using Mendeley for reference management and VOSviewer for bibliometric network visualization. This documentation will be used to analyze publishing trends, study foci, and research development patterns related to the Make a Match learning model and primary school learning outcomes from 2021 to 2025. With this documentation tool, researchers can get valid and systematic data without gathering primary data. This material helps researchers support study goals with quantitative analysis and bibliometric visualization. Research requires data analysis to understand the phenomenon. This study used bibliometric analysis with PoP, Mendeley, and VOSviewer. The quantitative and descriptive analysis revealed trends, foci, and patterns of elementary school Make Match learning model research.

The data analysis stages in this study are as follows:

a. Determining Search Keywords

The initial step in bibliometric analysis is to determine search keywords relevant to the research topic, namely "Make a Match" and ("Learning Outcome") and ("SD" or "Elementary School"). Determining these keywords aims to provide an overview of the research scope and ensure that the data obtained aligns with the research focus.

b. Initial Search Results

Data searches were conducted through Google Scholar, Crossref, and Open Alex databases with the assistance of Publish or Perish (PoP) software. This allowed researchers to obtain initial metadata including title, author, year of publication, abstract, and keywords. The initial search results are expected to yield published documents (journal articles, proceedings, and research reports) relevant to the research topic from 2020–2025. These are then compiled in Research Information System (RIS) format to store important information such as author affiliations, references, and citation counts.

c. Search Result Refinement (Screening)

Initial search data was then screened to meet the research criteria. The criteria used in this study were:

1) Publications in the form of journal articles or proceedings relevant to the research topic.
2) Articles were published between 2020 and 2025.
3) Articles specifically discussed the application or study of the Make a Match learning model on learning outcomes at the elementary school level.
4) Articles were available in full-text format or had clear metadata (title, author, year, keywords, journal, and abstract).
5) Articles that did not meet the criteria, such as books, theses, or irrelevant articles, were eliminated.

d. Compilation of Initial Statistical Data

Articles that passed the screening stage were then exported in RIS format for subsequent import into the Mendeley application. This step was carried out to

complete the article metadata (title, author, year of publication, journal, keywords, and abstract). The completed data will serve as the basis for bibliometric analysis.

e. Data Analysis

The prepared data was then analyzed using VOSviewer software. The analysis was conducted to:

1) Present publication trends of Make a Match articles on learning outcomes in elementary schools from 2020–2025.
2) Identify the main focus of the research study, focusing on learning outcomes.
3) Map relationships between keywords (keyword co-occurrence) to examine the relevance of the research topics.
4) Present the analysis results in the form of network visualization, overlay visualization, and density visualization.

f. Drawing Conclusions

The results of the data analysis were used to answer the research questions, namely regarding publication trends, identifying dominant keywords, and determining primary journals as publication outlets for the Make a Match study on learning outcomes in elementary schools from 2020–2025.

3. RESULTS AND DISCUSSION

Results

Data Description

This study used Publish or Perish software to search Google Scholar, Crossref, and OpenAlex databases for educational articles using the keywords "make a match" and ("hasil belajar" or "learning outcome") and ("sd" or "elementary school"). These were selected using Mendeley based on screening criteria to build a dataset, which VOSviewer evaluated and mapped. Years of research have examined the Make a Match learning model's impact on primary school learning. Using the keywords "make a match" and ("hasil belajar" or "learning outcome") and ("sd" or "sekolah dasar"), along with article document data, a data search and analysis of research articles from 2020-2025 was conducted to identify relevant research on the Make a Match learning model and elementary school learning outcomes.

The screening yielded 130 articles (see appendix table). The screening findings were gathered from Google Scholar, Crossref, and OpenAlex databases, with 130 of the 582 original data screened by Publish or Perish and Mendeley as the Make a Match learning model study used for analysis. Due to predetermined inclusion and exclusion criteria, 452 documents were excluded from the research data sample. Also sampled were 130 published articles. This stage was optimized to find suitable articles for analysis according to the study's problem formulation. The data was recorded in RIS format and converted into networks and maps using VOSviewer software. Display scientific publication growth graphs in Microsoft Excel. Data processing produces network, overlay, and density visualizations. The network visualization map shows keyword-related research themes' relationships and clusters. Overlay visualization shows annual research patterns. Density visualization predicts research trends.

Results and Analysis

Scientific Publication Growth Trends

Bibliometric analysis of the Make a Match learning model in Elementary Schools (SD) resulted in a total of 130 publications during the period 2020 to 2025. Annual publication trend data is presented in Table 1.

Table 1. Number and Percentage of Publications (2020-2025)

Year	Number of Publications	Percentage
2020	12	9%
2021	15	12%
2022	17	13%
2023	24	18%
2024	36	28%
2025	26	20%
Total	**130**	**100%**

Table 1 indicates a tremendous increase in elementary school Make a Match model research. From 12 in 2020 to 36 in 2024, publications increased steadily. With 28% of 2020-2025 output coming from 2024 articles, this rise is not linear but accelerated.

According to the innovation diffusion model, cooperative learning techniques like Make a Match are most accepted by researchers and teachers after the epidemic. The high numbers in 2023 and 2024 demonstrate that the education industry has adapted to the requirement to improve primary school pupils' social contact and learning results after distant learning. In classroom action research (CAR), instructors find this paradigm practical and easy to implement, which leads to many articles in national education journals.

The minor drop in 2025 (26 documents) should be understood in light of bibliometric data temporal alignment restrictions. Indexing delays or lags often cause a decline in the final year of the study. Mid- to late-2025 publications may not have been fully aggregated and indexed by databases until the conclusion of the data collecting period. With 26 articles, 2025 was one of the most productive years for this model, demonstrating continued interest.

Most Productive Journals Based on Document Contributions

Identification of the core publication sources (journals) that contributed most significantly to the literature on Make a Match to Learning Outcomes in Elementary Schools resulted in the top 5 journals, which collectively contributed 27 documents.

Table 2. Journals with the Most Article Publications (2020-2025)

No.	Journal Name	Number of Documents (N)	Percentage of Sub-Total 27(%)	Percentage of Total 130(%)
1.	Pinisi Journal Pendidikan	11	41%	8%
2.	Guru Sekolah Dasar Pendas: Jurnal Ilmiah Pendidikan Dasar	5	19%	4%

No.	Journal Name	Number of Documents (N)	Percentage of Sub-Total 27(%)	Percentage of Total 130(%)
3.	Primary: Jurnal Pendidikan Guru Sekolah Dasar	4	15%	3%
4.	Jurnal Pendidikan Dasar	4	15%	3%
5.	Jurnal Basicedu	3	11%	2%
	Total	27	100%	21%

At 11 publications, the Pinisi Journal of Elementary School Teacher Education was the most prolific journal (Table 2). This journal accounts for 41% of the top five journals' publications, making it the hub of elementary school Make a Match literature. The journal's quality and focus on elementary school learning experiments explain its popularity, as they are the main focus of CAR research. PGSD or the Elementary School Teacher Education Journal, dominated the top five journals. This concentration ensures that research findings on the Make a Match model's efficacy are accessible to PGSD lecturers, students, and elementary school teachers, who are most likely to adopt and replicate it.

The top five journals (27 publications) account for 21% of all publications (N=130). This low percentage indicates significant literary fragmentation. Numerous journals host the majority of publications, accounting for 79%. The widespread acceptance of the topic across various publication forums confirms its relevance. This high dispersion makes systematic reviews difficult because they require lengthy journal searches to cover the material. Despite the presence of a strong core journal, interest in this topic spans multiple journals within Indonesian elementary education.

Primary Keywords Based on Frequency (Occurrences) and Total Link Strength

Top Keywords Based on Frequency and Relationship

The most frequently occurring keywords (with the highest number of occurrences) in the analyzed scientific articles are presented in Table 3. The top two keywords are "learning outcomes" (56 occurrences, Total Link Strength 77) and "make a match" (52 occurrences, Total Link Strength 65).

Table 3. Top Keywords Occurrence Frequency and Strength of Relationship

No.	Keyword	Occurrences	Total Link Strength	Klaster
1.	Learning Outcomes	56	77	2
2.	Make A Match	52	65	1
3.	Make A Match Model	20	23	4
4.	Cooperative Learning	11	20	4
5.	Learning Model	9	18	7
6.	Student Learning Outcomes	9	11	5
7.	Make A Match Learning Model	8	8	3

No.	Keyword	Occurrences	Total Link Strength	Klaster
8.	Islamic Education	8	13	2
9.	Social Studies Learning Outcomes	7	5	7
10.	Mathematics	6	8	9

These findings implicitly confirm the research framework. "Learning outcomes" and "make a match" are the two most frequently discussed central variables, reflecting the primary focus of research in this area. The strength of the relationships (Total Link Strength of 77 and 65) indicates that these two concepts not only appear frequently but are also highly connected to each other in the literature, confirming the Make a Match model's position as the most central intervention for researching learning outcomes improvement.

Network Analysis and Clusters (Network Visualization)

The network map (Figure 2) divides keywords into 12 color-coded clusters, with three main clusters having the largest connection density and node size:

1. Cluster 1 (Red): Focuses on "make a match" as a cooperative learning model related to psychological aspects of learning such as "motivation" and "learning interest."
2. Cluster 2 (Green): Focuses on "learning outcomes" as an outcome variable, which has a strong relationship with the subjects "Islamic education" and "mathematics."
3. Cluster 4 (Yellow): Focus on the "make a match model" and "cooperative learning", which have a close relationship with the implementation context in "elementary schools".

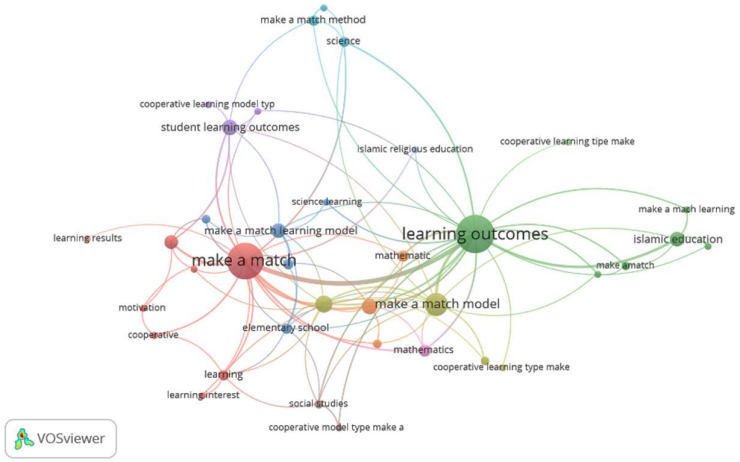

Figure 1. Network Visualization of Keywords

The "make a match" model (Cluster 1) and enhanced primary school learning outcomes (Cluster 2) are strongly conceptually related. Clusters 1 and 4 promote Make a Match's cooperative learning identity. This suggests that Make a Match's success in

improving learning outcomes (Cluster 2) is due to cooperative learning principles like student interaction, accountability, and a fun learning environment (reflected in Cluster 1's "motivation" and "learning interest"). Cluster 2 is strongly linked to mathematics, science, and Islamic religious education, suggesting that the Make a Match model is the most widely used and effective way to improve primary school math, science, and religious education.

Topic Development Trend Analysis (Overlay Visualization)

The overlay map (Figure 3) presents the research development trend over time from 2022 (blue) to 2024 (yellow).

1. Keywords that tend to be blue/green (early 2022-2023), such as "make a match" and "cooperative learning model type make a match," indicate that basic research on model application and learning outcomes began to be conducted extensively at the beginning of the period.
2. Keywords that tend to be yellow/light green (late 2023-2024), such as "make a match learning," "Islamic education," and "cooperative learning type make a match model," indicate a trend toward more specific research topics or recent term variations.

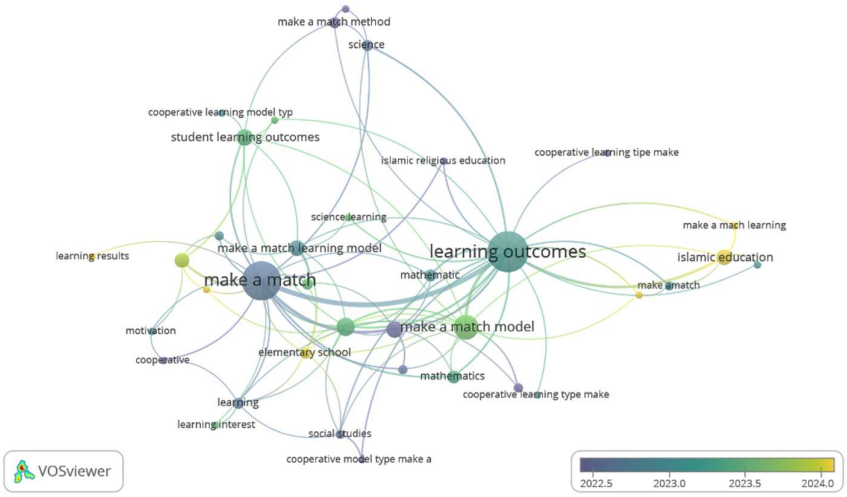

Figure 2. Keyword Visualization Overlay

The overlay visualization illustrates the maturity of topics. The fundamental research (Make a Match vs. Learning Outcomes) establishes a consistent basis from the onset of the period (blue/green). More particular phrases, such as "Islamic education," represented by yellow nodes (a new trend), indicate that academics are increasingly investigating the Make a Match model within more precise and contextualized topics. This trend signifies an endeavor to diversify and enhance proof of the model's efficacy across multiple subjects in primary education. This bibliometric data experimentally substantiates the significance of the Make a Match learning model, designating it as one

of the most prevalent and pertinent interventions for enhancing student learning outcomes at the elementary school level over the 2020-2025 academic period.

Keyword Density Analysis (Density Visualization)

The density map (Figure 4) shows areas of topic concentration and popularity. The density visualization shows two areas with bright yellow intensity (highest density):

1. The area encompassing the keywords "learning outcomes" and "mathematics."
2. The area encompassing the keywords "make a match" and "make a match learning model."

Figure 3. Density Visualization of Keywords

This high-density area confirms that the two main concepts (Make a Match and Learning Outcomes) are the most researched themes and have a central position in the analyzed literature. The presence of the subject "mathematics" in the high-density area indicates that most Make a Match research focuses on the context of mathematics learning in elementary schools.

Discussion

This discussion explores key findings from a bibliometric analysis of how the Make a Match learning model affects learning outcomes in elementary schools from 2020 to 2025.

Trends in the Growth of Scientific Publications

The period from 2020 to 2025 showed a significant increase in publications on the Make a Match model in elementary schools, with a total of 130. The number of publications increased steadily from 12 in 2020 to a peak of 36 in 2024. The year 2024 alone accounted for 28% of all publications from 2020 to 2025. This increase was particularly significant in 2023 and 2024. This aligns with the diffusion model of innovation, where cooperative learning techniques such as Make a Match are widely

accepted by researchers and teachers after the distance learning period. This model is considered practical and easy to implement in teacher Classroom Action Research (CAR), sparking numerous articles in educational journals. The slight decrease in 2025 (26 articles) is likely due to limitations in the temporal alignment of bibliometric data, where year-end publications may not have been fully indexed at the time of data collection. Nevertheless, the 26 articles demonstrate continued interest.

The analysis focuses on the most productive journals and the issue of literature fragmentation

Journal analysis identified the primary sources of publications as (1) Pinisi Journal of Elementary School Teacher Education, the most productive journal with 11 publications (41% of the top five journals), making it a hub for the literature on Matching in Elementary Schools. This dominance is due to the journal's focus on elementary school learning experiments, a key focus of CAR research. (2) The top five journals accounted for only 21% of the total publications (27 of 130 articles). This indicates significant literature fragmentation, with 79% of publications spread across numerous journals. While indicating broad acceptance of the topic across multiple publication forums, this high dispersion complicates a systematic review, as it requires extensive journal searches.

Analysis of Keywords and Research Themes

Frequency and Strength of Relationships

The most frequently occurring keywords were "Learning Outcomes" (56 occurrences) and "Make a Match" (52 occurrences). The high frequency and strength of the relationships (Total Link Strength of 77 and 65) confirm that these two concepts are the most discussed and interconnected central variables in the literature, confirming the research framework.

Topic Network and Clusters

The network visualization shows the relationships and groupings of themes (12 clusters). Clusters 1 (Red) and 4 (Yellow): Cooperative Identity. These clusters reinforce Make a Match's identity as a cooperative learning model. Cluster 1 focuses on "making a match," which is related to psychological aspects such as "motivation" and "learning interest." This implies that Make a Match's success in improving learning outcomes (Cluster 2) is closely related to cooperative learning principles that encourage student interaction and a fun learning environment. Cluster 2 (Green): Outcome Variables and Subjects. This cluster focuses on learning outcomes and shows strong relationships with Islamic education and mathematics. This suggests that Make a Match is the most widely used and effective intervention for improving learning outcomes in mathematics, science, and religious education in elementary schools.

Topic Development Trends (Overlay Visualization)

The overlay visualization shows topic development from 2022 (blue) to 2024 (yellow). Research Foundation (Beginning of the 2022–2023 Period): Blue/green keywords, such as "make a match" and "cooperative learning model type make a match," indicate that basic research on model application and learning outcomes was well established at the beginning of the period. Topic Specialization (End of the 2023–2024 Period): Yellow/light green keywords, such as "Islamic education" and "make a match learning," indicate a trend toward more specific and contextualized topics. This trend reflects efforts to diversify and strengthen evidence of the Make a Match model's efficacy across various elementary school subjects.

Concentration and Popularity (Density Visualization)

The density visualization highlights areas of highest topic concentration. The two highest-density areas (light yellow) are "learning outcomes" and "mathematics," and the areas are "make a match" and "make a match learning model." These findings reaffirm that Make a Match and Learning Outcomes are central themes. However, the presence of "mathematics" in the highest density area indicates that most Make a Match research focuses on the context of elementary school mathematics learning.

Building upon the analyzed bibliometric data, this study provides an overview of how the Make a Match (MaM) Model and related research develop and interact within the educational literature.

Table 4. Comparison of Literature with Research Findings

Findings	Research Findings (2020–2025)	Implications of Comparison with Previous Research
Growth Trends	Significant increase, peaking in 2024 (36 publications).	Demonstrates massive adoption post-pandemic. Previous literature (before 2020) may have indicated a more linear growth, while this data highlights a period of accelerated adoption of the innovation.
Central Variables	"Learning Outcomes" and "Make a Match" had the highest frequency and strength of relationship (TLS 77 & 65).	This confirms a long-standing fundamental hypothesis in education: MaM is a key intervention for improving learning outcomes. These findings provide a large quantitative dataset (N=130) that validates the focus of previous MaM research.
Subject Focus	The highest density was in Mathematics, followed by Science and Religious Education.	While previous literature may be scattered, this study demonstrates a strong concentration of themes. The predominant focus on Mathematics and Religious Education indicates that researchers believe the model is highly effective (or highly needed) in these subjects.
Topic Development Direction	The trend shifted from basic topics ("make a match," "learning outcomes") to more	This demonstrates that MaM research has reached maturity. Academics are no longer simply testing basic efficacy

Findings	Research Findings (2020–2025)	Implications of Comparison with Previous Research
	specific topics, such as "Islamic education" (yellow nodes in the overlay).	but are now investigating the model's efficacy in more specific contexts and fields.
Implementation Practices	The dominance of publications in the PGSD Journal was driven by teachers' CAR, who found this model practical.	This confirms the relevance of MaM at the practitioner level (primary school teachers). Previous literature may have been dominated by academic experimental studies, while this data highlights that MaM adoption is heavily influenced by ease of implementation in the field.

This bibliometric research not only collected data but also visualized the structure and trends of the literature, making important contributions: (1) Validation of the Central Research Framework: Quantitatively, this research validated that the relationship between “Make a Match” and “Learning Outcomes” is the main and strongest focus among all related topics in elementary school (highest TLS). (2) Topic Architecture Mapping: Through network visualization, this research grouped MaM into clusters related to psychological aspects (“motivation” and “learning interest”), strengthening the theoretical rationale for why this cooperative model is successful. (3) Research Gap Identification (Gap Analysis): The overlay visualization (time trend) shows that new topics (yellow nodes), like "Islamic education," are becoming more popular. Future researchers can use this to identify specific areas that remain unexplored and warrant further investigation. This research serves as evidence-based evidence that solidifies the Make a Match Model as an important and sustainable pedagogical intervention in elementary schools, while also charting the course for future studies.

This bibliometric research experimentally reinforces the significance of the Make a Match Learning Model:

1. Strengthening Efficacy: These data point to Make a Match as one of the most prevalent and relevant interventions for improving student learning outcomes at the elementary school level during the 2020–2025 period.
2. Future Research Directions: These findings map the development trends of the topic, indicating a shift from basic research to more specific and contextual case studies in specific subjects (such as Islamic Religious Education).
3. Identifying Central Journals: Primary school teacher education journals that dominate publications (such as Pinisi) can serve as primary references for researchers, lecturers, and elementary school teachers who wish to adopt or replicate this model, ensuring relevant findings are readily accessible.
4. Subject Focus: Identification of dominant research in mathematics (highest density) and other subjects (such as Islamic religious education and science) provides practitioners with insight into the most popular and promising areas for model implementation.

4. CONCLUSION

This bibliometric study analyzed 130 scientific publications related to the Make a Match (MaM) Learning Model and learning outcomes in elementary schools during the 2020–2025 period. The results showed a remarkable increase in the number of publications, peaking in 2024 with 36 articles (28% of the total). This increase indicates high adoption and acceptance of the MaM model as a relevant intervention at the elementary school level, especially after the distance learning period. The two main research concepts that appeared most frequently and had the highest relationship strength were "Learning Outcomes" and "Make a Match." This confirms that MaM is the most central intervention for researching student learning outcomes in elementary schools. Density analysis showed the strongest concentration of research on the relationship between MaM and "Learning Outcomes" and the subject of "Mathematics." Furthermore, the MaM model was also widely associated with improving learning outcomes in science and Islamic Religious Education. The literature shows significant fragmentation, with the top five journals accounting for only 21% of the total publications. Nevertheless, there are highly productive core journals, such as the Pinisi Journal of Elementary School Teacher Education. The dominance of elementary school teacher education journals indicates that this research is driven by practical studies that are easily adopted by teachers. Furthermore, research trends are moving away from basic studies of MaM versus learning outcomes toward more specific and contextualized topics, as indicated by the emergence of terms such as "Islamic education" among the latest trends (yellow nodes).

As a suggestion, research focus can be shifted to less dense (low density) or emerging areas. For example, examining the efficacy of MaM in subjects outside of mathematics, science, and Islamic religious education, which have low density, or in more specific classroom-level implementation contexts. Given the fragmented literature, researchers are encouraged to conduct comprehensive systematic reviews (not just bibliometric ones) to synthesize qualitative findings from a wide range of journals. Elementary school teachers are advised to continue adopting the Make a Match Learning Model, especially in teaching mathematics, as the subject is the area most supported by empirical evidence (highest density). In addition, the journal management can consider initiatives to reduce literature fragmentation by promoting collaboration or special publications (thematic editions) on cooperative learning models in elementary schools.

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