RESEARCH TRENDS OF TECHNOLOGY INTEGRATION IN TEACHING ENGLISH GRAMMAR AS FOREIGN LANGUAGE: BIBLIOMETRIC ANALYSIS IN 2013-2023

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Abstract: Technological developments have a significant impact on education, especially in the context of teaching English grammar as a foreign language. This research emphasizes the importance of understanding these technological developments. To find out about these developments, it is necessary to conduct an analysis. This research uses bibliometric analysis, it is an analysis that explains the mapping process based on research trends that utilize metadata processing analysis. The purpose of this study is to analyze and determine the development trend of research related to the integration of technology in teaching grammar as a foreign language from 2013-2023. Researchers use quantitative analysis methods in processing calculating the frequency of publications or citations. Both quantitative and qualitative processes used to analyze the data. The qualitative analysis process involves interpreting and understanding visualization the content of the data. Data search and database analysis using Scopus software, Ms. Excel and VOSviewer. The results of the research analysis highlight the fact that technology integration in teaching English grammar as a foreign language is still in a relatively new stage of development in the last ten years, from 2013 to 2023. A significant surge of attention to this topic occurred in 2022. New core topics emerged between 2020 and 2022, including discussions on multimedia systems, multimedia technologies and educational computing. In this context, multimedia technology takes center stage, signaling potential research directions for the future. This highlights the need for further development in multimedia technology-based teaching methods to support effective learning that is responsive to students' needs.
Keywords: *bibliometric analysis; technology integration; teaching English grammar.*

INTRODUCTION

Technology is playing an increasingly important role and influence in the teaching of English as a foreign language, especially in terms of assisting the role of teachers as one of mediating learning. Recent advances in technology have brought new and demanding situations and responsibilities for teachers in applying it in the learning process. Technology is increasingly being used in educational contexts. Technology has also played an important role in language teaching since the 1960s. The field of English language teaching has undergone significant changes due to the availability of more time and more advanced technology. These technological advances provide various opportunities to make teaching more interesting and effective (Liang, 2021). Utilizing technology in language teaching and learning opens up avenues for both teachers and students to explore novel learning opportunities and enrich their educational experiences.

Adapting to the evolving educational landscape where technology holds a pivotal role necessitates educators to be proficient in its usage. Leveraging technology to support students in their academic pursuits can significantly enhance learning outcomes. Employing technology in the classroom, aligned with standards and diverse learning objectives, facilitates successful language learning among students.

Whether teachers have one computer in their classroom, several computers, or rarely use the computer lab, English Language Teaching through Technology offers effective solutions for different levels of access. There are different types of technologies that can be used for English grammar teaching, such as computer programs and applications, self-learning software, and online learning platforms. These technologies can help teachers prepare interactive, engaging grammar teaching materials that are easily understood by students and help smooth the learning process. Students usually practice memorizing grammar rules and answering exercise questions from

textbooks during traditional grammar lessons. With the use of technology, grammar teaching can become more interesting and fun for students (Utomo & Ahsanah, 2020).

Technology readiness often refers to the expertise and experience of education stakeholders in using technology as a learning medium as well as the extent to which they benefit from the use of technology during the learning process. According to Kusumaningrum et al. (2022), to see the relationship and development of technology in grammar teaching in particular, it is necessary to conduct a review or analytical study. Each development will be able to guide which parts of existing research need to be improved and which developments are too far away to be applied. Technological advancements have resulted in many educational innovations and modifications. Its easy accessibility and affordability for education makes technology as a learning medium increasingly popular around the world (Jie & Sunze, 2021). Especially in English as a Foreign Language (EFL) classes, teachers can encourage students by providing audio and video materials, online media, multimedia software, etc. in the classroom. A wide range of skills can be taught in English language teaching by using technology such as speaking, listening, writing, and also reading. In the area of writing skills is Teaching English Grammar.

English grammar is one of the aspects of language learning that discourages learners from learning the language. Grammar is referred to as the generalization of linguistic aspects that make up the language system (Hashim et al., 2019). Understanding sentence structure patterns and using grammar as a tool when creating spoken and written texts are two ways to define grammar. Grammar will always be important in language development and should not be neglected. Although vocabulary study is the primary goal, grammar can and should be taught in the classroom. Concerns over potential boredom or difficulty can be overcome by using the right strategies and resources to make grammar learning interesting, rewarding and productive (Nurhidayat, 2021). Despite the challenges of these issues, teachers are using recognizable technologies for educational reasons (Suharti, 2022). Teaching grammar becomes more difficult without applying technology in the current situation.

English Grammar as a foreign language and technology have a close relationship in teaching and learning. The integration of technology in English grammar teaching has changed the way students learn and teachers teach, bringing significant benefits. Technology allows teachers to present grammar materials in a more interactive way. Students in grammar teaching become more centered in the learning process. Approaching grammar teaching using technology is an effective way to support the development of every grammar learning process. Students can use various applications, such as applications to increase vocabulary, improve grammar, and generate texts that can be accessed online (Parra & Calero, 2019). Grammar teaching gains supporting resources when technology integration is applied, the difficulties when teaching foreign grammar are facilitated by the use of appropriate technology. The advancement of grammar teaching technology is considered necessary to be further developed.

To see the progress of technology, it is necessary to see its development so that it can be a reference to choose which technology is very useful and which technology needs to be improved and which technology is still weak in development. Several studies have shown the impact of technology integration in teaching grammar to EFL learners. Among them are (Dinc, 2019; Liang, 2021; Rintaningrum, 2023; Sharom & Kew, 2021) who conducted research on the impact and benefits of using technology in classroom writing instruction. Other research from (Kumar et al., 2022) which studies the importance of technology. Another research based on (Wahyuni et al., 2020) which studies the types of technology used to facilitate language learning. Technological developments also need to be seen in the field of education, one of which is English language teaching. By looking at trends and following the flow of integrated technology, one way is to use bibliometric analysis.

Bibliometric analysis is one of the methods for researching technological developments. A highly preferred and accurate strategy for investigating and analyzing scientific research metadata on a large enough scope and specific basis is bibliometric analysis. Bibliometric analysis is a research method that uses bibliographic data on information about scientific publications, such as title, author, year of publication, etc. to analyze research trends, patterns, and impacts. By using bibliometric analysis, researchers hope to analyze the development of technology in grammar teaching, so as to create a teaching approach that is expected to be more effective and efficient in the future.

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The procedure of bibliometric analysis helps us to know all forms of research analysis that will be carried out with the form of interpretation results from data that has been mapped into visualization. So that with the use of bibliometric analysis, researchers are able to find the purpose of the research conducted. Bibliometrics is a field of study using mathematical and statistical methods. In addition to being able to effectively identify influential studies, authors, journals, organizations, and countries over a period of time, this method can provide a macroscopic overview of the vast amount of academic literature (Lee et al., 2020).

Based on the provided introduction, a potential research gap that could be addressed is the need for a comprehensive analysis of the current state of research on the integration of technology in teaching English grammar as a foreign language. The purpose of this study is to identify and analyze trends in research developments related to the integration of technology in the teaching of English grammar as a foreign language, specifically in the period 2013-2023. The purpose of this study was made more specific in order to help educational researchers deepen the scope of technology in teaching grammar as a foreign language, with the following research questions: (1) What are the developments of scientific research publications on Technology Integration in Teaching English Grammar? (2) What are the types of scientific publications on Technology Integration in Teaching English Grammar? (3) What is the most cited research on Technology Integration in Teaching English Grammar? (4) What are the results of visualizing research trends in technology integration in teaching grammar as a foreign language?

METHOD

The researcher used quantitative and qualitative methods of analysis with bibliometric analysis. Using bibliometric analysis to conduct a literature search on the use of technology in teaching English grammar. In modern times, bibliometric measurement is now an important part of academic outcomes assessment. Starting from research design, collecting metadata, analyzing, visualizing, and ending with interpreting data results are part of the workflow for processing bibliographic data (Derviş, 2020). Some bibliographic research has shown its benefits in providing new insights into the development of a particular topic or field that can be useful for other researchers. While the visualizations generated through bibliometric analysis can provide valuable insights, they can also simplify complex research landscapes, leading to potential misinterpretations if not critically assessed (Lee et al., 2020).

This research uses Scopus as a database. Scopus archive dates back to 1996, ensuring that its coverage remains current and relevant (Magadán-Díaz & Rivas-García, 2022). Scopus is a good choice for a primary source database for bibliometric analysis because it is an abstract database with the largest number of citations from peer-reviewed literature reviews or other researchers covering a wide range of topics. Scopus was chosen for its broad coverage, verified data, advanced search features, and regular updates. This is why researchers use Scopus as the primary source database. The term as keyword "technology integration in teaching grammar" was used to perform the research. When searching for published data, the title, keywords, and abstract criteria are employed. Using Scopus sources, the analysis was done using the article's keywords. The selection criteria for articles in this study involved choosing those released between 2013 and 2023 from the Scopus database. The primary focus was on articles related to the integration of technology in teaching grammar as a foreign language. The inclusion criteria likely involved articles that explicitly addressed this topic in their titles, abstracts, or keywords. Exclusion criteria may have involved articles outside the specified timeframe or those not directly related to the research topic. Additionally, articles that were not available in full-text format or those written in languages other than the researchers' primary language may have been excluded. The aim was to ensure that the selected articles provided relevant and comprehensive insights into the trends and developments in the integration of technology in teaching grammar as a foreign language within the specified period. Finally, the Scopus database had 27 articles. The articles were selected among those released between 2013 and 2023. Authors, titles, years, the title of the source, volumes, issues, etc. are the first pieces of information in the article. Collection of the articles was done in *.csv format. The article data that was found in the earlier stage is processed using CSV files then Ms.Excel form. This Excel was made to study the research that professionals have conducted and to gather data on the number of papers published each year (Husaeni & Al, 2022). This Excel was created to gather information on the amount of articles published annually and to examine the research that experts have conducted on the keywords employed.

The next step is using Vos Viewer software, 27

articles as primary source were chosen, mapped, and then re-analyzed. Software called Vos Viewer may present visualizations of bibliometric networks and offers appealing graphics, analysis, and evaluation (Putri et al., 2022). Based on terms from network-wide keyword collaboration, Vos Viewer can offer network visualization, overlay visualization, and density visualization. The information is displayed as a bibliometric map. Analysis of the Vos Viewer software is the final phase.

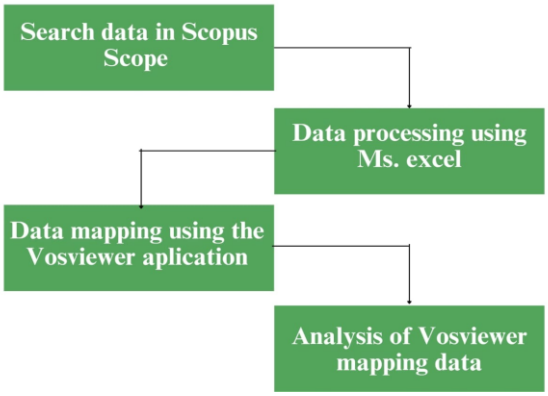

Figure 1. *Stages of bibliometric analysis*

RESULTS AND DISCUSSION

The development of scientific research publications on technology integration in teaching grammar

Based on the search results conducted from the main source of Scopus as a database, there are 27 articles consisting of 23 articles in the period 2013-2023 and there are 4 articles under the period 2013 to 2009, this shows that the development of integrated technology research in teaching foreign grammar during the period 2013-2023 has increased. In 2013 - 2014 there was a decrease, in 2013 there were two studies on integrated technology in teaching grammar, while in 2014 there was a decrease, there was only one study. The same thing also happened in 2016 - 2018, each year there was only one study. However, there were no studies in 2015 and 2017. A significant increase occurred in 2018-2019. In 2019 there were four new studies on integrated technology in grammar teaching. The same thing happened in 2021, a significant increase occurred from 2020-2021. There were four new studies in 2021. The difference in 2020 was a decrease from 2019 and then an increase again in 2020 which only had two studies.

This proves that the awareness of the global community regarding integrated technology in grammar teaching in 2020 is experiencing instability, where in 2020 the Covid 19 pandemic occurred which has an impact on all aspects of global life including in the field of education. This made research on integrated technology in grammar teaching experience instability, but this increased again in 2021. A very significant increase occurred in 2021-2022.

There were seven studies related to integrated technology in grammar teaching in 2022. This proves that there is a renewed global awareness of the importance of technology integration in grammar teaching. In this case, it is also evident that the most dominant integrated technology is about applications used as technology used in grammar teaching. With this, the research trend on integrated technology in grammar teaching is highly developed in 2022. In this case, the renewal of the integration of technology in grammar teaching is still very hotly discussed although specifically for grammar teaching itself is hotly discussed before the period 2020-2023. The research results indicate a significant increase in global awareness of technology integration in English language teaching, especially in recent years. With the rapidly evolving research trend since 2020, particularly in 2022, there is a great opportunity to develop more effective and responsive teaching methods to meet student needs. This highlights the need for further development in integrating technology-based teaching methods to support effective English language learning. The implications of these findings underscore the importance of continuously updating English teaching approaches especially in teaching English Grammar by integrating technology, in line with current developments in education.

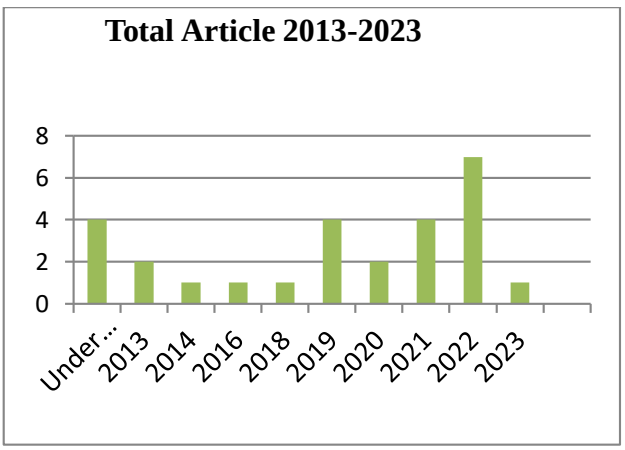

Figure 2. *Development of scientific publications*

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in 2013-2023

Types of scientific publications on integration technology in teaching English grammar

Based on the diagram below, out of a total of 27 articles obtained as the main dataset from Scopus, there are various types of scientific publications, including Articles, Conference Papers, Book Chapters, and Reviews. In the period of research development on the integration of technology in teaching English grammar from 2013 to 2023, there were 15 article publications, which constituted the highest number of publications, followed by 9 Conference Paper publications. Additionally, there were 2 Book Chapter publications, and the lowest number of publications was Reviews, with only 1 publication.

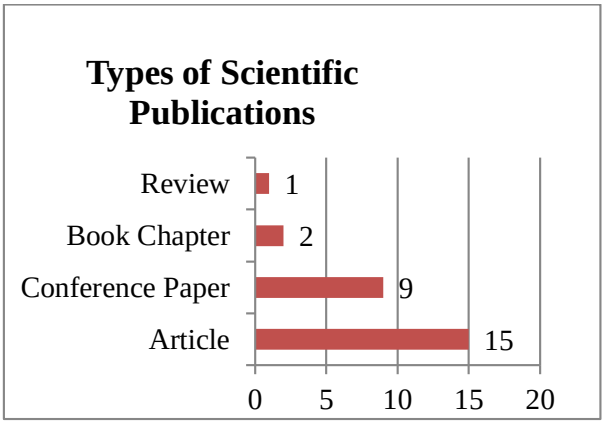

Figure 3. *Types of scientific publications 2013-2023*

The most cited research on technology integration in teaching English grammar

Based on the results of the analysis of the database sourced from Scopus, the number of scientific publications most cited from the period 2013-2023 on Integration Technology in Teaching English Grammar can be determined. Utilizing the findings derived from an in-depth analysis of the comprehensive database obtained from Scopus, which is a prominent abstract and citation database widely used in academic research, a detailed overview of the extensively cited publications within the timeframe of 2013 to 2023 is provided.

This thorough analysis allows for a comprehensive understanding of the trends and patterns in research related to the integration of technology in teaching English grammar over the specified period, focusing on the subject of Integration Technology in Teaching English Grammar, has been meticulously compiled. This compilation is presented in a structured tabular format for clarity and accessibility. There are categories ranging from author, year, title and cited. Where in the table has been presented with reference to the order of the most citations. In the first order with the most citations of 51 is the publication article by (Li & Walsh, 2020) with the title "Technology uptake in Chinese EFL classes", then for the second most citations by (Shu Y, 2020) with the title "Experimental data analysis of college English teaching based on computer multimedia technology".

Then, the third order is the publication of a research article by (Muftah, 2022) with the title "Integration of video in teaching grammar to EFL Arabic learners" which has been cited 11 times. In the fourth most cited order there are 6 times cited scientific publications with two different articles, namely by (Moratelli & Dejarnette, 2014) and also (Comelles et al., 2013). Furthermore, the article by Muftah (2022) with the title "Impact of social media on learning English language during the COVID-19 pandemic" which has been cited 4 times. And the last is an article by Gerova et al. with the title "Smart technologies in foreign language students' autonomous learning" which has been cited 3 times.

Table 1. *The most cited research 2013-2023*

Author	Year	Title	Cited
Li L., Walsh S.	Under 2013 (2011)	Technology uptake in Chinese EFL classes	51
Shu Y.	2020	Experimental data analysis of college English teaching based on computer multimedia technology	19
Alharbi M.A.	2019	Integration of video in teaching grammar to EFL Arab learners	11
Moratelli K., Dejarnette N.K.	2014	Clickers to the Rescue: Technology Integration Helps Boost Literacy Scores	6
Comelles E., Laso N.J., Forcadell M., Castaño E., Feijóo S., Verdaguer I.	2013	Using online databases in the linguistics classroom: Dealing with clause patterns	
Istifci I.,	Under 2013	An effective role of e-learning technology for English	5

Lomidazde T., Demiray U.	(2011)	language teaching by using meta communication actors	
Muftah M.	2023	Impact of social media on learning English language during the COVID-19 pandemic	4
Gerova N., Lapenok M., Sheina I.	2016	Smart technologies in foreign language students' autonomous learning	3

Visualization of scientific publications on technology integration in grammar teaching using VOSviewer software

Visualization of VOSviewer is used to map the development of research trends on technology integration in English grammar teaching. The input used is key data, from this input a visualization of VOSviewer is obtained. To display each keyword in the visualization, a spherical node represents the keyword. Existing keywords are then labeled with colored circles. Researchers used a minimum number of term occurrences of 1 and a maximum number of term selections of 144 items. From the visualization results, groupings are obtained that provide an overview to help understand the pattern relationships in the data. by the visualization

Three visualization images are shown from the VOSviewer visualization results. Figure 1 Network visualization, Figure 2 Overlay visualization, and Figure 3 Density visualization displayed by VOSviewer in bibliometric analysis. From these three visualizations, it will be illustrated how the development of the research trend of Integration technology of teaching English Grammar as Foreign Language Each visualization will interpret the data mapping differently. For network visualization, it focuses on the relationship of each keyword that appears through interconnected clusters. For the overlay visualization, it explains the mapping of data about the time span or publication year of the article. And for density visualization, it explains the mapping of the novelty of each keyword that appears.

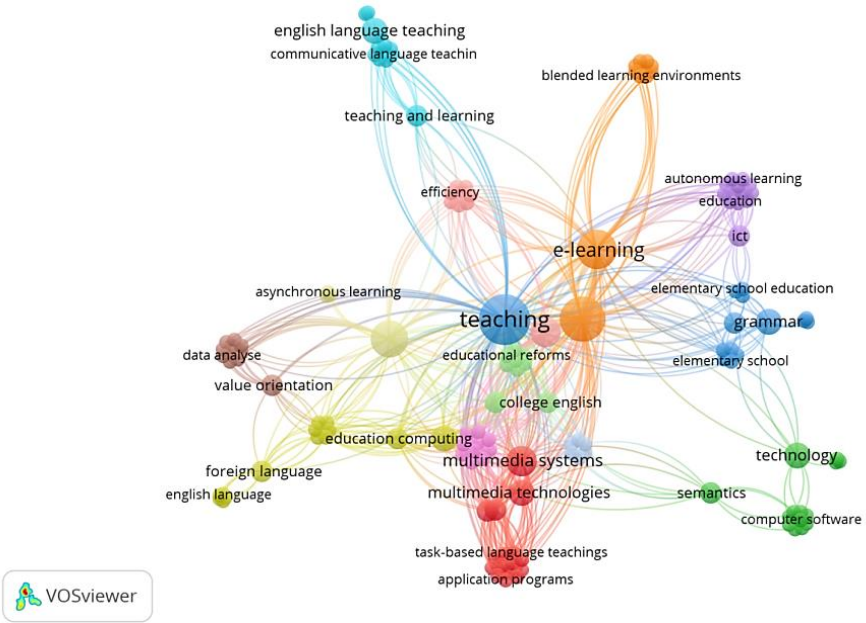

Figure 4. *The network visualization of the articles*

The relationship between each keyword related to the integrated technology for teaching English grammar is shown through a network visualization. The items are interconnected and form clusters. There are 1138 relationships connecting 13 separate clusters of 144 items, with a total of 1219 relationships related to each other. Red, dark green, dark blue, sage, dark purple, blue, orange, brown, light purple, pink, light green and light blue are among the 13 colors shown in the network visualization. Having the same network or connectivity indicates having the same color. The visualization employs a color scheme to differentiate between the clusters, with each color representing a distinct thematic group. For instance, keywords belonging to the same cluster are assigned the same color, facilitating the identification of thematic cohesion within the network. This visual representation aids in identifying prominent research themes, trends, and

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areas of focus within the field of integrated technology in English grammar teaching.

The following are the 13 clusters identified by the VOSviewer mapping results using the keyword "technology integration in teaching English grammar as a foreign language" and the dominant keywords that appear in each cluster:

Cluster 1 indicated in red, there are 16 items in the cluster with the dominant keywords appearing in this cluster are multimedia systems, multimedia technologies, task-based language teachings and application programs. For cluster 1, the dominant keywords that appear are related to multimedia technology and applications.

Cluster 2 indicated in dark green, there are 15 items with the dominant keywords appearing in this cluster are technology, computer software and semantics. Cluster 2 is still dominant with results related to technology.

Cluster 3 indicated in dark blue, there are 14 items in this cluster, for the dominant keyword that appears is teaching. For this cluster, teaching is the most dominant issue being researched at the moment.

Cluster 4 indicated in sage green, there are 14 items in this cluster, for the dominant keywords that appear are education computing, foreign language and English language. In this cluster, the dominant keywords of the research conducted are about language as well as related to educational computerization.

Cluster 5 indicated in dark purple, there are 13 items in this cluster, for the dominant words that appear are autonomous learning, education and also ict. In this cluster, it is illustrated that autonomous learning and education are often researched, for ict is also one of the dominant key items researched.

Cluster 6 indicated in colored blue, there are 12 items in this cluster and the dominant keywords appearing are elementary school education, grammar and elementary school. It is in this cluster that the keyword grammar appears which shows that grammar is still very much researched in the recent period.

Cluster 7 indicated in orange color, there are 11 items in this cluster with two dominant keywords e-learning and blended learning environments. This cluster illustrates that the research and keywords used are about online and blended learning situations.

Cluster 8 indicated in brown, there are 11 items in this cluster and the dominant keywords are data analysis and value orientation. This cluster illustrates that a lot of research is done about analysis.

Cluster 9 indicated in light purple, there are 10 items in this cluster with the dominant keywords that appear are about multimedia systems. This cluster is also related and has connections with other dominant keywords such as the keywords college English and computing education.

Cluster 10 indicated in pink, there are 9 items in this cluster that are interrelated and the dominant keyword that appears is efficiency. The dominant keyword efficiency has a network and connectivity with teaching. This illustrates that efficiency and teaching have a relationship and connectivity between cluster 10 and cluster 3.

Cluster 11 indicated in light green in color, there are 9 items with the dominant keywords that appear are educational reforms and college English which have network connectivity with the keyword teaching. It is depicted that the research subject is teaching in college English.

Cluster 12 indicated in light blue, there are 6 items in cluster 12 with the dominant keywords English language teaching, communicative language teaching and teaching and learning. This illustrates that the subject of research for teaching is very often discussed.

Cluster 13 indicated in sage green, there are 4 items in this cluster with the dominant keyword asynchronous learning. In this cluster, the research subjects do not have too many connections and networks.

In addition to clusters and lines, the size of the nodes also indicates the frequency of the keywords. Figure 4 shows that education, e-learning, grammar, multimedia systems, and technology are the most frequently occurring subjects and keywords. This indicates that research trends and developments continue to be debated from 2013 to 2023.

For research conducted, integrated technology in grammar teaching is still the current research that is most discussed by researchers. However, keyword nodes or items that do not form clusters or have networks with other keywords may eventually become current research subjects. In the picture in each cluster for the research subject of technology integration in teaching grammar as a foreign language, there are many research subjects that have not been connected to each other.

This can be a research subject for the future. This network visualization provides a picture to determine which research subjects have been widely discussed around the world and are interconnected with others. And provide a clear picture of the extent of development for the

research subject of technology integration in language teaching. This indicates the potential for research subjects in the future.

The network visualization provides an overview of research subjects that are widely discussed globally and how these subjects are interconnected. Discussion on the implications of these trends for practitioners, policymakers, and future research is crucial to guide further steps in the development of technology integration in teaching English grammar.

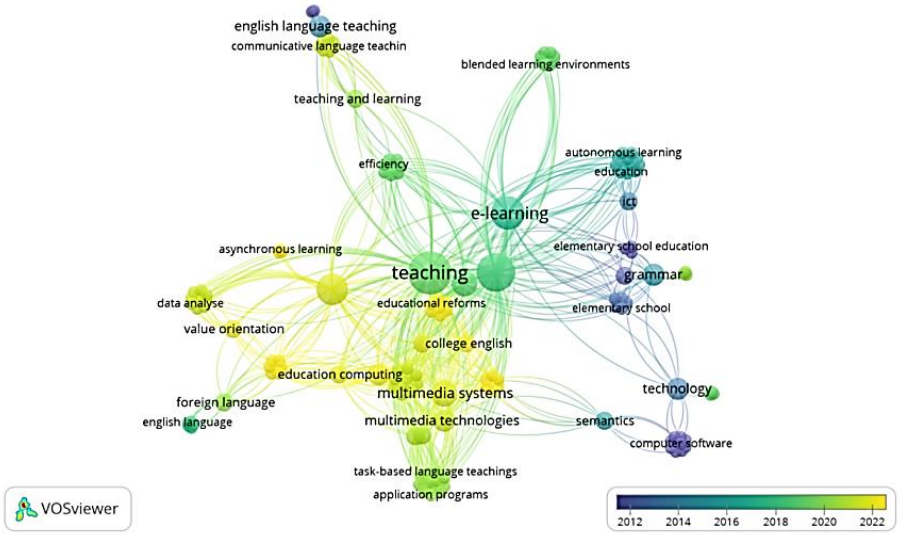

Figure 5. *The overlay visualization of the articles*

Based on the year of publication, the overlay visualization shows how recent a topic is. The year 2022 is shown in this figure as yellow, while 2012 (below 2013) is shown as dark blue. The yellow color indicates that the topic is newer and has been the subject of recent research and discussion. The dominant green color that does not reach the dark blue color in the figure indicates that there was little discussion about the use of technology in English grammar teaching in 2012.

However, the subject caught the attention of researchers in 2020-2022, especially in reaction to the COVID-19 epidemic, with researchers looking for ways to advance the integration of technology in English grammar teaching through multimedia systems and educational computing. A computer-based device referred to as a multimedia system. These multimedia systems are the use of a single computerized technology to combine sound, text, images, animation, or video and audio and present them with tools such as other media and also in the form of links that make it easy to provide teaching through the use of digital technology-based integration.

New issues and discussions from the network mapping results describe multimedia systems, multimedia technology, educational computing. While grammar itself has been discussed for a long time. However, researchers can now explore how technologies such as multimedia systems, can be linked back to the teaching of English grammar. From the results of the overlay visualization, it can be seen that the relationship between grammar or grammar has long begun to be researched, but for the renewal of research for the 2020-2022 period, it appears that there is not much research related to grammar and technology.

This can be a current research opportunity by utilizing the relationship between multimedia systems, and also teaching grammar. Apart from multimedia systems, there is also multimedia technology which is still new and developing rapidly in the period 2020-2023. The latest issues related to technology integration are also being discussed by researchers. The connectivity between technology integration and grammar is directly visible in its relationship within the cluster. The direct visibility of connectivity between technology integration and grammar within this cluster underscores its significance.

From the period 2012 - 2022, there is a brighter density picture for multimedia subjects, while for grammar itself has been discussed for a very long time so that the density picture is no longer bright. This is an opportunity for research subjects on grammar and also technology integration because they have been discussed for a very long time but for this last period it is rarely discussed.

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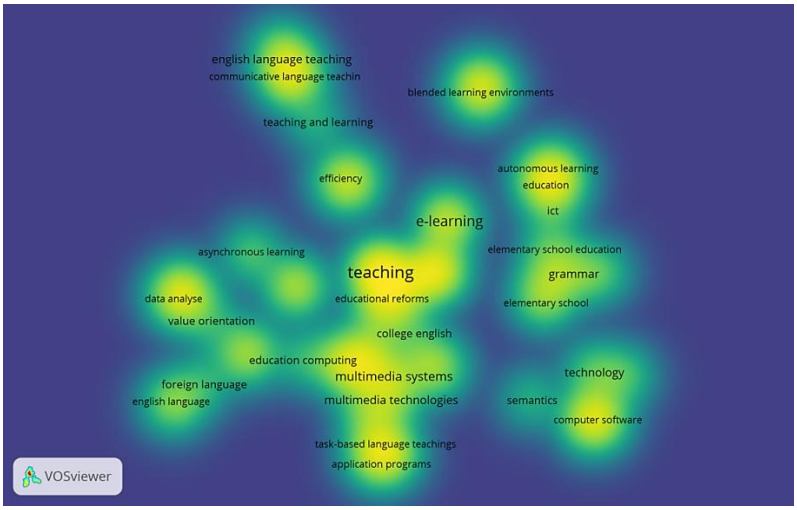

Figure 6. *The density visualization of the articles*

The frequency of topic discussions is shown by the density visualization, with lighter colors indicating more frequent discussions. Based on Figure 6, the most frequently discussed topics include teaching, multimedia systems, computer software, e-learning, and English language teaching. In contrast, the least frequently discussed topics are related to semantics, value orientation, and asynchronous learning. These topics that have not received much attention provide great opportunities for further research or investigation, especially with regard to grammar teaching. This can be seen from the visualization, where the colors for grammar and technology are not very bright, indicating that there is still much room for research in this area. The visualization also underscores a shift in research focus from grammar and technology towards teaching with multimedia systems in the period between 2013 and 2023.

This shift prompts researchers to consider how technology can be leveraged to enhance language learning experiences, especially within the context of multimedia-rich environments. Although the relationship between the study of language and technology and grammar teaching in particular has long been explored, researchers can consider how technology can still be improved. How to integrate multimedia systems or technology with teaching English grammar as a foreign language is of interest to researchers.

CONCLUSION

In conclusion, this study aimed to identify and analyze trends in research developments related to the integration of technology in teaching English grammar as a foreign language, specifically focusing on the period from 2013 to 2023. The analysis reveals that the development trend of research in this area is still considered relatively new and necessary. While there has been some exploration of the topic in previous years, significant growth and renewed interest in research are observed starting from 2022. This indicates an increasing interest and recognition of the importance of integrating technology into English grammar teaching.

Furthermore, for types of Scientific Publications on Technology Integration in Teaching English Grammar: The examination of various types of scientific publications, including articles, conference papers, and reviews, provided insights into the diverse approaches and methodologies employed in researching technology integration in grammar teaching.

From the results of exposure to bibliometric mapping through Vosviewer shows that; 1). Network maps with the latest topics are related to multimedia systems, multimedia technology, educational computing. 2) Space for research in the field of English grammar that integrates technology is still very likely. 3) For issues or topics that are classified as low and still little discussed, it becomes the next novelty to be discussed regarding multimedia technology and English grammar teaching technology.

The visualization of research trends using Vosviewer highlighted emerging topics such as multimedia systems, multimedia technology, and educational computing. These findings offer valuable insights into the current landscape and future directions of technology integration in grammar teaching.

From the results of the study, the researcher hopes that the broader implications of this study extend to the field of teaching English as a foreign language. The findings underscore the importance of embracing technological advancements to create innovative and effective learning environments. By

integrating technology into language teaching practices, educators can enhance student engagement, facilitate interactive learning experiences, and ultimately improve language proficiency outcomes. This highlights the need for continuous exploration and adaptation of teaching methodologies to meet the evolving needs of language learners in the digital age.

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