EVALUATING THE RESEARCH TREND ON THE APPLICATION OF MULTIMODAL APPROACH IN ESL CLASSROOMS

AVALIANDO A TENDÊNCIA DE PESQUISA DE APLICAÇÃO DE ABORDAGEM MULTIMODAL EM SALAS DE AULA DE ESL

Misslina Jelani
Language Academy Universiti Teknologi
Malaysia
cikgumisslina@gmail.com

Hanita Hassan
Language Academy Universiti Teknologi
Malaysia
hanita@utm.my

ABSTRACT

The growing needs for employing multimodality in teaching have sparked research activities all around the world. Due to its broad range of applications, multimodality has received a lot of attention as an approach to be applied in any fields specifically in education. This bibliometric study aimed to evaluate the global research trends in applying multimodality to ESL classrooms based on publication outputs, co-authorships among authors and affiliated countries, and co-occurrences of author keywords. A total of 1303 journal articles published between 1972 and 2022 were retrieved using the Scopus database. The results demonstrate that the number of publications has been steadily increasing since 1972. Approximately 29% of the global total publications were contributed by researchers from the United States and the TESOL Quarterly published the greatest number of articles related to research on the multimodal approach in ESL classrooms. The findings of this review show that the application of multimodality to ESL classrooms may eventually supplant the clusters that dominated multimodality research in the past. In conclusion, the recent progress in implementing the multimodal approach in ESL classrooms includes the following, but not limited to, i) teaching strategies, ii) teaching environments, and iii) teaching and learning with educational technology.

Keywords: Bibliometric analysis, Multimodal approach, Multimodality, ESL classroom, VOSviewer.

<center>**RESUMO**</center>

A crescente necessidade de empregar a multimodalidade no ensino tem desencadeado atividades de pesquisa em todo o mundo. Devido à sua ampla gama de aplicações, a multimodalidade tem recebido muita atenção como uma abordagem a ser aplicada em qualquer área especificamente na educação. Este estudo bibliométrico teve como objetivo avaliar as tendências globais de pesquisa na aplicação da multimodalidade em salas de aula de ESL com base em resultados de publicações, coautorias entre autores e países afiliados e coocorrências de palavras-chave de autores. Um total de 1.303 artigos de periódicos publicados entre 1972 e 2022 foram recuperados usando a base de dados Scopus. Os resultados demonstram que o número de publicações tem aumentado constantemente desde 1972. Aproximadamente 29% do total global de publicações foram contribuídas por pesquisadores dos Estados Unidos e o TESOL Quarterly publicou o maior número de artigos relacionados à pesquisa sobre a abordagem multimodal em ESL. salas de aula. As conclusões desta revisão mostram que a aplicação da multimodalidade às salas de aula de ESL pode eventualmente suplantar os clusters que dominaram a investigação sobre multimodalidade no passado. Concluindo, o progresso recente na implementação da abordagem multimodal em salas de aula de ESL inclui o seguinte, mas não limitado a, i) estratégias de ensino, ii) ambientes de ensino e iii) ensino e aprendizagem com tecnologia educacional.

Palavras-chave: Análise bibliométrica, Abordagem multimodal, Multimodalidade, Sala de aula de ESL, Visualizador VOS.

Introduction

A multimodal approach collects and examines the visual, auditory, bodily, and spatial components of encounters and events, as well as how they relate to one another (Jewitt, 2009; Kress, 2009). Due to its vast variety of applications, multimodality has gotten a lot of attention as a new approach to be utilized in any field, particularly education (Bhardwaj, 2016; Djamdjuri et al., 2021; Sullivan et al., 2003). Many studies in various fields of education such as Science Social (Duanxian, 2021), technology and internet (Szymkowiak et al., 2021), financing and management (Shaturaev, 2021), biology education (Jelani and Hassan, 2021), English as a Second Language (ESL) teaching and learning (Luo, 2022; Sharif et al., 2022; Lam, Habil and Hui, 2022; Bambol and Sulaiman, 2022; Setyowati et al., 2020; Ara, 2020; Begum, 2019), engineering (Chayaningati and Lestari, 2018) and education in Covid-19 era (Bergdahl and Nouri, 2021; Chang et al., 2021; Chakraborty et al., 2021) have been carried out. However, there has been no research that discusses bibliometric analysis with the mapping analysis method in the field of education specifically related to the multimodality in ESL classrooms for the last five years using the VOSviewer software. The increased demand for

multimodality in education has prompted research efforts across the world. Therefore, this study aimed to examine temporary distribution patterns of a multimodal approach in ESL classrooms journal articles by showing publication outputs, contributions of leading countries, preferred journals, leading authors, leading academic institutions, and highlighting co-occurrence of authors' keywords.

Research method

A statistical analysis tool known as bibliometric gives a quantitative insight (Al Husaeni et al., 2022; Benckendorff and Zehrer, 2013; De Bellis, 2009), which can be used to determine research trends by looking at literature databases. It is used as an approach to understand global research trends in a specific area (Al Husaeni and Nandiyanto, 2022; Hamidah et al., 2020; Khudzari et al., 2018; Mulyawati and Ramadhan, 2021) including citation analysis, and co-citation analysis (De Bellis, 2009), and co-words analysis for keyword (He, 1999). Data acquired in the database, such as keywords, co-authorship, citations, co-occurrence, or number of publications, can be studied using bibliometric analysis, which provides an insight into the growth of information literature within a specific topic (Nandiyanto et al., 2021; Van Raan, 2005; Van and Waltman, 2013) using VOSviewer as a mapping tool (Al Husaeni and Nandiyanto, 2022; Hamidah ert al., 2020; Khudzari et al., 2018; Mulyawati and Ramadhan, 2021). To achieve the aim of the study, this technique was used to look at the overall global research trends, niche areas, and research gaps of the application of multimodality in teaching English as a second language classrooms.

Data source and search strategy

The Scopus database was used to undertake data mining between November 4 and 14, 2022. The central theme in this study was articles containing "Multimodal approach" OR "ESL classroom" OR "multimodal approach in ESL classroom" OR "multi-modal in ESL classroom" OR "multi-modal approach in ESL classroom" in the title and abstract. The search question string used was: TITLE-ABS-KEY (

"Multimodal approach" OR "ESL classroom" OR "multimodal approach in ESL classroom" OR "multi-modal in ESL classroom" OR "multi-modal approach in ESL classroom") AND (LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "ARTS") OR LIMIT-TO (SUBJAREA , "BIOC") OR LIMIT-TO (SUBJAREA , "MATE") OR LIMIT-TO (SUBJAREA , "AGRI") OR LIMIT-TO (SUBJAREA , "MULT")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE, "English"). A total of 1303 journal articles published between 1972 and 2022 were retrieved.

The core theme search result was studied to determine how the year affected the sources, authors, associations, nation/territorial, subject areas, and kinds of document. Total articles, CiteScore, total citations, and h-index are a few bibliometric indicators that have been employed for ranking reasons. The process of data collection was adapted from Zare et. al., (2017) and summarized as shown in Figure 1.

Figure 1 – Data collection process adapted from Zare et. al., (2017)
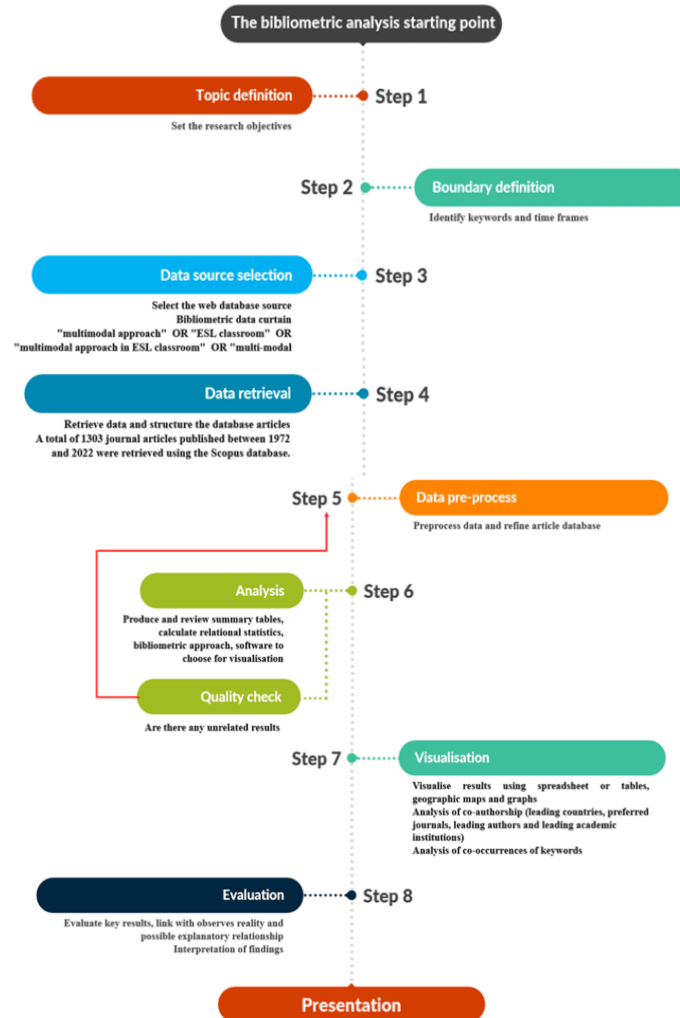
As illustrated in Figure 1, the data gathering process began with defining the topic and establishing the research objectives. This was followed by defining the boundary by selecting keywords and time frames, before the data source selection could be conducted. The Scopus index was used as the data source for searching and extracting papers by utilising bibliometric data curtain "multimodal approach" OR "ESL classroom" OR "multimodal approach in ESL classroom" OR "multimodal". The Scopus database was chosen because it produces accurate citation search results and provides extensive coverage of resources for fields of study (Hallinger & Kovačević, 2019). In this study the Scopus database was used to obtain 1303 journal articles which were published between 1972 and 2022. Following that, the data was pre-processed and the article database was refined. Next, the collected articles were

analysed according to the following stages; i) produce and review summary tables, ii) calculate relational statistics, iii) analyse using bibliometric approach, iv) adopting VOSviewer software for the visualisation process. To determine whether there were any unexpected results, the quality of the findings was assessed. Fortunately, the results turned out to be good and following this, the results from the analysis of co-authorship (leading countries, preferred journals, leading authors, and leading academic institutions), as well as the keyword co-occurrences analysis, were encoded into tables, geographic maps and graphs. The evaluation process was then carried out by analysing the main findings, making connections with observed reality and potential explanatory relationships, and interpreting the findings.

Database Creation

The required bibliographic information was downloaded and saved in an Excel file. The file included "meta data" that was typically associated with each publication, including author names, affiliations, article titles, source keywords, abstracts, and other different citation information. At this point, a thesaurus file was developed to prepare the data for the analysis procedures using VOSviewer (Ghani et al., 2022; Van Eck and Waltman, 2020). The role of thesaurus file was to 'disambiguate' related terms during the study to ensure credible analysis. For example, the data file acquired could contain documents written by the same scholar but with various names. The same issues might arise when terms with similar keywords, such as 'classroom' and 'classrooms,' are used. The use of a thesaurus file can improve accuracy during analysis by integrating multiple forms of terms, author names, and so forth (Van Eck and Waltman, 2020).

Bibliometric maps

Citations, bibliographies, and author keywords of 1303 articles were exported to VOSviewer (version 1.6.8, Centre for Science and Technology Studies, Leiden University, The Netherlands). It is worth stating that VOSviewer is a software tool for constructing and visualising bibliometric maps. Maps generated with the VOSviewer include elements of interest, such as countries or author

keywords in the form of data mapping; network visualisation, density and overlay. The aim of using the VOSviewer user manual was to study the peculiarities of the relationship between the elements. Each relationship has a positive numerical value that represents its strength. The link strength increases with increasing value (Van Eck and Waltman, 2018). The link indicates the strength of the association, which reflects a positive numerical value. The greater the value, the stronger the relationship. The nation link displays the number of papers co-authored for the co-authorship research by two linked countries. The connection strength represents the total strength of a country's co-authorship ties with other countries. Similarly, the author's keyword association strength represents the number of publications in which the co-occurrence study covers two terms (Van Eck and Waltman, 2018).

Co-authorship analysis

In the analysis of co-authorship, 36 countries affiliated with different authors were considered. The affiliated countries were divided into ten clusters. Each cluster has the major countries of co-authorship such as United States, United Kingdom, Italy, Malaysia, Germany, Canada, France, Australia, China and Spain.

Co-occurrence analysis

The minimum number of keyword occurrences examined by the VOSviewer was set to five keywords. The overlay visualisation option was chosen to display the number of occurrences, average publication year, and keyword strength between the connection. The colour denotes the typical year that the article would have been published, where the keywords were found. The social network mapping software called VOSviewer was utilised (Van Eck and Waltman, 2018) as a means of displaying the relationship between document elements found in the multimodal approach in ESL classrooms. In addition, co-word maps were used to examine various knowledge base links in identifying the most frequently explored topics in the literature (Zupic and Carter, 2015; Small, 1999; Van Eck and Waltman, 2020; White and McCain, 1998).

Results and Discussion

The results demonstrate that the number of related publications has been steadily increasing since 1972. Figure 2 shows that 1303 articles were produced in 50 years. The earliest publication was in 1972, and there was a fluctuate data until 2003. It was clearly shown that the strong interest in multimodal approaches in ESL classrooms research began in 2004. The annual rate of growth grew started in 2017 and the number has been doubled since 2021. A significant increase in the total number of publications published throughout time was caused by gradually rising annual publications. Consequently, it is anticipated that the annual publication will continue to grow. Nevertheless, most of the articles required fees to access, or in other words, the articles were published in non-open access journals, therefore users could not access the journals or read the articles for free.

Figure 2 – The annual and cumulative number of research publications on multimodal approach in ESL classrooms published in Scopus from 1972 to 2022

The findings of this bibliometric study have shown that research from all around the world is concerned with various aspects of the multimodal approach in ESL classes. Most academics and researchers who were involved in these studies came from various parts of the world. An analysis of this research topic reveals that the studies on multimodal approach in ESL classes mainly focus on societal research. This is demonstrated by the total number of articles that have been categorised according to the following subject areas: Social Sciences (735 articles), followed by Arts and Humanities (419 articles), Biochemistry, Genetics and Molecular Biology

(384 articles), Medicine (287 articles), Engineering (139 articles), Materials Science (106 articles), Computer Science (100 articles), Psychology (82 articles), and Physics and Astronomy (80 articles). Nevertheless, the multimodal approach in ESL classes is categorised in a diverse field, one of which has been labelled as Arts and Humanities. The results also demonstrate that the publications used in this study were written in four languages, with English being the primary language used in most of the articles.

Preferred Journals

In addition, the findings reveal that the four different publishers were selected as the preferred journals and act as the most competitive and productive journals. The top four journals were the Tesol Quarterly, Asian EFL, ELT and System. Tesol Quarterly published most of the journals, with 37 in total. Meanwhile, 15 journals were published by Asian EFL, and 15 journals by ELT. Three articles with the highest number of citations were successively published in the RELC, Language Learning, and System as shown in Table 1.

Table 1 – The top 10 most productive journals on multimodal approach in ESL classroom research with their most cited article

| Journal	Total Publication	Total Citation	CiteScore 2021	The most cited article (reference)	Times cited	Publisher
System	160	2685	5.3	**Exploring EFL teacher resilience in the Chinese context**	15	Elsevier Ltd
TESOL Quarterly	102	965	4.9	**Measuring L1 and L2 Productive Derivational Knowledge: How Many Derivatives Can L1 and L2 Learners with Differing Vocabulary Levels Produce?**	5	John Wiley and Sons Inc
RELC Journal	73	390	2.9	**Facilitating Synchronous Online Language Learning through Zoom**	59	SAGE Publications Ltd
Pertanika Jounal of Social Science and Humanities	70	682	0.7	**Factors Influencing ESL Learners' Behavioural Intention in Using Edmodo: An SEM Approach**	5	Universiti Putra Malaysia
Asian EFL Journal	65	773	1.0	**Full-time online assessment during COVID -19 lockdown: EFL teachers' perceptions**	12	Asian EFL Journal Press
International Journal of Learning	51	29	0.2	**Design, development and evaluation of contextualised learning materials in consumer electronics**	3	Common Ground Research Network
Language Learning	49	1213	7.7	**Individual Differences in Second Language Listening: Examining the Role of Knowledge, Metacognitive Awareness, Memory, and Attention**	31	John Wiley and Sons Inc
Indonesian Journal of Applied Linguistics	42	433	1.5	**Establishing a COVID-19 lemmatized word list for journalists and ESP learners**	2	Uniersitas Pendidikan Indonesia
ELT Journal	37	479	2.9	**Translanguaging as a political stance: implications for English language education**	11	Oxford University Press
Canadian Modern Language Review	13	132	1.5	**L2 Peer Interaction before and after Writing: How Does Each One Promote Writing Development?**	1	University of Toronto Press

System is the most productive and competitive journal with 160 articles, followed by TESOL Quarterly (102) and RELC (73). The System journal received the highest number of citations with a total of 2685 citations. Referring to the report

released by CiteScore 2021, two journals had a CiteScore of 5 and above, wherease the rest recorded a CiteScore of 0.2 and above. Journals that earned the highest and lowest CiteScore belonged to Language Learning (7.7) and International Journal of Learning (0.2). The International Journal of Learning being ranked sixth with a total of 51 articles in Scopus, the number of citations and CiteScore of this journal is relatively low compared to other journals. It is believed that CiteScore significantly influences authors' and researchers' choices on which journals will publish their work. CiteScore from Elsevier-Scopus, for instance, is a substitute for the Clarivate Analytics Influence Factor, a metric used to assess the impact of journals which is based on the results of citation analysis in the Scopus database. However, it is believed that CiteScore is not the only metric used to evaluate the impact of the journal. Authors and researchers must understand the extent to which the journal can convey their work to the target audience and contribute to the advancement of the research field.

### Leading Countries and Leading Academic Institutions

Approximately 29 percent of the global total publications of articles related to research on multimodal approach in ESL classrooms were contributed by researchers from the United States (see Figures 3 and 4). Figure 3 shows co-authorship by 49 countries categorized within 9 clusters (color coded), with a total of 246 links and a total link strength of 429. The United States is the most productive country, with the largest association connected to 32 countries. This is followed by United Kingdom (32 links), Italy (22 links), Malaysia (13 links), and others.

Figure 3 – The top 10 most productive countries in publishing articles related to
the multimodal approach in ESL classrooms
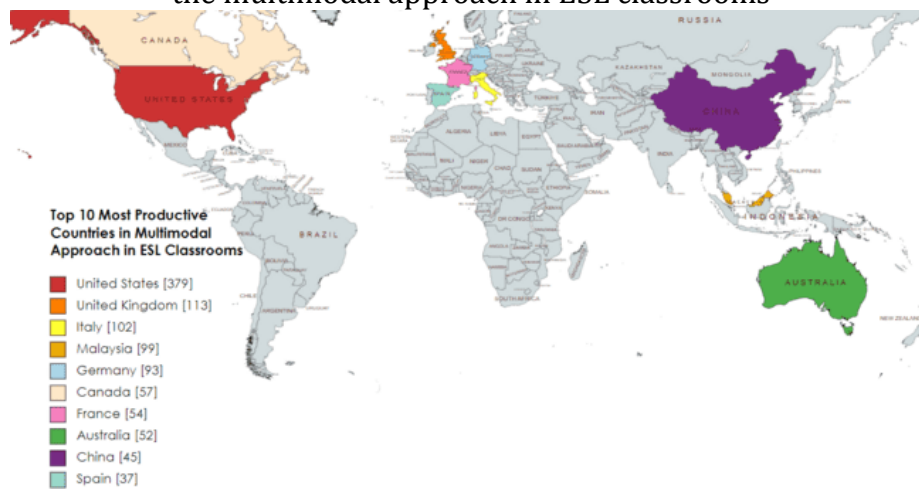
The highest publication per country came from United States (379 publications) which connotes that the United State is the key role in the advancement of multimodal approach in ESL classrooms research followed by United Kingdom (113 publications), Italy (102 publications), Malaysia (99 publications), Germany (93 publications), Canada (57 publications), France (54 publications), Australia (52 publications), China (45 publications) and Spain (37 publications) as shown in geographical distribution map in Figure 3. Similarly, Figure 4 shows the visualisation display generated using VOSviewer that highlights the country distribution by area.

Figure 4 – The bibliometric map built with the network visualisation based on co-authorships
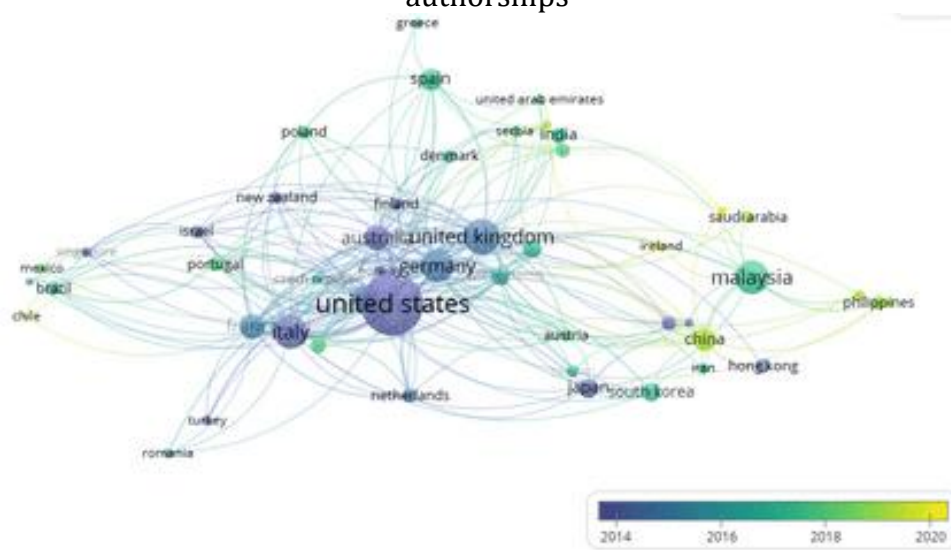
According to the VOSviewer, the relationship between two countries gets stronger and more significant when they are closer to one another as shown in Figure 4. This thus indicates that there is a significant intra-country cooperation between them.

The links in Figure 5, on the other hand, demonstrate international cooperation and citation among nations, which is not only relevant to networking, exchanging knowledge, having access to different expertise, and assimilating a different culture, but they can also help raise global awareness on its advantageous to universities and research.

Figure 5 – The bibliometric map built with the network visualisation based on countries citation

The graph that shows the leading academic institutions in the multimodal approach publications is shown in Figure 6. The academic institutions that actively worked on multimodal approach in ESL classrooms were Universiti Kebangsaan Malaysia (31), followed by Centre National de la Recherche Scientifique (19), Universiti Teknologi MARA (17), Columbia University (16), Universiti Sains Malaysia (15), Universiti Putra Malaysia(13), Harvard Medical School (11), Brookhaven National Laboratory (11), Universita di Pisa (11), and University of Pennsylvania (10).

Figure 6 – Leading academic institutions in publishing articles related to the multimodal approach in ESL classrooms
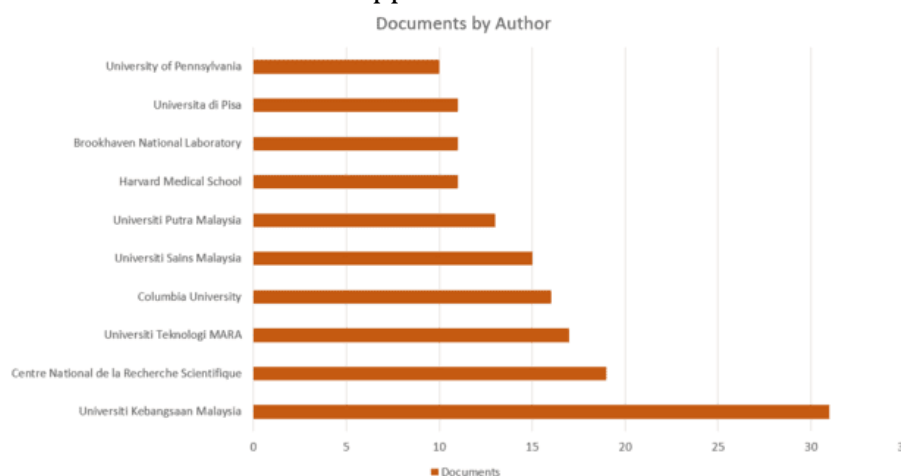
Leading authors

The ten most prominent authors in multimodal approach in ESL classrooms, as shown in Figure 7, are: Yunus (12), Waring (7), Lee (6), Frenkel (5), Jewitt (5), Mark (5), O'Halloran (5), Agbatogun (4), Hashim (4), and Kaur (4).

Figure 7 – Leading authors in the multimodal approach in ESL classrooms publications
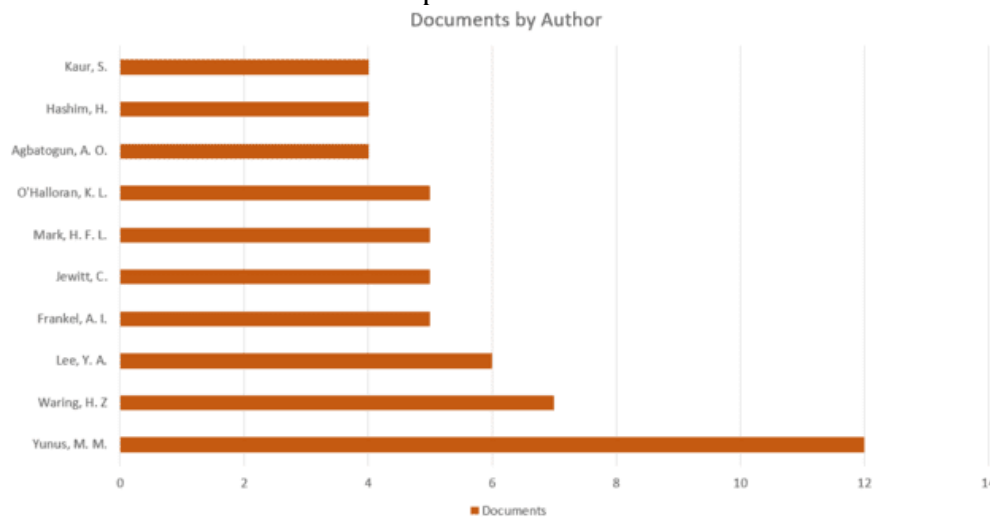
The list in Table 2 reveals the ten most prominent authors in multimodal approach in ESL classrooms according to states are: United States (3 authors), Malaysia (2 authors), United Kingdom (2 authors), South Korea (1 author), Nigeria (1 author), and Australia (1 author). The first publications were between 1992 and 2016, of which ten authors played a part as the first author and nine as a co-author. While the sequence of authorship does not have specific guidelines, the latter status is generally associated with seniority and supervisory role.

Table 2 – List of the 10 most prolific authors in the multimodal approach in ESL classroom research area

Author	Scopus author ID	Year of 1st publication	Total publication	h-index	Total citation	Current affiliation	Country
Yunus, M. M.	57218893299	2007	215	**18**	1860	Universiti Kebangsaan Malaysia, Bangi	Malaysia
Waring, Hansun Zhang	8694395000	2002	45	**17**	1061	Columbia University, New York	United States
Lee, Yo-an	16245254700	2004	19	**11**	509	Sogang University, Seoul	South Korea
Frenkel, Anatoly I.	24404182600	1994	381	**73**	21137	Stony Brook University, Stony Brook	United States
Jewitt, Carey	15220569600	1997	85	**20**	2180	University College London, London	United Kingdom
Mark, Hon Fong Lo	7102511843	1993	111	**19**	1255	Boston University School of Medicine	United States
O'Halloran, Kay L.	7006034042	1992	87	**22**	2019	University of Liverpool, Liverpool	United Kingdom
Agbatogun, Alaba, O.	36536556600	2009	15	**3**	82	Olabisi Onabanjo University, Ago-Iwoye	Nigeria
Hashim, Harwati	57214815467	2016	46	**8**	188	Universiti Kebangsaan Malaysia, Bangi	Malaysia
Kaur, Sarjit	57209289262	2010	27	**8**	170	Victoria University, Footscray,	Australia

Referring to Table 2, there were four authors with their earliest publications in 1992, 1993, 1994, and 1997. Yunus was associated with Universiti Kebangsaan Malaysia, Bangi has published 215 articles, with 18 h-index and 1860 citations since 2007. Waring and Hansun Zhang were associated with the Columbia University, New York ranked 2nd followed by Lee and Yo-an from Sogang University, Seoul. It

should be noted that the publications included in Table 1 are mostly cited and the authors may or may not appear in Table 2.

Co-occurrence (Author keywords)

Co-occurrence analysis was conducted to get the keywords used by authors. The keywords of the top authors can serve as indicators of the study priorities and interests of scientists and researchers in the subject (Zhang et al., 2019). In this bibliometric analysis, it was crucial to examine the list of keywords which authors used in the selected articles. A mapping analysis done show that there are relationships between the terms found in the research, particularly in the context of the multimodal approach in ESL courses. Following the re-labeling of the synonymic single words and congeneric phrases for the mapping in VOSviewer, a total of 175 keywords with six clusters and 1689 linkages reached the threshold by meeting the minimal criteria of five occurrences. Based on the mapping analysis, studies related with multimodal approach in ESL classrooms are divided into six clusters; Cluster one (marked in red) contains 72 items, Cluster two (marked in green) contains 41 items, Cluster three (marked in dark blue) contains 28 items, Cluster four (marked in yellow) contains 15 items, Cluster five (marked in purple) contains 15 items, and Cluster six (marked in light blue) contains 4 items. Table 3 summarizes the total strength and occurrence based on multimodal approach in ESL classroom terms in each cluster.

Table 3 – Total strength and occurrence on terms related to multimodal approach in ESL classrooms

Cluster	Item	Total link strength	Occurence
1	English as a second language	20	23
	esl	23	31
	esl classroom	4	20
	multimodal	41	26
	multimodality	49	78
2	Multi-modal	55	23
	Multi-modal approach	176	104
3	Multimodal approach	49	28

The common keywords used by authors were multi-modal approach, multimodality, ESL, multimodal approach, and multimodal. The bibliometric map on the co-occurrence of keywords with the overlay visualisation mode is shown in Figure 7.

Figure 7 – The bibliometric map built with the network visualisation based on co-occurrences
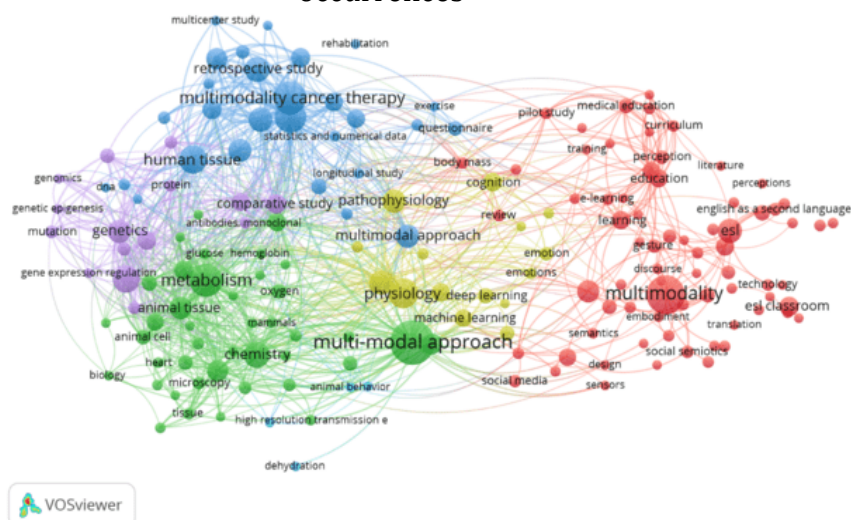
The visualisation network in Figure 7 shows the relationship between the terms (Al Husaeni and Nandiyanto, 2021). The keywords frequency and counts are reflected in the bubble size (Van Eck and Waltman, 2018). The findings of this analysis indicate that the use of multimodality in ESL classrooms may eventually supersede the clusters that dominated multimodality in the past. The five clusters are near to each other in the visualisation network despite being far apart from other clusters. It demonstrates the close relationship between the terms.

In addition, research on the multimodal perspective has been conducted in many areas of education, although without a particular focus on ESL classrooms (see Figures 8(a) &(b)). The development of a specific term in English is equally fascinating to see (Figure 8(c)), of which highlights the needs for more studies on multimodality in ESL classes. Meanwhile in Figure 8(d), the word "multimodal approach" is highlighted in green, showing its popularity in 2018 and beyond.

Figure 8 – A screenshot of the bibliometric map built with network visualisation based on multi-modal approach (a), multimodality (b), esl (c), and multimodal (d)
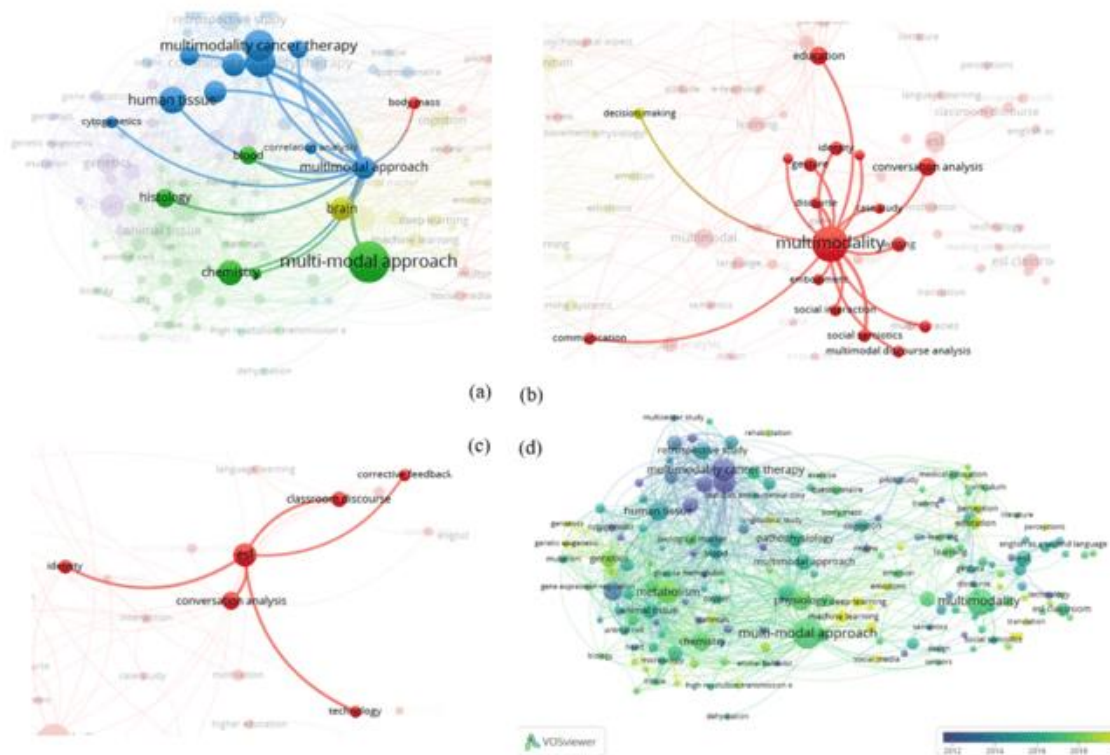
Density visualisation on multimodal approach in ESL classrooms

Figure 9 depicts a density representation of research findings on multimodal approaches in ESL classrooms. Density visualisation depicts item dots with varying colours based on the density of an item (Mulyati and Ramadhan, 2021). In summary, the number of items related with other items that represent the most frequently used keywords in the publication determines the colour of the dots in the mapping. According to the visualisation graphic (see Figure 9), the áreas in yellow connote the tight association, while áreas in green indicate a sparse association.

Figure 9 – A screenshot of the bibliometric map built with density mapping based on multimodal approach in ESL classrooms topic
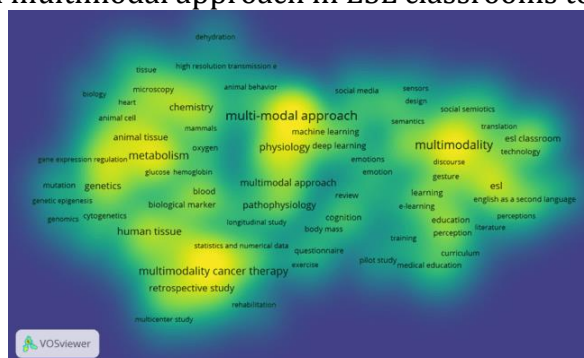
Conclusion

This study was on bibliometric analysis on multimodal approach in ESL classrooms by integrating mapping analysis with the VOSviewer software. The data of this study were 1303 papers from the Scopus database published between the year 1972 and 2022. The aim of this study was to provide a summary of changes in the multimodal instruction in ESL classrooms. The findings have shown that there is a rapid growth in publication in the previous five years, and more vigorous growth is anticipated. The United States and the United Kingdom are found to have the biggest quantity of publications and international partnerships. This study, in addition, has found a number of recently developed research fields using a multimodal approach, including science instruction specifically in ESL classrooms, which have the potential to be explored for future research. To sum up, recent progress has been made in integrating a multimodal approach to teaching ESL, including but not limited to the following: teaching methodologies, teaching environments, and teaching and learning utilizing educational technology. This study was limited to one database, which only contains journal articles written in English. Future studies should compare data from multiple databases, such as WOS, using other software tools for constructing and visualising the data to discover the interesting points which have not been reviewed by the previous researchers.

REFERENCES

Al Husaeni, D. F., and Nandiyanto, A. B. D. (2022). Bibliometric using VOSviewer with Publish or Perish (using google scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre and post Covid-19 pandemic. ASEAN Journal of Science and Engineering, 2(1), 19-46.

Ara, R. (2020). A Foreign Language or the Second Language: The Future of English in Bangladesh. International Journal of Language Education, 4(1), 81-95.

Bambol, E. S., & Sulaiman, N. A. (2022). Language Attitude among Form Four Students in ESL Classroom at Tebedu Secondary School, Sarawak. Higher Education and Oriental Studies, 2(4).

Begum, J. (2019). Learner Autonomy in EFL/ESL Classrooms in Bangladesh: Teachers' Perceptions and Practices. International Journal of Language Education, 3(1), 12-21.

Benckendorff, P., & Zehrer, A. (2013). A network analysis of tourism. Annals of tourism research, 43, 121–149. Retrieved from https://doi.org/10.1016/j.annals.2013.04.005

Bergdahl, N., and Nouri, J. (2021). Covid-19 and crisis-prompted distance education in Sweden. Technology, Knowledge and Learning, 26(3), 443-459.

Bhardwaj, A. (2016). Importance of education in human life: A holistic approach. International Journal of Science and Consciousness, 2(2), 23-28.

Cahyaningati, D. T., & Lestari, L. A. (2018). The Use of Multimodal Text in Enhancing Engineering Students' Reading Skill. International Journal of Language Education, 2(2), 65-73.

Chakraborty, P., Mittal, P., Gupta, M. S., Yadav, S., and Arora, A. (2021). Opinion of students on online education during the COVID-19 pandemic. Human Behavior and Emerging Technologies, 3(3), 357-365.

Chang, T. Y., Hong, G., Paganelli, C., Phantumvanit, P., Chang, W. J., Shieh, Y. S., and Hsu, M. L. (2021). Innovation of dental education during COVID-19 pandemic. Journal of Dental Sciences, 16(1), 15-20.

De Bellis, N. (2009). Bibliometrics and citation analysis: from the science citation index to cybermetrics. scarecrow press.

Djamdjuri, D. S., Suseno, M., Tajuddin, S., Lustyantie, N., & Chaeruman, U. A. (2021). Multimodal Approach in Online EFL Class Using Islamic Learning Materials: Students' Perspective. International Journal of Language Education, 5(4), 337-355.

Duanxian, W. (2021). The internal examination of ideology and politics education in colleges and universities under the perspective of social subject research method. Journal of Educational Theory and management, 5(2), 96-98.

Ganapathy, M., & Seetharam, S. A. (2016). The Effects of Using Multimodal Approaches in Meaning-Making of 21st Century Literacy Texts among ESL Students in a Private School in Malaysia. Advances in Language and Literary Studies, 7(2), 143-155.

Ghani, N. A., Teo, P. C., Ho, T. C., Choo, L. S., Kelana, B. W. Y., Adam, S., & Ramliy, M. K. (2022). Bibliometric analysis of global research trends on higher education internationalization using Scopus database: Towards sustainability of higher education institutions. Sustainability, 14(14), 8810.

Hamidah, I., Sriyono, S., and Hudha, M. N. (2020). A Bibliometric analysis of Covid-19 research using VOSviewer. Indonesian Journal of Science and Technology, 5(2), 209-216.

Hallinger, P., & Kovačević, J. (2019). A Bibliometric Review of Research on Educational Administration: Science Mapping the Literature, 1960 to 2018. Review of Educational Research, 89(3), 335–369.

He, Q. (1999). Knowledge Discovery through Co-Word Analysis. Library Trends, 48(1), 133-59.

Jewitt, C. (ed.) (2009). The Routledge Handbook of Multimodal Analysis, London: Routledge.

Jelani, M. & Hassan, H., (2021), A Bibliometric Review of Global Research Trends on Multimodal Approach in Biology Education using Scopus Database. In Haladin et al., Virtual Language and Communication Postgraduate International Seminar 2021 Proceedings (pp.86-92), Language Academy, Universiti Teknologi Malaysia. https://humanities.utm.my/vlcpis2021/wp-content/uploads/sites/96/2021/10/VLCPIS-2021-PROCEEDINGS.pdf

Khudzari, J. M., Kurian, J., Tartakovsky, B., & Raghavan, G. V. (2018). Bibliometric analysis of global research trends on microbial fuel cells using Scopus database. Biochemical engineering journal, 136, 51-60.

Kress, G. (2009) Multimodality: A Social Semiotic Approach to Contemporary Communication, London: Routledge.

Lam, C. N. C., Habil, H., & Hui, S. M. (2022). A Mobile Application Developed For Scaffolding Esl Learners In Providing Peer Feedback. Journal of Nusantara Studies (JONUS), 7(2), 291-313.

Luo, Z. (2022). Determinants of the perceived usefulness (PU) in the context of using gamification for classroom-based ESL teaching: A scale development study. Education and Information Technologies, 1-28.

Mulyawati, I. B., and Ramadhan, D. F. (2021). Bibliometric and visualized analysis of scientific publications on geotechnics fields. ASEAN Journal of Science and Engineering Education, 1(1), 37-46.

Nandiyanto, A. B. D., and Al Husaeni, D. F. (2021). A bibliometric analysis of materials research in Indonesian journal using VOSviewer. Journal of Engineering Research. 9(ASSEEE Special Issue), 1-16.

Nandiyanto, A. B. D., and Al Husaeni, D. F. (2021). A bibliometric analysis of chemical engineering research using VOSviewer and its correlation with covid-19 pandemic condition. Journal of Engineering Science and Technology, 16(6), 4414-4422.

Setyowati, L., Sukmawan, S., & El-Sulukiyyah, A. A. (2020). Exploring the Use of ESL Composition Profile for College Writing in the Indonesian Context. International Journal of Language Education, 4(2), 171-182.

Small, H. (1999). Visualizing science by citation mapping. Journal of the American Society for Information Science, 50(9), 799–813

Sharif, T. I. S. T., Noor, M. Y. M., Omar, S. R., & Seong, T. K. (2022). Humanising Mobile Online Esl Blended Learning Model. Journal of Nusantara Studies (JONUS), 7(2), 473-494.

Shaturaev, J. (2021). Financing and management of Islamic (madrasah) education in Indonesia. Zeszyty Naukowe Politechniki Częstochowskiej Zarządzanie, 42(1), 57-65

Sullivan, A. M., Lakoma, M.D., and Block, S. D. (2003). The status of medical education in end-of-life care. Journal of General Internal Medicine, 18(9), 685-695

Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. Technology in Society, 65, 101565.

Van Eck, N. J., and Waltman, L. (2013). VOSviewer manual. Leiden:Univeristeit Leiden; 1(1), 1-53.

Van Eck, N. J., & Waltman, L. (2014). Visualizing bibliometric networks. In Measuring scholarly impact (pp. 285-320). Springer, Cham.

Van Eck, N.; Waltman, L. (2020). Manual for VOSviewer Version 1.6.16. Leiden, CWTS Universiteit Leiden.

Van Eck, N.J. & Waltman, L. (2018) Manual for VOSviewer Version 1.6.8; CWTS Meaningful Metrics; Leiden, Leiden University.

Van Raan, A. F. (2005). Fatal attraction: Conceptual and methodological problems in the ranking of universities by bibliometric methods. Scientometrics, 62(1), 133-143.

White, H. D., & McCain, K. W. (1998). Visualizing a discipline: An author co-citation analysis of information science, 1972–1995. Journal of the American society for information science, 49(4), 327-355.

Zhang, X., Estoque, R. C., Xie, H., Murayama, Y., & Ranagalage, M. (2019). Bibliometric analysis of highly cited articles on ecosystem services. PloS one, 14(2), Retrieved from https://doi.org/10.1371/journal.pone.0210707

Zare, F., Elsawah, S., Iwanaga, T., Jakeman, A. J., & Pierce, S. A. (2017). Integrated water assessment and modelling: A bibliometric analysis of trends in the water resource sector. Journal of Hydrology, 552, 765-778. Retrieved from https://doi.org/10.1016/jhydrol.2017

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. Organizational research methods, 18(3), 429-472.