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Arabic Vocabulary Applications Bibliometric Analysis from 1987 to 2024

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Abstract
This study analyzes the development and trends of Arabic vocabulary applications from 1987 to 2024 using bibliometric techniques.It examines 37 years of literature to address gaps in understanding their evolution and impact. Data were cited from databases such as SCOPUS as well as Web of Science, focusing on conference proceedings, articles, and reviews published within the defined timeframe. Various bibliometric indicators, VosViewer version 1.16.20 tools to analyze publication trends, citation counts, co-authorship networks, and thematic analysis were utilized to analyze the research landscape comprehensively. Findings highlight increasing publications, themes like gamification, and the shift to AI-powered tools, emphasizing future research directions.

Keywords: Learn; Vocabulary; Arabic; Application.

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1.0 Introduction

The evolution and application of Arabic vocabulary from 1987 to 2024 reveal a dynamic interplay between traditional linguistic practices and modern adaptations driven by technological advancements. In the late 1980s, Arabic vocabulary reflected mostly specific uses in education, mass media, and religious practices. Knowledge delivery methods strictly adhered to the textbook and rote learning as these approaches maintained the integrity of the language to the detriment of its versatility in meeting the modern world's requirements. During this period, language modernization endeavors were limited, and the use of Arabic to express new ideas was slow, With words borrowed from other languages were often used literally because of a lack of direct translation. Nevertheless, this deserted gradually as the globalization process unfolded, and regional linguistic associations realized the need to enhance the Arabic lexis to meet the demands of science and technology (Alfuhaid, 2023; Setiyadi, Anhar, & Anwar, 2022).

The beginning of the use of digital tools in the 2000s and the widespread use of the internet made it possible for the application of Arabic vocabulary to turn a new page. In light of the processes that took place over the course of the years, by 2024, the language was taught, learned, and employed in a rather different manner due to digital transformation. Smartphone applications and software, websites, and social networks were crucial to achieving both official and informal learning acquisition (Tawil, 2019; Wright, 2016). Therefore, new vocabulary learning applications such as *Memrise* among others, and other applications that were developed with a

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specific focus on the Arabic language were developed with features such as game-based learning, flashcards, and spaced repetition to reinforce learning.

Based on the previous argument, this study aim to analyzes the development and trends of Arabic vocabulary applications from 1987 to 2024 by examining 37 years of literature to address gaps in understanding their evolution and impact. The study will discover the research trends in Arabic vocabulary application studies corresponding to the year of publication and determine the most published articles by subject area and the authors regarding the most cited articles. The study will also determine the quantity of the published research according to the countries and the co-occurrence, co-citation, and countries' collaboration.

2.0 Literature Review

The discovery of Arabic vocabulary applications has recently attracted considerable attention in the current literature, showing diverse approaches to the learning of vocabulary terms among learners. Of particular interest is the research that underlines how beneficial the use of mobile applications appears to be. Non-native secondary students prefer using mobile applications over conventional methods. Learning is enhanced by multimedia materials such as videos and games, which help students retain knowledge for longer and make them more motivated (Zulkepli, Abd Hamid, & Dajani, 2024). Furthermore, investigations into the use of word-by-word translations with regard to the Qur'an show that such strategies can strongly contribute to vocabulary acquisition and rote learning. However, care should be taken not to go to extremes with translation techniques that may block the development of overall linguistic competence (Herawati & Ainil Mawaddah, 2023). In addition, the use of interactive multimedia tools such as Web-Based Games like "Wordwall" also assists in increasing students' interest and leads to a better understanding of vocabulary as complemented by a more flexible and interesting learning environment (Musthafa & Anam, 2023; Safitri & Ammar, 2023). Overall, these studies call for incorporating technology and communicative approaches in the teaching and learning concerning Arabic to redress ongoing difficulties in the learning of vocabulary.

It was also witnessed by attempts to produce applications that use both Modern Standard Arabic (MSA) and regional dialects to address different language demands. This change was made in a bid to respond to calls for the applicability of language skills in academic institutions and organizations and for everyday use. In addition, governments and linguistic academies in the Arab world worked to set up standard Arabic terms to further the expansion of authentic languages consistent with the progress of advanced technology. This contextualization of tradition and innovation underscores how Arabic vocabulary applications have moved from fixed pedagogical assets into flexible digital assets for crossing the past and present Arabic language contexts (Yahaya, Sardi, Radzi, Abdelhamid, & Bakar, 2019). Overall, these studies call for incorporating technology and communicative approaches in the teaching and learning of Arabic to redress ongoing difficulties in the learning of vocabulary.

3.0 Methodology

Organizing, coordinating, and assessing bibliographic information from scientific publications is referred to as bibliometrics (Alves, Borges, & De Nadae, 2021; Assyakur & Rosa, 2022; Verbeek, Debackere, Luwel, & Zimmermann, 2002). Additionally, typical descriptive data like publication year, publishing journals, as well as key author classification, it incorporates advanced techniques like document co-citation analysis (Wu & Wu, 2017). A quality literature review requires an iterative process that includes the identification of pertinent keywords, literature searches, as well as meticulous analysis to produce a comprehensive bibliography and trustworthy conclusions (Fahimnia, Sarkis, & Davarzani, 2015). Note that the research concentrated on excellent papers to offer beneficial information regarding the theoretical stances influencing the area development. To determine data reliability, the study obtained data utilising the SCOPUS database (Al-Khoury et al., 2022; di Stefano, Peteraf, & Veronay, 2010; Khiste & Paithankar, 2017). To reduce the bias by including only high-quality papers, lecture notes, as well as books were excluded. Here, only papers published in rigorously peer-reviewed international academic journals were considered (Gu, Li, Wang, Yang, & Yu, 2019). In particular, it was accessible to gather papers from 1987 to 2024 for further analysis with the help of Elsevier's SCOPUS, which is one of the largest databases.

3.1 Data search strategy

A screening sequence was utilised in this research to identify the search terms to be used in the article search. The current search began by searching the SCOPUS database with TITLE-ABS-KEY (Arabic AND vocabulary AND application), generating 151 articles. From this process, 151 articles were obtained and further refined to include only research articles using English and the article reviews were also eliminated. Finally, for the bibliometric analysis, 151 articles were obtained with the help of final search string refinement. All articles found from the SCOPUS database emphasizing Arabic vocabulary application for students and published between 1987 and 2024 were included in the study.

3.2 Data *analysis*

The VOSviewer, which was established by van Eck and Waltman at Leiden University, is one of the most popular bibliometric tools in which the user-friendly graphical user interface and powerful functional characteristics are appreciated (van Eck & Waltman, 2010, 2017). It is often implemented for the analysis and display of scientific research articles. It is especially employed in the creation of readable and compelling network diagrams, group categorizations, and density mapping. This is a major strength coming from the fact that the software covers the analysis of co-citation, co-authorship, as well as keyword co-occurrence networks, allowing the researcher to have a clear comprehension with regard to research environments. As a result of its interactive interface and relatively frequent

updates, VosViewer should be considered a necessity for any scholar who seeks to understand vast amounts of data in complex areas of study.

Another critical feature with regard to VosViewer is its ability to translate bibliometric data into charts and maps that are easy to interpret (van Eck & Waltman, 2010, 2017). Focusing on the visualization of connections, the software is most efficient regarding group similarity, analyzing the co-occurrence of the words specified, and displaying density. It is easy to use and has been developed to cater to first-time users and researchers with prior knowledge, allowing for easy search and networking within the research fields. Continuous improvements will ensure that VosViewer remains one of the leading bibliometric analysis tools that can offer valuable information based on the metrics calculations and the specific visualization the user might prefer. Its ability to adapt to various types concerning bibliometric data, including co-authorship as well as citation networks, establishes VOSviewer as a flexible and essential resource for scholars examining a deeper comprehension and significant insights given their research areas.

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defined "proportional to the ratio that exists between the observed number of i and j cooccurrences as well as the predicted number of i and j cooccurrences under the assumption that co-occurrences of i and j are statistically independent" (Van Eck and Waltman, 2010, p. 531). Therefore, VOSviewer uses this index to reduce the weighted total of the squared distances that exists between all item pairs before placing items in the form of a map. Appio et al. (2016) determine that the LinLog/modularity normalization was utilised. Moreover, patterns using the mathematical correlations were discovered by implementing visualization techniques to the data set utilising VOSviewer. This allowed for the execution of analyses, for example, co-citation analysis, citation analysis, as well as keyword co-occurrence.

4.0 Findings

Q1. What are the research trends in Arabic vocabulary application studies according to the year of publication?

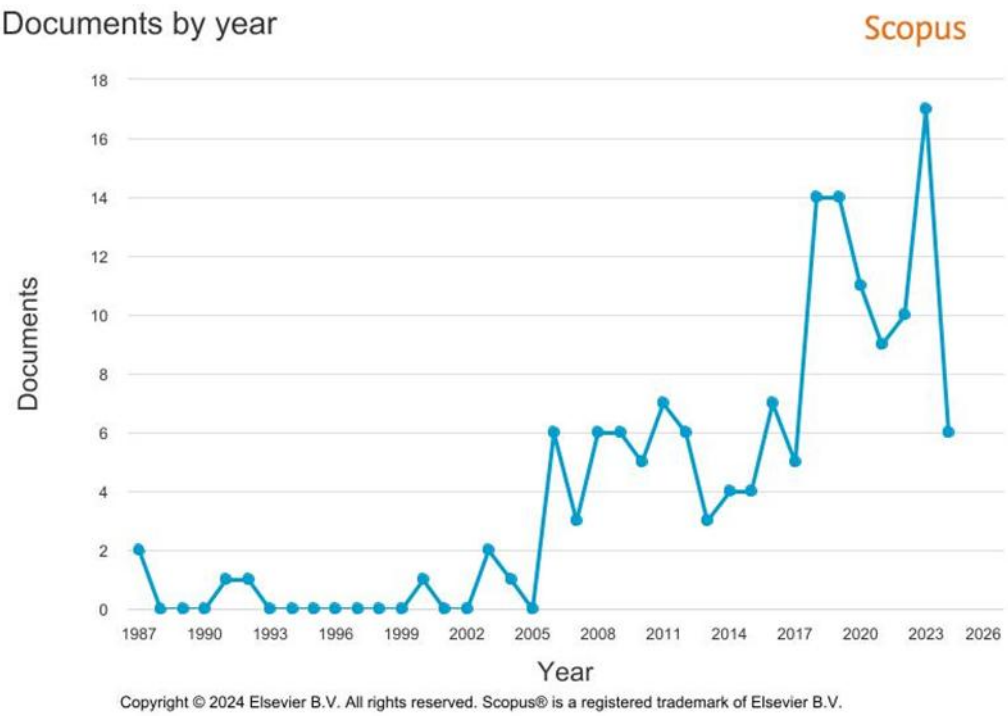

Figure 1: Trend with regard to research in Arabic vocabulary application by years.

The figure displays the number of publications indexed in SCOPUS from 1987 to 2026. There is a significant upward trend, with a major surge starting around 2017 and peaking in 2023. Hence, it indicates increasing research activity and publication output in the field. The fluctuations and spikes might be due to changes in publication practices, external factors, or subject areas.

Q2. What are the most published articles by subject area?

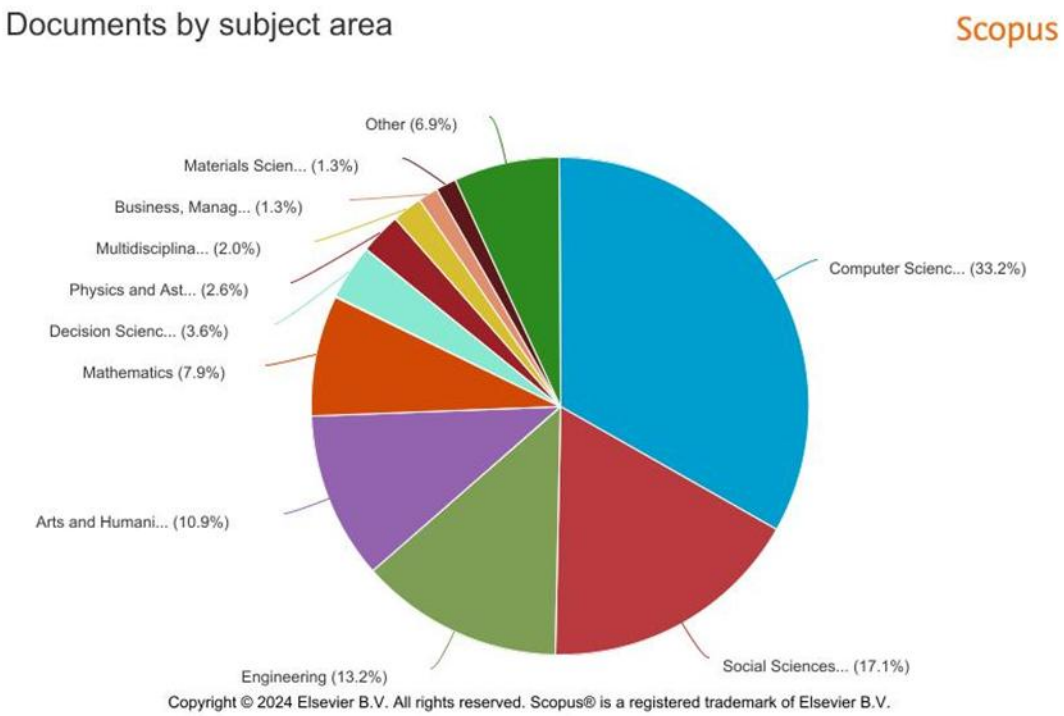

Figure 2: Documents by subject area.

The pie chart provided shows the distribution of publications on Arabic vocabulary applications across various subject areas. Computer Science is the discipline with the most emphasis, with 33.2% of the publications. This suggests much emphasis on computational methods and techniques of solving textual data in Arabic for analysis and processing. Science and Engineering are also among the top categories, which also indicates that interdisciplinary is a key to Arabic vocabulary applications. Some other fields, such as Arts and Humanities, Mathematics, and Physics, are also represented, which means that a lot of methodologies and points of view are presented.

Q3: Who writes the most cited articles?

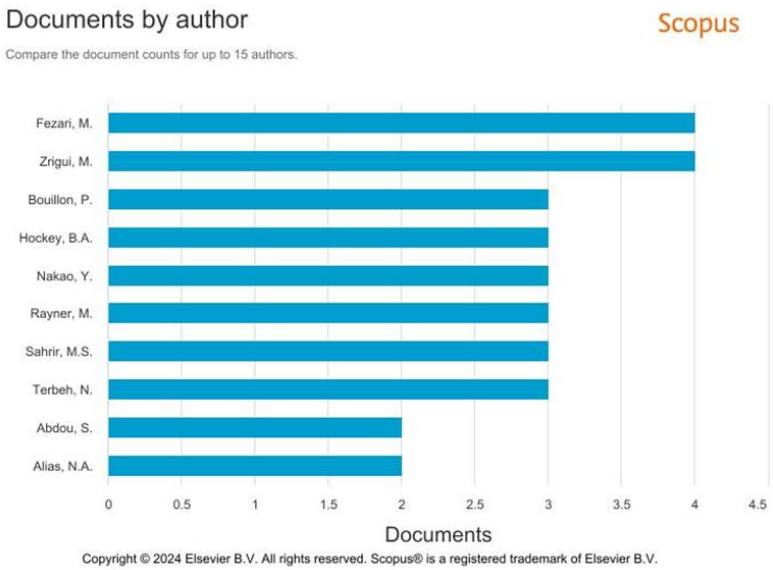

Figure 3: The most cited articles.

The above figure illustrates the distribution of the Arabic vocabulary applications among different authors. The top two authors of the articles are Fezari, M., and Zrigui, M. This indicates that they have been involved in conducting research in this particular area for a

long time or have produced more research works than the other universities. The number of publications also shows that there is not much difference between the top 10 researchers regarding productivity, suggesting a consistent level of research activity.

Q4: How much has been published according to the countries?

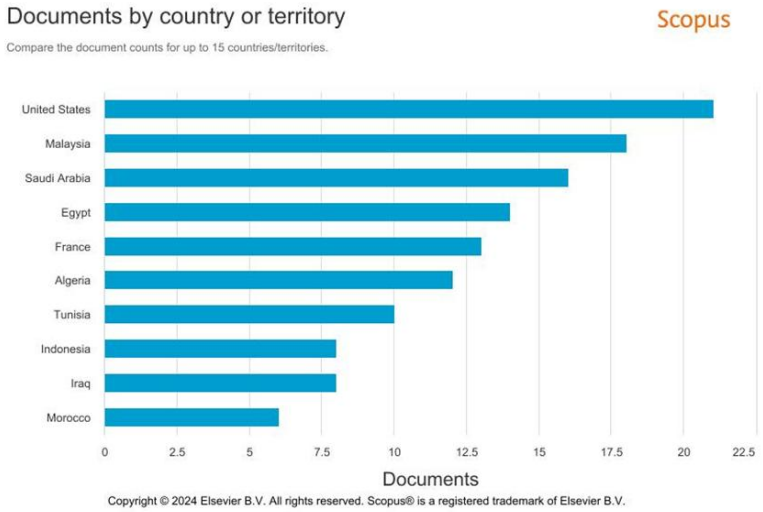

Figure 4: Documents by country

The provided figure also explains the number of publications in Arabic vocabulary applications by country. The United States appears at the top of the list, which shows that much research has been conducted in this area. Middle Eastern countries like Malaysia, Saudi Arabia, Egypt, and others have a significant presence, suggesting a growing interest in Arabic language research within these regions. The diverse geographical representation, including countries from North America, Southeast Asia, North Africa, as well as the Middle East, emphasises the global nature with regard to research in this area. This trend implies a rising demand for learning the Arabic language and its uses anywhere globally.

Q5: What are co-citation, co-occurrence, as well as countries' collaboration?

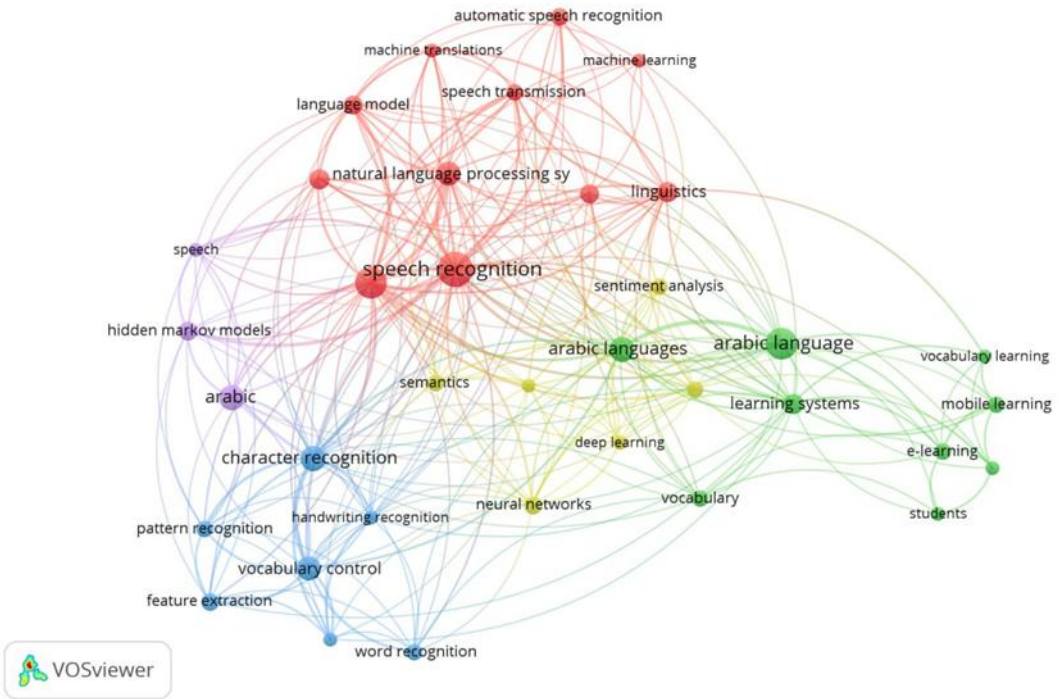

Figure 5: Network visualization map regarding keywords' co-occurrence.

The keyword co-occurrence network reveals distinct clusters, underscoring key research areas in Arabic vocabulary applications:

- Speech Recognition and Natural Language Processing: This cluster focuses on speech recognition technologies and natural language processing (NLP) techniques.
- Machine Learning as well as Deep Learning: This cluster covers the development of machine learning and deep learning techniques for enhancing Arabic vocabulary applications.
- Arabic Language and Linguistics: Vocabulary research, from a linguistic perspective, is the focus of this cluster in the Arabic language.
- Education and Learning: This cluster emphasized using Arabic vocabulary research findings in education.

The network presents a multidisciplinary field here with clear interconnections between these fields, which may point to weaknesses for interdisciplinary work and the emergence of new approaches and concepts.

The cluster colors represent subject areas according to citation or co-occurrence patterns. The yellow cluster focuses on deep learning in Arabic, the purple on computational techniques, the blue on character recognition, the red on NLP, and the green on learning Arabic. When combined, they draw attention to important study topics and their relationships.

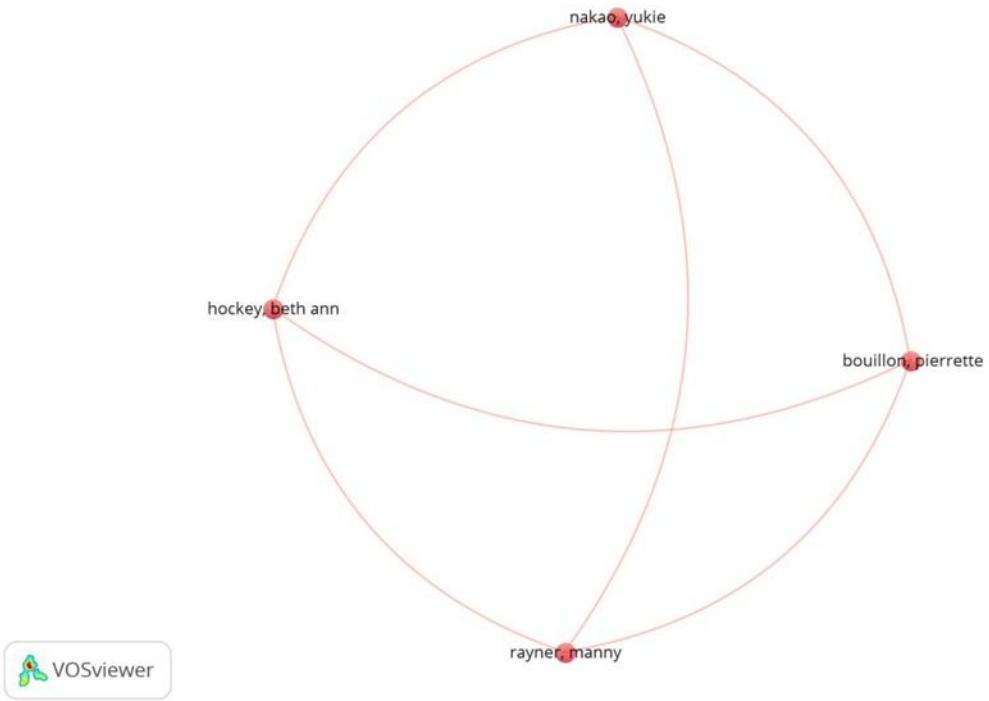

Figure 6: Co-authorship connected clusters map in Arabic vocabulary application.

The co-authorship network is broken down into four clusters, which are groups of researchers who collaborate internally. Overall, these groups seem quite disconnected from each other, and there is little intersection between the two. This implies that there is little Interdisciplinary research in the field, and researchers are not working closely with researchers from the other subfields.

With a view to improving the development of this field, it could be important to bring together such groups that can cooperate and conduct more effective and profound research. More cooperation and research collaborations should be encouraged across discipline-based and knowledge-sharing platforms.

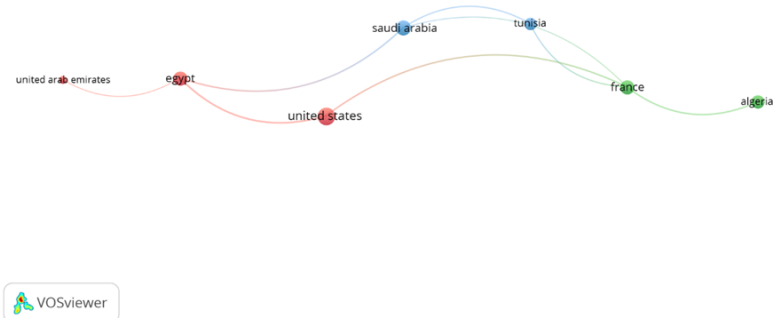

Figure 7: The top contributing countries.

The co-authorship network reveals three main clusters of countries collaborating on Arabic vocabulary applications:

1. Egypt, United Arab Emirates, and the United States: Strong collaboration ties, likely due to shared interests.
2. France and Tunisia: Close collaboration, possibly due to geographical proximity and linguistic similarities.
3. Saudi Arabia and Algeria: Weaker connection, suggesting less frequent collaboration.

In general, the network prescribes rather scarce inter-group interaction, which can be beneficial only in the form of cooperation between the countries of different groups to exchange experiences and implement the principles of interdisciplinary approach.

5.0 Discussion

The results present a sharp increase in the number of articles that address Arabic vocabulary applications, more specifically between the years 2017 and 2023, due to technological improvements, availability of funds, and shifting to an interdisciplinary approach. Such growth highlights how collaboration and ethical practice can meet the new challenges posed by research and technology concerning the Arabic language.

The analysis with regard to the network map reveals that the field of Arabic vocabulary research has a clear structure divided into subdomains and is quite developed. However, it also shows that there is a lack of interaction between the different research groups. There is a great potential for interdisciplinary collaboration and knowledge sharing to promote further development of the field and create better educational applications.

Applications of Arabic vocabulary are based on important ideas of language acquisition. Vygotsky's Sociocultural Theory stresses social learning through collaborative instruments, while Krashen's Input Hypothesis guarantees that learners receive intelligible input for steady growth. Behaviorist Theory enhances learning through rewards and instant feedback, while Cognitive Load Theory lessens learning difficulties by including gamified and multimedia information. When taken as a whole, these theories show how technology helps people learn new words.

6.0 Conclusion& Recommendations

The study's scope is constrained by its dependence on SCOPUS-indexed papers and bibliometric analysis. Larger datasets, qualitative investigations, and case studies ought to be a part of future studies. The integration of AI, VR, interdisciplinary cooperation, and adaptive learning is the main focus of the recommendations. Long-term objectives, gamification, and Arabic apps for heritage learners require more research.

Acknowledgments

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Paper Contribution to Related Field of Study

The study “Arabic Vocabulary Applications Bibliometric Analysis from 1987 to 2024” analyses the period of 37 years and reveals the transformation from conventional approaches to technology-supported techniques, including mobile applications, games, and AI, in learning Arabic vocabulary. It utilizes bibliometric analysis to point out the research gaps and promotes interdisciplinary cooperation and advocacy of language technologies that may suit every learner. The research emphasizes the contribution of different fields, such as Computer Science and Social Sciences, to the enhancement of Arabic education, which also keeps in mind ethical issues like data privacy and access. It offers the framework for enhancing Arabic language acquisition through innovative, equitable, and integrated application of technology.

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