

DEVELOPMENTS ON TEACHER COMPETENCY ISSUES AND THEIR DEVELOPMENT IN THE FUTURE ERA THROUGH A BIBLIOMETRIC ANALYSIS REVIEW: A REVIEW OF RESEARCH PUBLICATIONS 2010-2025

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Abstract

This research is motivated by the important role of teachers in advancing education, but there are still various problems with teacher competence that have an impact on the quality of learning. The purpose of this study is to examine trends, dominant topics, active researchers, and potential renewable issues regarding teacher competence during the period 2010-2025. The approach used is quantitative with bibliometric research method. The main data source comes from 500 publications in the Google Scholar database extracted using the Publish or Perish application and visualized with VOSviewer. The research was conducted in April 2025 and analyzed using qualitative descriptive techniques. The results showed that the publication trend increased since 2010, peaked in 2020, and decreased dramatically in 2025. The dominant source of publication is e-journals as many as 386 sources (80%), and the most productive researchers come from Padang State University as many as 4 people including Fivia Eliza, Rahmat Hidayat, Dwiprima Elvanny Myori, and Doni Tri Putra with each producing 2 publications (a total of 6 publications). Dominant topics include PMM, professional competence, and teacher performance. The conclusions indicate the need to strengthen teacher competencies through more in-depth research. Limitations of this study include the non-use of international scale data and limited visualization. Further recommendations include the use of the Scopus database and a broader exploration of the dynamics of teacher competence globally.

Keywords: Bibliometrics, Competencies, Education, Teachers

INTRODUCTION

Education discussions will never end because it is the most important element that is always attached throughout human life until returning to His bosom. The importance of education in the dimensions of human life is in line with the support put forward by Ellen Field, et al. (2023) where they stated that the curiosity of mankind in gaining knowledge makes the aspect of education an important thing as a self-reflection to remain its nature as a creation of Allah SWT. on earth. A similar opinion was expressed by Al-Attas that the main target of education, specifically Islamic education, is to try to strengthen human identity to understand the existence of himself as a servant of God (Muamanah & Syafa'ati, 2020). Based on the description, it can be concluded temporarily that education is very urgent and has a strategic position for human individuals, namely understanding their identity and achieving the deepest knowledge. The progress of education will never be realized without elements that support the process. Referring to the efforts in literature carried out by Faiha & Riska (2024) state that the components that support the educational aspects in school institutions include educational goals, educators, students, teaching materials, learning systems, and evaluations. Furthermore, the discussion that will often be raised in this description is related to educators as an important aspect of supporting the progress of education.

It is generally known that specifically in Indonesia, educators are attributed in more detail to teachers. Tracing the genealogy of the word when viewed from the linguistic meaning in the Online KBBI, a teacher is a person whose job/livelihood/profession is teaching (Badan Bahasa Kemdikbud RI, 2016). Viewed from a terminology perspective, a teacher is an educator whose main task is to educate, teach, guide, direct, train, assess, and monitor students (Arifin, 2021). According to Muhddinur (2019) stated that a teacher is someone who has the responsibility to provide guidance and coaching to students. Meanwhile, Maulana Akbar's view (2020) is that the teacher is a central figure who holds control over the learning and teaching process, and according to Irma & Nursiwi (2023) views that a teacher is someone who plays a role in facilitating students to develop their competence, reasoning skills, and moral values to achieve success in the future.

Judging from the various definitions regarding teachers, on the other hand, teachers as educators also have an important role in the educational process, including as executors of the learning and teaching process, learning managers, educators and mentors, class leaders and managers, and

improving the quality of education (Buchari, 2018; Juhji, 2016; Nurzannah, 2022). Then, categorically, it is generally known that teachers in the world of education are divided into several classifications, including class teachers, namely teachers who teach all subjects at the elementary education level, subject teachers, namely teachers who only have the task of teaching one subject both at the elementary and secondary education levels, guidance and counseling teachers (BK), namely teachers who are tasked with providing counseling services in the personal, social, learning, and career areas, then special education teachers, substitute teachers, honorary teachers, permanent teachers, and professional teachers, namely teachers who have teacher certification (Al Habsy et al., 2024; B. Uno & Lamatenggo, 2016).

Islam also views teachers as being classified into several parts, including Muslim, namely teachers who convey knowledge, both religious and worldly, next is murabi, namely educators and moral instructors whose duties are not only to teach but also to educate morals and shape the personality of students, third is muaddib, namely teachers of the values of politeness, ethics, and manners, fourth is mursyid, spiritual/spiritual guides, and finally is da'i, namely teachers who act as preachers to the wider community (Amin et al., 2021; Bakar et al., 2024; Eka & Baidlawie, 2018; Huda, 2024; Mukhlis, 2020). Teachers have a position as educators, and it is necessary to have several competency skills that must be possessed by them, according to law number 14 of 2005 concerning Teachers and Lecturers, there are at least four core competencies that must be possessed by a teacher, including pedagogical, personality, social, and professional (Hasnawati, 2020). In Ki Hajar Dewantara's view regarding teacher competence, he emphasizes the teacher's ability to be a role model, inspire enthusiasm for learning, and provide encouragement to students (Huda, 2020; Nita et al., 2023).

Teachers as the driving force of education in Indonesia in particular have a very strategic and important role. Where to the data records from the Ministry of Education, Culture, Research and Technology (Kemendikbudristek) there are around 3.39 million teachers currently located throughout the archipelago with a composition of 960,633 male teachers and 2,436,161 female teachers in the odd semester of the 2024/2025 school year (Databoks, 2024). With such a large quantity, it is a potential that can move the wheels of education to be more advanced, but in reality, in the field it encounters challenges. In the practical realm, problems have been found regarding teacher competence which are divided into two categories, namely internal and external, in the internal realm, these

problems include the lack of teacher ability in using teaching media, lack of professionalism, lack of learning experience, difficulty in class management, lack of teacher awareness of the role as a role model, violations of ethics and norms, and neglect of personality competence, while in the external realm, these problems are inadequate facilities and infrastructure, a curriculum that is not flexible enough, administrative demands, low welfare of educators, inconsistent government policies and differences in standards between general and religious education (Baharuddin & Maunah, 2022; Rohman, 2016; Suryana et al., 2022; Sutrisna & Artajaya, 2022).

From the problematic dynamics that occur, efforts are needed to overcome them which are solution-oriented and constructive. Several parties have attempted to provide teacher competency strengthening, including research conducted by Sanita & Nurhasannah (2024) by utilizing digital learning resources and integrating them into learning, it has been proven to be effective, then Heny, et al. (2024) with workshop training to implement the Blended Learning system in learning, then to direct and measure learning achievements based on research by Asrina & Enung (2024) namely the need for the implementation of academic supervision by the principal as the leader of the local educational institution, and based on research by Nadhrah & M. Sirozi (2024) Efforts to develop teacher competency are carried out through planning based on local wisdom and its effective use.

In addition, the same effort is also intended by researchers to provide breakthroughs in solving problems related to teacher competence through this research, where the research conducted is to observe/investigate research results on the topic of "Teacher Competence" to formulate important issues and have the potential to be developed in the future into an applicable step for various parties with a review conducted using bibliometric analysis as a differentiator and is new compared to previous research. The research to be conducted is guided by the formulation of research problems, including: (1) What is the trend in the development of scientific publications on teacher competence issues from 2010 to 2025? (2) What are the sources of publications that contain the most studies on teacher competence? (3) Who are the most productive researchers and institutions in producing publications on teacher competence? (4) What are the dominant topics that are often studied related to teacher competence and its development in research publications? (5) What is the potential for the latest themes that can be developed from the results of bibliometric analysis of teacher competence for future needs? From the problem formulation guide, the aims of this research are: (1) To examine the development of research

topics regarding Teacher Competence over the last 15 years, (2) To identify the main themes and topics that are frequently studied in teacher competency publications over the last 15 years, and (3) To provide recommendations for the direction of teacher competency development in the future era based on the findings of bibliometric analysis.

METHOD

The research was conducted using a quantitative approach, namely an approach to research based on data in the form of numbers and statistical analysis to describe phenomena (Fisher & Fisher, 2011). This approach aims to test theories, measure variables objectively, and reveal relationships between variables (Östlund et al., 2011). The choice of this approach, as quoted from Creswell, is to describe the relationship between variables in answering the problem formulation of "to what extent", "how much", and "is there any influence" (Allwood, 2012). Based on his opinion in the context of this study, it is to see to what extent research publications on the topic of teacher competence have been produced from provider databases such as Google Scholar, Scopus, Web of Science, and so on over the last 15 years (2010-2025 period).

Specifically, the research method used is bibliometric research, namely a quantitative scientific method that aims to analyze publications of research results with a focus on patterns such as quantity of articles, citations, collaboration between authors, research topic trends, and the influence of publication sources or authors in a field (Huda et al., 2025; Öztürk et al., 2024). This method attempts to measure the scientific productivity of authors/institutions, assess impact through citations, map research trends, and identify scientific collaborations and developments in science (Huda, Hamdi, Nurhuda, et al., 2024; Mukherjee et al., 2022). Bibliometric research can be identified as including citation analysis, co-citation analyses, bibliographic coupling, co-authorship analysis, and keyword analysis to assess references, author collaboration, and the dynamics of developing topics (Ellegaard & Wallin, 2015; Huda, Hamdi, Ridani, et al., 2024).

The data used in this study were 500 research publication articles on teacher competency from 2010-2025 as shown in Figure 1 as primary data, journal articles, proceedings, papers, books, and valid internet sources as secondary data, and the research was conducted in April 2025.

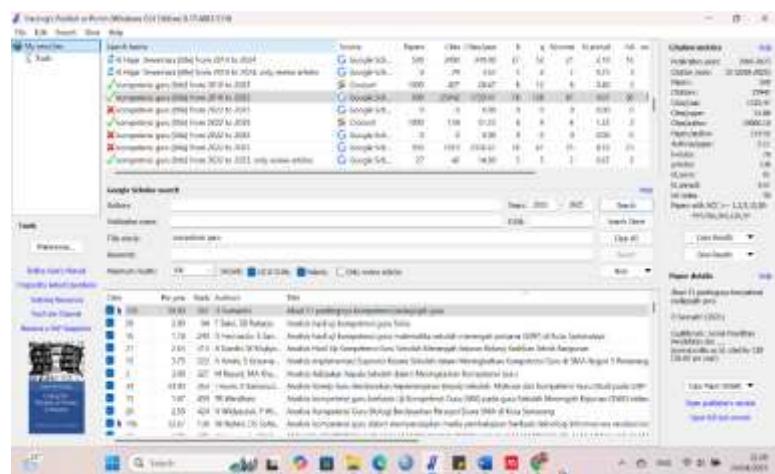


Figure 1. 500 Research Publication Articles on Teacher Competence (2010-2025) on Google Scholar Database as Primary Data

In addition, this study also uses several research tools to help the analysis process, namely by using three applications, including Google Scholar as a database (primary data provider), publish or Perish (PoP), and Vos Viewer. The Google Scholar application is a search tool that is easily accessible from Google in searching for scientific literature such as articles in the form of journals, theses, dissertations, proceedings, books, and proceedings from various scientific fields (Salamah, 2022; Wang & Howard, 2012), this application was chosen because of several of its advantages, including a tool that can find scientific literature, the availability of citation information, tracking of the latest research, and the availability of documents that can be accessed (Habibi et al., 2022; Wang, 2020). Second, the publish or perish application is an application that helps researchers in analyzing and evaluating scientific publications as well as the performance of citation data from various sources, one of which is Google Scholar (D. Linton et al., 2011; Madikizela-Madiya, 2023). Thirdly, the Vos Viewer application is an application used to design, describe, and explore bibliometric maps to see the relationship between elements in scientific literature such as authors, keywords, institutions, or documents based on citation data (Arruda et al., 2022; B. Hammouti et al., 2025; Ding & Yang, 2022).

After the data is collected, the next step is analysis. The analysis used in this research is descriptive qualitative data analysis. Qualitative descriptive data analysis means the use of quality research analysis methods to describe, explain, and understand the meaning of a social phenomenon based on non-numerical data with an emphasis on extracting meaning, patterns, and issues from the data that has been collected (Kim et al., 2017; Vaismoradi et al.,

2013). The choice of this analysis is so that researchers are freer and in-depth in analyzing research findings based on the formulation of the problem questions in the context of this research, namely the analysis of data findings from bibliometric research related to the topic of teacher competence which is the purpose of the study. In more detail, the flow of the stages of bibliometric research in this study can be seen in Figure 2 as follows:

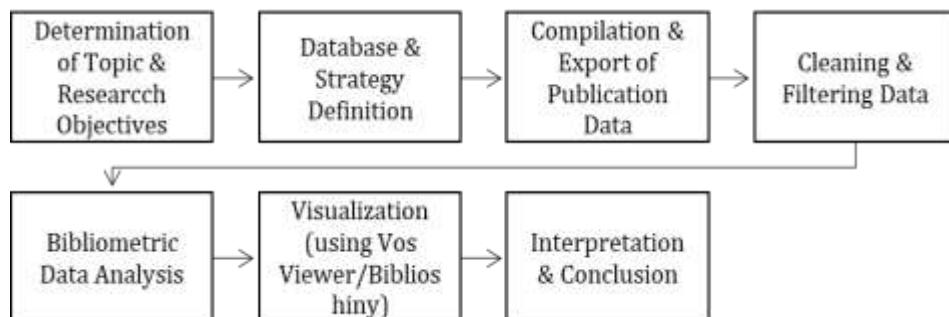


Figure 2. Research Flow Design Bibliometric Research
(Chai & Xiao, 2012; Deda & Disnawati, 2024)

FINDINGS AND DISCUSSION

Answering the first research formulation, namely the development of scientific publication research on teacher competency issues over the past 15 years (2010-2025), is to trace it through exploration of research publication searches using the Google Scholar application located in the Publish or Perish application as a data provider (database) on the topic. The steps used include, first, entering the keyword topic "teacher competency", then limiting the search range from 2010 to 2025, then limiting the number of publication data obtained is 500 articles, and from the automatic search results directly by the application, 500 publication articles were found, which were then carried out by manual analysis stages by sorting them which were reviewed from the year of publication as a criterion for the suitability of articles that met the requirements throughout 2010 to 2025, further as follows:



Figure 3. Development of Research Publications on Teacher Competence Issues (2010-2025)

Tracing the development of research on the issue of teacher competence as shown in Figure 3 above is the result of an analysis of 500 published articles originating from the Google Scholar database sourced from the Publish or Perish application as the main publication provider which was then analyzed by researchers based on the year of publication as a qualifying criterion. The analysis was carried out manually by the researcher himself where the publications that were mixed all years were randomly classified to enter their years so that the publications produced in 2010 were 2 studies which can then be seen in the quantity graph creeping up significantly where the largest number of publications occurred in 2020 as many as 71 publications which then in the last four years experienced ups and downs where in 2021 it fell by 5 points to 66 publications which in the following period decreased quite sharply in 2022 as many as 47 publications and increased again by 15 points in 2023 to 62 publications where the next period in 2024 decreased again by 18 points to 44 publications and in 2025 drastically decreased sharply to only 2 research publications.

Next, based on a manual analysis of 500 published articles conducted by the research after sorting, it was found that the number of published articles was filtered again to 494 articles. This is because there are the same keywords/titles (duplicates) and also the year of publication that experiences the same thing, namely repetition, so that the net number of the number mentioned is produced.

The second research data finding from this research is an attempt to investigate the main publication sources that are mostly produced from the issue of teacher competence by analyzing data from 494 published articles found in the Google Scholar database through the Publish or Perish

application which has succeeded in exploring what publication sources are developing with this topic, where the results are as follows:

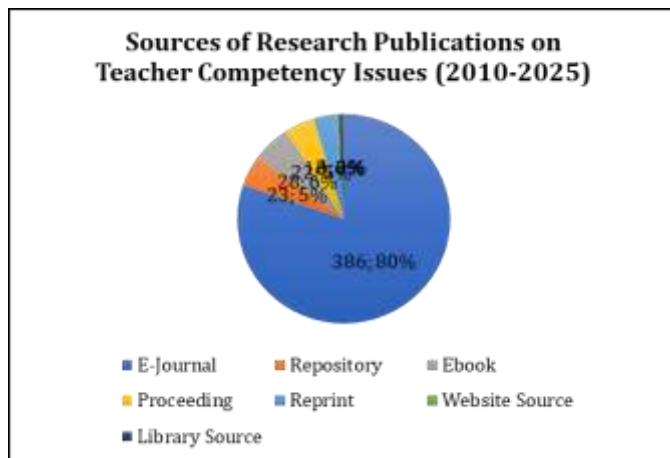


Figure 4. Research Publication Sources on Teacher Competence Issues (2010-2025)

Based on Figure 4 above, it is known that the sources of research publications on teacher competency issues from 494 publications originating from the Google Scholar database after being analyzed, there are several sources, including in the form of electronic journals (e-journals) as many as 386 publications, in the form of repositories as many as 23 publications, in the form of ebooks as many as 28 publications, in the form of proceedings as many as 22 publications, in the form of reprints as many as 16 publications, through the form of website sources as many as 2 publications, and in the form of library sources as many as 4 publications. Of the seven publication sources, it can be seen that the most dominant source is in the form of electronic journals (e-journals) which occupy the largest position with a percentage weight of 80% (386 publication sources), in second place is ebooks at 6% (28 publication sources), and in third place is the repository with a percentage of 5 (23 publication sources).

Electronic journals occupy the largest position as a source of publication on issues regarding teacher competence due to several advantages, including ease of access, speed of information dissemination, relatively minimal costs, ease of content updates, interactive presentation of data/information, supported by open access, more efficient data storage, ease of dissemination and citation of articles, and enabling the involvement (Ivanović et al., 2023; Monaco et al., 2024; Newman & Newman, 2024).

The third research finding is to investigate researchers who contributed to producing research publications on issues regarding teacher competence

over the past 15 years, namely from 2010 to 2025. The investigation of researchers who studied the issue was carried out with the assistance of the VosViewer application version 1.6.20 on 494 research publications originating from the Google Scholar database on the publish or perish application with the following stages:

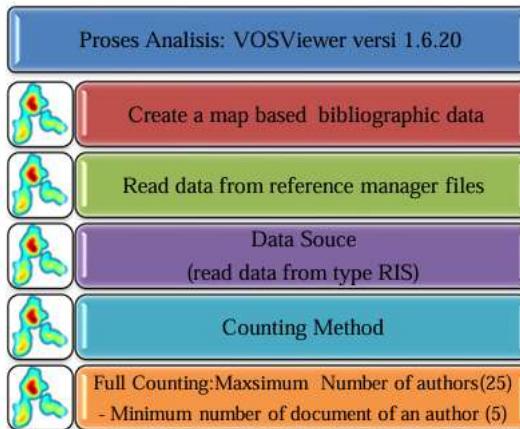


Figure 5. Stages of Discovery of Researchers Contributing to the Issue of Teacher Competence in the Last 15 Years 2010-2025 (Hamdi et al., 2024)

Based on Figure 5 above, the initial step is the selection of the type of data used by researchers to create visualizations based on the bibliographic data produced. The next step is the selection of identified data, namely by selecting the type of data in RIS format, then in the selection of the counting method, the full counting section is selected with a maximum number of authorship documents of 25. The selection results from the 25 total, 39 researchers were filtered from a total of 917 researchers, then automatically re-selected by the application so that 4 researchers meet the criteria and are related to each other as shown in the following figure:

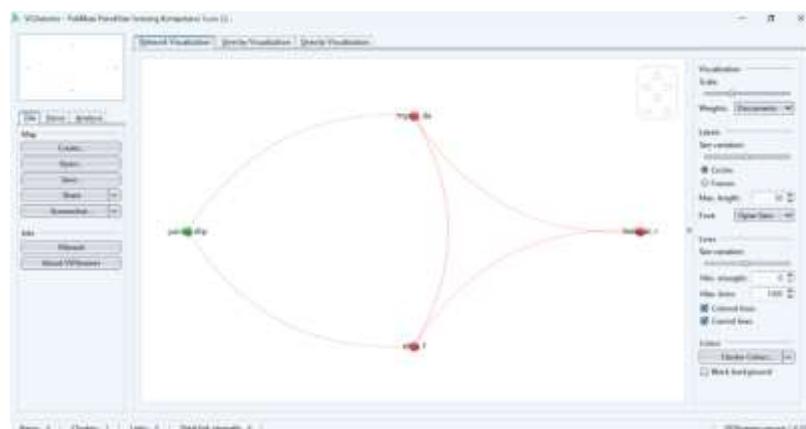


Figure 6. Researchers Who Contributed to Research Publications on Teacher Competence Issues in the Last 15 Years (2010-2025)

Based on Figure 6 above, it is known that the researchers who contributed to the focus of the research study on the issue of teacher competence for the last 15 years (2010-2025) include 4 researchers, the first researcher is Fivia Eliza who is an academic from Padang State University with a concentration of knowledge including in the fields of higher education, teaching methods, and educational technology which resulted in 2 research publications. The second is Rahmat Hidayat who is also a lecturer at the same institution as the first researcher, Padang State University with a field of knowledge namely vocational education which resulted in 2 publications. The third researcher is Dwiprima Elvanny Myori who is also a member of the same institution as the two previous researchers, namely Padang State University with a concentration of expertise in the fields of statistics, analysis, applied mathematics, and electrical engineering which resulted in the same publications as the two previous researchers, as many as 2 publications. The three researchers who have been described, based on further investigation by the researcher, were involved in the same collaboration when their work was published. The fourth researcher is Doni Tri Putra Yanto who is a lecturer from the same institution as the three previous studies, namely from Padang State University with the field of expertise in vocational education and electrical engineering which produces the same research publications as many as 2 publications and this fourth researcher is also together with the three previous researchers in one project. Therefore, it can be concluded that the four researchers who have been found are connected and related to each other.

The fourth finding in this study is trying to explore the issues that are developing and widely studied from the topic of teacher competence through the same steps as the search for contributing researchers, namely with the help of the VosViewer application version 1.6.20. through stages including the first selection of the type of data model in this study, namely selecting the create a map-based on text data menu, then in the data source section, read data from reference manager files is selected with the supported file type option being RIS, then in the counting method menu, Binary Counting is selected with a minimum number of occurrences of terms of 2 terms and the number of terms to be selected which is produced as many as 255 term items from 2884 term items, then automatically by the application it is filtered again with a percentage of 60% so that the items that are truly selected are as many as 153 items as can be seen in Figure 7. After obtaining items that meet the requirements by considering the term item issues related to teacher competence, the next step is the in-depth analysis stage which can be seen in

Figure 8 with the network visualization display mode.



Figure 7. Binary Counting Results with Minimum Number of Occurrences



Figure 8. Results of 153 re-selected items from 96 items with a network map display using the Network Visualization model in the Vos Viewer application

Based on Figure 8 above with the network visualization display mode, 153 items have been filtered by the application which is then reviewed again by the researcher for topic items that are relevant to teacher competency, this is because there are often keywords/items in the form of conjunctions, complements, and other additional words that are not definite words that have a clear and definite meaning, therefore a detailed review is carried out to avoid incompatibility, and the next flow is further analyzed. After being reviewed again by the researcher, the items that have been selected by the Vos Viewer application are automatically displayed so that the results are

around 65 items that are relevant to the teacher competency study.

The total of 65 term items based on Figure 8 above is also known and some items are divided into 11 clusters. Cluster 1 consists of 9 items including. Basic, religious teachers, Islam, Malang city, use of the Merdeka platform, mastery, PMM, SMK, and improvement strategies. Cluster 2 consists of 8 items, namely lecturers, identification, Malang district, Sumedang district, personality, professional competence, pedagogy, and role. Cluster 3 consists of 8 items, namely junior high school teachers, house training, Bandung city, increasing professionalism, influence of organizational culture, assessment, perception, and high school. Cluster 4 consists of 7 items, namely competence, competency, intervening, Malaysia, students, teachers, and teacher performance. Cluster 5 consists of 7 items, namely how, Banda Aceh, teachers in designing learning, teacher competence in compiling RPP, Banda Aceh city, public elementary schools, and ICT. Cluster 6 consists of 6 items, namely PAI teachers, religious education teachers, management, PAI management, and roles. Cluster 7 consists of 5 items, namely factors, teachers in preparing learning plans, teachers in preparing RPP, optimization, and RPP. Cluster 8 consists of 5 items, namely description, implementation, profession, study, and teaching staff. Cluster 9 consists of 4 items, namely teachers and lecturers, teacher personality, teacher competency concept, and according to Akhmad Sudrajat. Cluster 10 consists of 4 items, namely PAUD teacher competency, education, teacher competency test, and UKG. The last cluster 11 consists of 2 items, namely classroom action research training and PTK.

In addition, based on the network visualization display image, it is known that as many as 65 term items connected to 112 threads that are interlinked with as many as 117 networks have a very strong level of connection and attachment. Referring to Figure 9, several topics that are often studied with the issue of teacher competence recently include PMM, Malang City, Competence, and Teacher Performance with the closest study starting in 2022 based on the yellow display term items and their threads as follows:

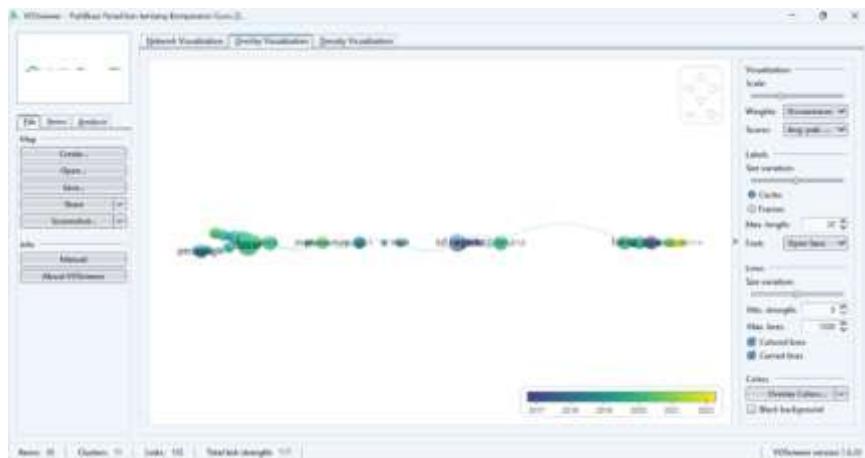


Figure 9. Frequently Reviewed Issues in Research Publications on the topic of Teacher Competence with the closest research occurring in 2022

The fifth final finding of this research is to try to explore some of the latest issues that can be developed, become study materials, discussions, and further studies by various parties, especially parties in the field of education and especially for teachers as educators and the motivator of the learning spirit. Some of the issues that can be explored more deeply based on the bibliometric review can be seen through the density visualization mode displayed in Figure 10 below:

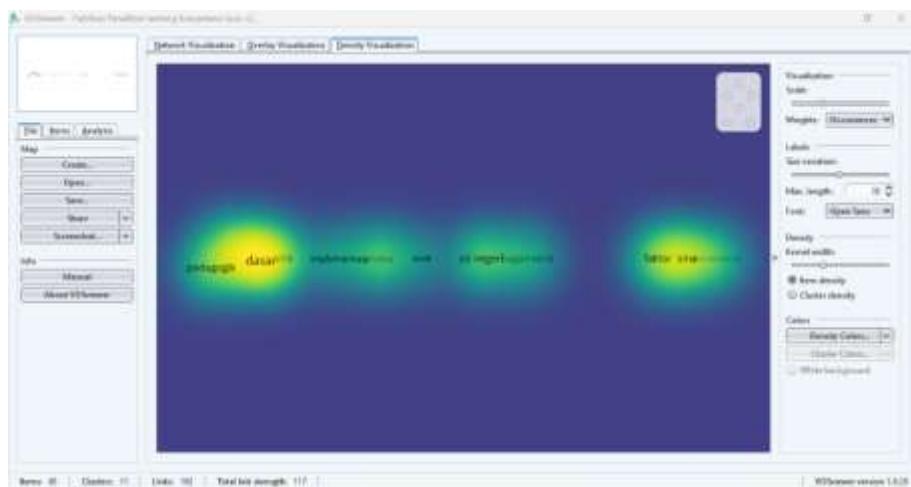


Figure 10. Frequently Reviewed Issues in Research Publications on the topic of Teacher Competence with the closest research occurring in 2022

Based on Figure 10 above, several renewable issues that can be further developed in the future are indicated by items in dim yellow (meaning not so bright) and tend towards dark, including identification, pedagogy, role,

description, implementation, profession, teaching staff, study, public elementary school, Banda Aceh, ICT, competence, and intervening. In contrast to items in bright yellow, including personality, professional competence of teachers, PAI, PAI teachers, Islamic religious education teachers, religious teachers, Islam, basic, education, management, PAUD teacher competence, PMM, mastery improvement strategies, Malang city, SMK, PTK, teachers in preparing RPP, Bandung city, factors, house training, assessment, junior high school teachers, perception, high school, influence of organizational culture, Malaysia competency, teacher, and student have the understanding that the bright color has many research publications.

CONCLUSION

The research that has been conducted has succeeded in answering the questions regarding the formulation of the problem and concluded several results. First, the development of research publications on teacher competency issues in the last 15 years (2010-2025) based on the graph has gradually experienced a significant increase starting in 2010 which only produced 2 publications then rose steadily in the following years and 2020 it peaked where the research publications produced were 21 publications, but in the following 4 years it experienced ups and downs and further decreased in 2025 which only had 2 publications again like the beginning in 2010.

Second, this study has also succeeded in investigating several sources of publications from research on teacher competence with a period of 2010-2025, of which there are 7 sources including e-journals, repositories, ebooks, proceedings, reprints, website resources, and library sources with the dominance of publication sources from e-journals as many as 386 sources (80%) followed by the second position, namely ebooks as many as 28 sources (6%), and the third position is the repository as many as 23 sources (5%). Third, this study has also found several researchers who contributed to research on the topic being studied, namely teacher competence, there are 4 researchers including Fivia Eliza, Rahmat Hidayat, Dwiprima Elvanny Myori, and Doni Tri Putra, all of whom come from the same institution/institution, namely Padang State University and each researcher produces 2 research publications that are also connected.

Fourth, this study has also identified several issues that are widely/often studied regarding teacher competence, including PMM, Malang City, Competence, and Teacher Performance, where the development of these studies has been growing from 2022 to the present. As the peak of the

findings of this study, namely fifth, it has also succeeded in identifying several new issues that can be developed in the future from issues regarding teacher competence based on bibliometric analysis through the density visualization display mode, including regarding identification, pedagogy, role, description, implementation, profession, teaching staff, study, public elementary schools, Banda Aceh, ICT, competence, and intervening as issues that still do not have many research publications.

The conclusion of this study provides a uniqueness that is not found in previous studies, namely by using bibliometric analysis as an analytical tool to provide suggestions for future studies for various parties, especially in the educational sector, to formulate them as carefully and as well as possible. In addition to the success of the research findings, this study also found limitations, including the absence of international scale data such as the use of the Scopus database, countries that predominantly publish research on teacher competence, the use of visualizations that are still limited and not in detail, and deeper analysis will be needed for subsequent research and researchers, especially types of research related to bibliometric research.

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