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ARABIC VOCABULARY LEARNING THROUGH SMARTPHONE APPLICATION: A BIBLIOMETRIC ANALYSIS

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Abstract:

In recent years, the integration of smartphones into language learning environments has gained significant attention due to its potential to enhance accessibility and effectiveness. This paper presents a bibliometric analysis focusing on the topic of "Arabic Vocabulary Learning Through Smartphone Application". The proliferation of smartphones and mobile applications has revolutionized various aspects of education, including language learning. Arabic language learning, in particular, has witnessed increased interest in leveraging smartphone applications to facilitate vocabulary acquisition. The lack of a systematic analysis of research on Arabic vocabulary learning through smartphone applications hampers the ability to identify emerging trends, key contributors, and high-impact studies in the field. This study employs bibliometric analysis techniques to examine the scholarly output related to Arabic vocabulary learning through smartphone applications. Data were retrieved from the Scopus database, focusing on publications from 2001 to 2023. 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. The analysis reveals a steady increase in publications over time, reflecting the growing interest and research activity in Arabic vocabulary learning through smartphone applications. This bibliometric analysis provides valuable insights into the trends, patterns, and impact of research on Arabic vocabulary learning through smartphone applications. The identified themes and high-impact articles contribute to our understanding of the field's

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development and offer directions for future research endeavors, educational practices, and policy decisions.

Keywords:

Learn, Vocabulary, Arabic, Application

Introduction

The utilization of smartphone applications for Arabic vocabulary learning presents a paradigm shift in language acquisition methodologies, offering convenience, accessibility, and interactivity. These applications leverage the ubiquity of smartphones, allowing users to engage with learning materials anytime, anywhere. Through interactive exercises, gamification elements, and personalized learning paths, these applications cater to diverse learning styles, making vocabulary acquisition engaging and effective (Az Zahrah & Anwar, 2023; Fakhruddin, Firdaus, & Mauludiyah, 2021; Fitriah, Eusabinus Bunau, Eka Fajar Rahmani, Rahayu Apriliaswati, & Eni Rosnija, 2023; Rizky Setiawan & Wiedarti, 2020). Moreover, incorporating multimedia content such as audio pronunciations, visual aids, and contextual examples enhances comprehension and retention (Irrazabal & Burin, 2021; Jones, 2013; Jones, 2003; Münchow, Mengelkamp, & Bannert, 2017). Furthermore, the adaptive nature of smartphone applications tailors learning experiences to individual proficiency levels, providing targeted feedback and reinforcement, thereby optimizing learning outcomes. Such features facilitate vocabulary retention and promote learner autonomy, empowering users to take ownership of their learning journey.

Additionally, integrating smartphone applications for Arabic vocabulary learning addresses various challenges encountered in traditional learning environments. By transcending physical constraints and time limitations, these applications democratize access to language education, particularly for individuals with busy schedules or limited resources. Moreover, the flexibility afforded by smartphone applications accommodates diverse learning contexts, enabling learners to tailor their study sessions according to their preferences and pace. Furthermore, the interactive nature of these applications fosters a dynamic learning environment, encouraging active engagement and participation (Gabarre, Gabarre, Din, & Fung, 2013; Guerrero-Quiñonez, Quiñónez Guagua, & Barrera-Proaño, 2023). Through features like spaced repetition algorithms and progress-tracking tools, learners receive personalized support, fostering a sense of achievement and motivation. Ultimately, integrating smartphone applications revolutionizes Arabic vocabulary learning, offering a versatile and empowering platform that transcends traditional barriers to language acquisition.

Literature Review

The literature surrounding Arabic vocabulary learning through smartphone applications encompasses various perspectives and methodologies, shedding light on both the effectiveness of vocabulary teaching methods and the linguistic intricacies involved in second language acquisition. Olioumtsevits, Papadopoulou and Marinis (2023) explore vocabulary teaching interventions for children with refugee backgrounds within the formal education system in Greece. Their study evaluates the effectiveness of flashcards, pantomime, and contextual cues, finding significant improvements in second language vocabulary skills through flashcards and pantomime. Conversely, Haider, Alzghoul and Hamadan (2023) delve into creating a parallel corpus of English-Arabic subtitles for culinary shows, emphasizing the challenges and

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strategies in translating culture-bound expressions. Al-Ahdal and Aljabr (2023) investigate the role of the mother tongue in mastering foreign language vocabulary, highlighting the benefits of bilingual teaching methodologies in enhancing vocabulary retention among EFL learners.

Similarly, Brown (2023) compares monolingual and multilingual foreign language teaching methods, demonstrating the advantages of incorporating non-target languages in second language instruction, particularly evident in vocabulary acquisition. This contrasts with Zibin, Altakhaineh, Suleiman and Al Abdallat (2023) examination of attributed nouns in the Holy Quran, emphasizing the Holy Quran's role in shaping Arabic grammar and vocabulary. Zhanpeissova, Kuzembayeva and Maydangalieva (2023) analyze the semantic development of Arabic-Iranian borrowings in the Kazakh language, underscoring the evolution of religious concepts and their integration into Kazakh vocabulary.

Furthermore, Rosenhouse (2023) scrutinizes translations of "The Little Prince" into Hebrew and Arabic, exploring the impact of word count and translation strategies on target language comprehension. Qadan and Shehab (2023) investigate concept recognition deficiencies among Palestinian learners of English vocabulary, emphasizing the importance of cultural sensitivity in language instruction. Alternatively, Hashim and Ghani (2023) study the borrowing of Sanskrit words in the Malay language, focusing on semantic changes influenced by religious and cultural shifts. Finally, Zakraoui, Saleh, Al-Maadeed and AlJa’am (2023) assess children's emotions and performance while handwriting Arabic characters using a haptic device, highlighting the potential of technology-enhanced learning environments.

Collectively, these studies underscore the multifaceted nature of Arabic vocabulary learning, emphasizing the need for culturally responsive teaching methodologies, bilingual approaches, and technological innovations to enhance vocabulary acquisition among learners. However, gaps remain in understanding the nuanced interactions between linguistic, cultural, and technological factors in the language learning process, warranting further research to inform pedagogical practices and curriculum development.

The literature on Arabic vocabulary learning through smartphone applications encompasses various perspectives and methodologies, shedding light on effective strategies, technological advancements, and linguistic intricacies. Nurjannah, Malia and Tahir (2023) emphasize the importance of using flashcard media to enhance maharah al-kalam (speaking skills) among Arabic learners. Their qualitative study demonstrates the positive impact of flashcards in facilitating vocabulary retention and sentence comprehension. However, while this approach proves effective, it primarily focuses on basic vocabulary and may not address the nuanced linguistic needs of intermediate or advanced learners.

In addressing the vocabulary needs of intermediate learners, Farhan, Mohd Noah, Mohd and Atwan (2023) propose a word-embedding-based query expansion technique specifically tailored for Arabic document retrieval. Their study introduces Deep Averaging Networks (DANs) to expand query terms and improve search accuracy. DANs offer a promising solution to the query–document vocabulary mismatch problem by incorporating semantic meaning at the query level. This approach enhances vocabulary acquisition indirectly by enabling more precise access to relevant learning materials.

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Further exploring vocabulary acquisition within specific linguistic contexts, Akmaliyah et al. (2023) investigate the efficacy of imitating Quranic sentences for translating Arabic into Indonesian. Their qualitative study reveals that imitating sentence patterns fosters translation accuracy and enhances vocabulary retention among learners. This approach underscores the importance of integrating authentic language materials, such as Quranic verses, into vocabulary learning curricula to promote proficiency and cultural understanding.

Moreover, Zibin et al. (2023) explore the potential of assistive applications in improving language comprehension for children with Autism Spectrum Disorder (ASD). Their study introduces a prototype Arabic assistive application aimed at enhancing comprehension and communication skills among ASD children. By leveraging technology to scaffold language learning, this research demonstrates the significant impact of interactive applications in expanding vocabulary and promoting language development among diverse learner populations.

While these studies offer valuable insights into vocabulary acquisition strategies, gaps in knowledge persist. For instance, while some studies focus on basic vocabulary acquisition, research is needed to address the linguistic complexities encountered by intermediate and advanced learners. Additionally, exploring the effectiveness of smartphone applications in diverse linguistic contexts and for different learner populations could provide further insights into optimizing vocabulary learning experiences.

In conclusion, the literature on Arabic vocabulary learning through smartphone applications encompasses a range of approaches, from flashcard-based interventions to sophisticated query expansion techniques and assistive applications for special populations. Given the existing research highlights promising strategies, future studies should address gaps in knowledge, particularly regarding the linguistic needs of diverse learner populations and the optimization of smartphone applications for vocabulary acquisition.

The literature on Arabic vocabulary learning through smartphone applications encompasses various perspectives, methodologies, and challenges. Ricci (2023) delves into the realm of Arabic speech recognition systems, particularly focusing on developing a system for recognizing isolated words from the Holy Quran. This endeavor highlights the complexity of Arabic vocabulary due to its rich linguistic heritage and multiple dialects. Moreover, the system demonstrates reasonable accuracy in identifying individual words, underscoring the need for sophisticated technological solutions to cater to the nuances of Arabic language learning.

In a different vein, Mustafa and Bouzoubaa (2023) explore the challenges of adapting the Arabic language to modern concepts and terms, especially in the context of transliteration and lexical expansion. Their study emphasizes the importance of systematically organizing Arabic vocabulary, particularly triliteral roots, to facilitate the translation of new terms and concepts. By categorizing roots based on their usage and acceptability, their work provides a valuable resource for enhancing Arabic vocabulary learning strategies, including those employed in smartphone applications.

Both studies shed light on the intricacies of Arabic vocabulary acquisition, highlighting the need for innovative approaches to address the linguistic complexities inherent in the language. Note that Ricci's (2023) research underscores the significance of advanced technological

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solutions for speech recognition and language learning. Meanwhile, Mustafa and Bouzoubaa's (2023) work emphasizes the foundational aspect of organizing and categorizing Arabic vocabulary to support effective translation and adaptation of modern concepts. Together, these studies underscore the interdisciplinary nature of Arabic vocabulary learning through smartphone applications and point towards avenues for future research to bridge the gap between traditional linguistic frameworks and contemporary technological advancements.

Research Question

Q1. What are the trends? What are the research trends in Arabic vocabulary learning through smartphone applications according to the year of publication?
Q2: Who writes the most number of articles?
Q3: Who are the top 10 authors based on citation by research?
Q4: What are the popular keywords related to the study?
Q5: What are co-authorship countries' collaboration?
Q6: What Network mapping is based on citation by country?

Methodology

Bibliometrics is organizing, coordinating, and analyzing bibliographic data from scientific publications (Alves, Borges, & De Nadae, 2021; Assyakur & Rosa, 2022; Verbeek, Debackere, Luwel, & Zimmermann, 2002). It includes sophisticated methods like document co-citation analysis in addition to standard descriptive information like publishing journals, publication year, and major author categorization (Wu & Wu, 2017). In order to provide a full bibliography and reliable findings, a good literature review requires an iterative process that includes the discovery of relevant keywords, literature searches, and careful analysis (Fahimnia, Sarkis, & Davarzani, 2015). Considering this, the study aimed to concentrate on high-caliber publications as they provide insightful information on the theoretical stances influencing the development of the field of study. The study used the SCOPUS database for data gathering to guarantee data dependability (Al-Khoury et al., 2022; di Stefano, Peteraf, & Veronay, 2010; Khiste & Paithankar, 2017). Furthermore, only papers published in carefully peer-reviewed academic journals were considered, with books and lecture notes purposefully left out to guarantee the inclusion of high-quality publications (Gu, Li, Wang, Yang, & Yu, 2019). In particular, Elsevier's SCOPUS, which is renowned for its broad coverage, made it easier to gather papers from February 2024 to 2001 for further examination.

Data Search Strategy

The study employed a screening sequence to determine the search terms for article retrieval. The study was initiated by querying the SCOPUS database with online TITLE learn* AND (vocab* OR dictionary OR glossary OR language) AND arab* AND (app* OR phone OR mobile OR software OR "smartphone"), thereby assembling 3489 articles. Afterward, the query string was revised so that the search terms "e vocab" AND "arab" should be focused on students as learners. Refinement included 1752 articles which were used for bibliometric analysis. As of February 2024, all articles from the Scopus database relating to Arabic vocabulary learning through smartphone applications were incorporated into the study.

Table 1: The Search String

Scopus	TITLE-ABS-KEY (learn* AND (vocab* OR dictionary OR glossary OR language) AND arab* AND (app* OR phone OR mobile OR software OR "smart phone")) AND (LIMIT-TO (PUBYEAR, 2001) OR LIMIT-TO (PUBYEAR, 2002) OR LIMIT-TO (PUBYEAR, 2003) OR LIMIT-TO (PUBYEAR, 2004) OR LIMIT-TO (PUBYEAR, 2005) OR LIMIT-TO

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	(PUBYEAR, 2006) OR LIMIT-TO (PUBYEAR, 2007) OR LIMIT-TO (PUBYEAR, 2008) OR LIMIT-TO (PUBYEAR, 2009) OR LIMIT-TO (PUBYEAR, 2010) OR LIMIT-TO (PUBYEAR, 2011) OR LIMIT-TO (PUBYEAR, 2012) OR LIMIT-TO (PUBYEAR, 2013) OR LIMIT-TO (PUBYEAR, 2014) OR LIMIT-TO (PUBYEAR, 2015) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2023) OR LIMIT-TO (PUBYEAR, 2024)) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English"))

Table 2: The Selection Criterion Is Searching

Criterion	Inclusion	Exclusion
Language	English	Non-English
Timeline	2022 – 2023	< 2022
Dokumen type	Article	Non Article
Source type	Journal (Article) and Proceeding	Book, Review

Data Analysis

VosViewer, a bibliometric software developed by van Eck and Waltman at Leiden University, Netherlands, is widely recognized for its user-friendly interface and robust analytical capabilities (van Eck & Waltman, 2010, 2017). It is extensively employed for visualizing and examining scientific literature, particularly in creating intuitive network visualizations, clustering related items, and generating density maps. The software's flexibility extends to analyzing co-authorship, co-citation, and keyword co-occurrence networks, offering researchers a comprehensive understanding of research landscapes. With its interactive interface and regular updates, VosViewer facilitates efficient exploration of large datasets, making it an invaluable resource for scholars seeking insights into complex research domains.

A notable feature of VosViewer is its ability to translate intricate bibliometric datasets into visually interpretable maps and charts (van Eck & Waltman, 2010, 2017). Focused on network visualization, the software excels in clustering related items, analyzing keyword co-occurrence patterns, and generating density maps. Its user-friendly interface caters to both novice and experienced users, enabling efficient exploration of research landscapes. Continuous development ensures that VosViewer remains at the forefront of bibliometric analysis, offering valuable insights through metrics computation and customizable visualizations. Its adaptability to various bibliometric data types, such as co-authorship and citation networks, positions VosViewer as a versatile and indispensable tool for scholars seeking deeper understanding and meaningful insights within their research domains.

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Result And Finding

Year Of Publication

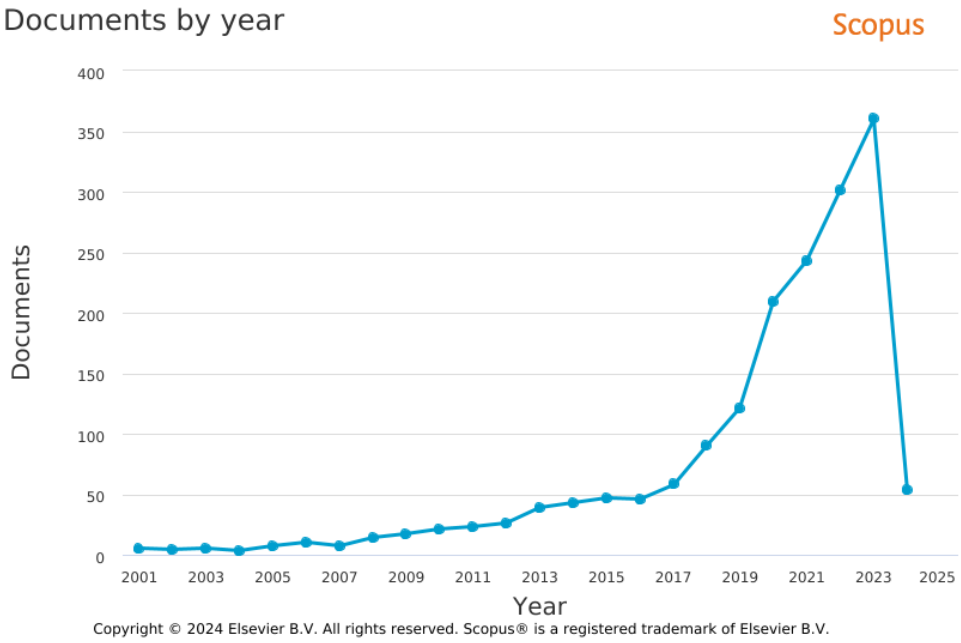

Figure 1: Plotting Document Publication By Years.

The line graph depicts the number of publications indexed in the SCOPUS database over a period of 23 years, from 2001 to 2023. The number of documents is shown on the vertical axis (y-axis), and the publication year is shown on the horizontal axis (x-axis).

- The graph shows a general upward trend in the number of publications over time. This indicates that the volume of research output within the field or topic has steadily increased.
- While the overall trend is positive, there are some fluctuations. Noticeable drops or increases between specific years could indicate shifting research focus or important events/discoveries within the field that may have influenced publication output at that time.
- There might be a particularly sharp increase in publications in more recent years (the exact extent depends on the data). This might suggest accelerating interest or heightened attention to the field of study.

The line graph shows the number of documents by year for the article "Arabic Vocabulary Learning Through Smartphone Application" in the Scopus database, which covers scholarly publications.

The graph shows an **increasing trend** in the number of publications over the time period from 2001 to 2023. There are some fluctuations in the number of publications from year to year, but overall, the trend is positive.

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Here are some factors that may have influenced the increasing number of publications:

- **Advancements in technology:** The development of smartphones and mobile learning apps has made it easier for people to learn Arabic vocabulary on their own time and at their own pace. This has led to an increased interest in research on this topic.
- **Changes in funding:** There may have been an increase in funding for research on mobile learning in recent years. This could be due to a growing recognition of the potential of mobile learning to improve educational outcomes.
- **Shifts in research priorities:** There has been a growing interest in mobile learning in recent years, as educators and researchers have begun to explore the potential of this technology to improve language learning. This has led to an increase in the number of studies on this topic.
- **Emerging trends in the field:** There is a growing body of research on using mobile learning for language learning. This research is helping to identify the best practices for using mobile learning to teach Arabic vocabulary and other language skills.

The increasing number of publications on this topic suggests a growing interest in using mobile learning to teach Arabic vocabulary. This is a positive development, as it could lead to the development of more effective methods for teaching Arabic to learners of all ages.

It is important to note that the data in the graph is from the Scopus database, which only includes scholarly publications. Other studies on this topic may not be included in the database.

Overall, the trend of increasing publications on this topic suggests a growing interest in using mobile learning to teach Arabic vocabulary. This is a positive development, as it could lead to the development of more effective methods for teaching Arabic to learners of all ages.

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Top 10 Scholar

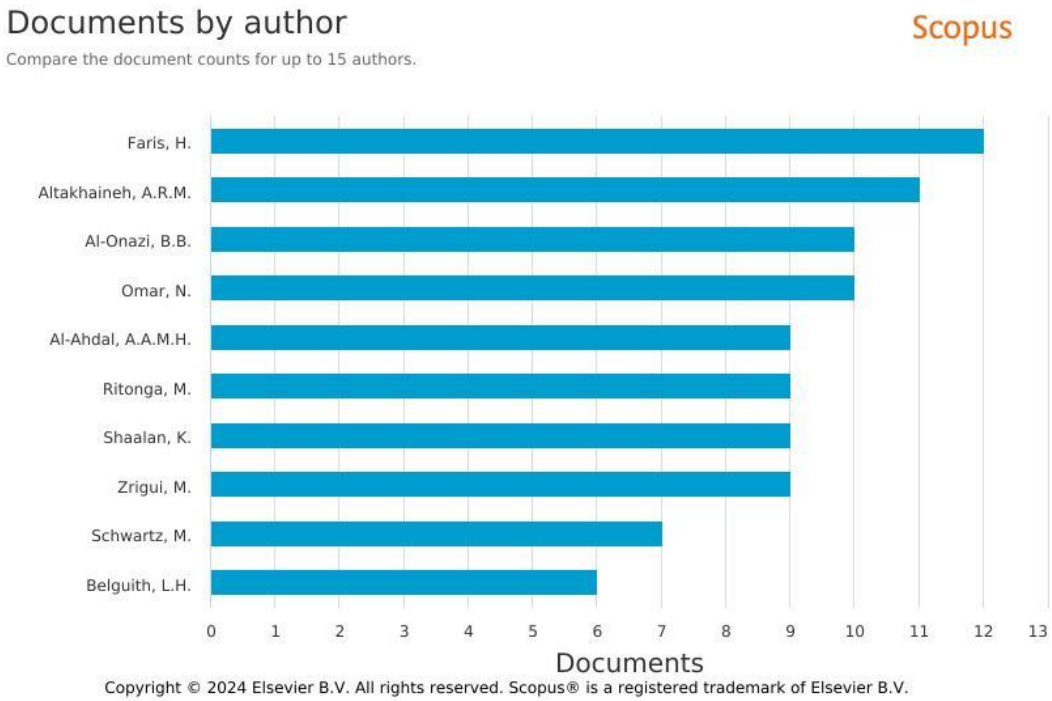

Figure 2: Top 10 Scholars.

Table 3: Top 10 Scholars.

AUTHOR NAME	Number of publication	Percentage
Faris, H.	12	0.684931507
Altakhaineh, A.R.M.	11	0.627853881
Al-Onazi, B.B.	10	0.570776256
Omar, N.	10	0.570776256
Al-Ahdal, A.A.M.H.	9	0.51369863
Ritonga, M.	9	0.51369863
Shaalan, K.	9	0.51369863
Zrigui, M.	9	0.51369863
Schwartz, M.	7	0.399543379
Belguith, L.H.	6	0.342465753

The provided graph displays the number of documents by the author for the article "Arabic Vocabulary Learning Through Smartphone Application" on Scopus. It shows the **distribution of publications across different researchers**, not publication trends over time.

Faris H. is the top researcher with 10 publications, followed by Altakhaineh, A.R.M. with 7 publications. The remaining authors have five or fewer publications each.

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It is difficult to say what factors might have influenced the number of publications by each author without additional information about their research activities and collaborations. However, some general factors that can influence publication rates in a field include:

- **Individual researcher's productivity and focus:** Some researchers are naturally more productive than others, and some may be more focused on a particular research topic, leading to more publications in that area.
- **Access to resources:** Researchers with access to funding, research facilities, and collaborators are more likely to be productive than those without.
- **Collaboration:** Collaboration with other researchers can lead to more publications, as each researcher can contribute their own expertise to the project.

The fact that one researcher has a significantly higher number of publications than the others does not necessarily imply that their research is superior. It is important to evaluate the quality of research based on its methodology, findings, and contribution to the field rather than simply the number of publications by a particular author.

Overall, the information in the graph is insufficient to draw any meaningful conclusions about trends or patterns in publication rates or the potential implications for the field's development.

Top 10 Authors Based On Citation By Research

Table 4: Top 10 Authors Based On Citation By Research.

Authors	Title	Year	Source Title	Cited by
Barak, Watted and Haick (2016)	Motivation to learn in massive open online courses: Examining aspects of language and social engagement	2016	Computers and Education	240
De Olde, Oudshoorn, Sørensen, Bokkers and De Boer (2016)	Assessing sustainability at farm-level: Lessons learned from a comparison of tools in practice	2016	Ecological Indicators	190
Tubishat, Abushariah, Idris and Aljarah (2019)	Improved whale optimization algorithm for feature selection in Arabic sentiment analysis	2019	Applied Intelligence	183
Al-Ayyoub, Khamaiseh, Jararweh and Al-Kabi (2019)	A comprehensive survey of Arabic sentiment analysis	2019	Information Processing and Management	132
Donlan, Cowan, Newton and Lloyd (2007)	The role of language in mathematical development: Evidence from children with specific language impairments	2007	Cognition	129

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Bernstein, van Moere and Cheng and (2010)	Validating automated speaking tests	2010	Language Testing	128
Oueslati, Cambria, HajHmida and Ounelli (2020)	A review of sentiment analysis research in the Arabic language	2020	Future Generation Computer Systems	122
Al-Hajj Mohamad, Likforman-Sulem and Mokbel (2009)	Combining slanted-frame classifiers for improved HMM-based Arabic handwriting recognition	2009	IEEE Transactions on Pattern Analysis and Machine Intelligence	121
Shawar and Atwell (2005)	Using corpora in machine-learning chatbot systems	2005	International Journal of Corpus Linguistics	117
Stamatatos (2008)	Author identification: Using text sampling to handle the class imbalance problem	2008	Information Processing and Management	116

The bibliometric analysis focused on ten authors' contributions to research relevant to Arabic language learning through smartphone applications. Among the top cited works, Barak et al. (2016) study on motivation in massive open online courses received the highest citations, with 240. De Olde et al. (2016) research on sustainability assessment at the farm level garnered 190 citations, followed closely by Tubishat et al. (2019) paper on the whale optimization algorithm for feature selection in Arabic sentiment analysis, which received 183 citations. Other notable works include Al-Ayyoub et al. (2019) comprehensive survey of Arabic sentiment analysis, Donlan et al. (2007) investigation into the role of language in mathematical development, and Bernstein et al. (2010) study on validating automated speaking tests.

Additionally, the analysis highlights various themes in Arabic language research, ranging from sentiment analysis to language impairments in mathematical development. Notable contributions include Stamatatos' (2008) work on author identification and Shawar and Atwell (2005) exploration of using corpora in machine-learning chatbot systems. The findings underscore the diverse array of research directions within Arabic language studies, reflecting both theoretical inquiries and practical applications, with significant attention on leveraging technological advancements such as machine learning algorithms for language processing tasks.

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What Are The Popular Keywords Related To The Study?

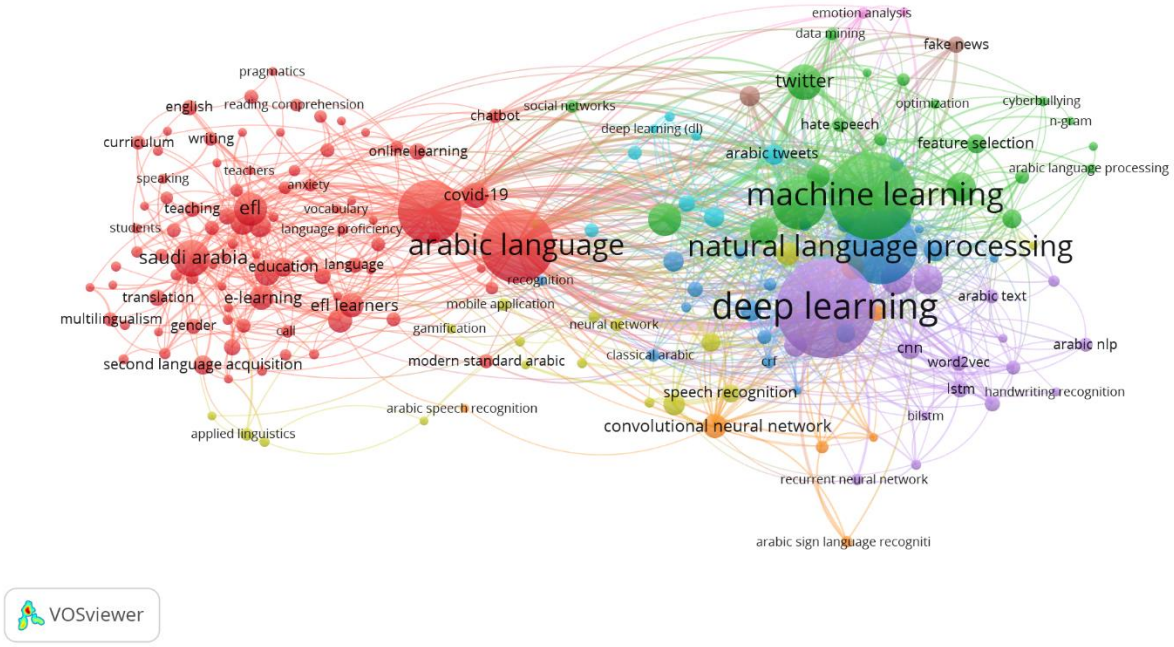

Figure 3: Network Visualization Map Of Keywords' Co-Occurrence

The most central keywords in the network visualization map include "Arabic language", "vocabulary", "learning", "mobile application", "efl", "efl learners", "Arabic vocabulary learning", and "Arabic language learning". This suggests these are the most prominent topics discussed in the analyzed articles about Arabic vocabulary learning through smartphone applications.

The network visualization map can be divided into several clusters of keywords. One cluster on the left side of the image includes keywords such as "deep learning", "machine learning", "neural network", "convolutional neural network", and "bilstm". This cluster likely refers to research that uses deep learning and machine learning techniques to develop mobile applications for Arabic vocabulary learning. Another cluster on the right side of the image includes keywords such as "curriculum", "teaching", "teachers", "students", "education", and "Saudi Arabia". This cluster likely refers to research on the pedagogical aspects of using mobile applications for Arabic vocabulary learning, such as the development of curriculum and the role of teachers in this context.

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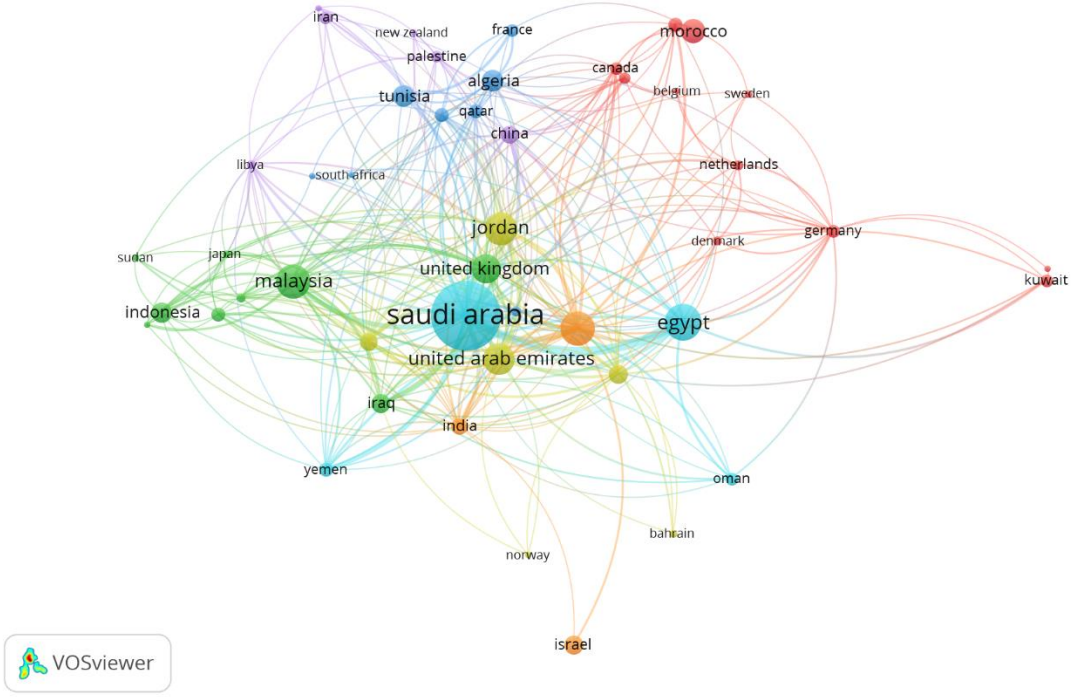

Figure 4: Shows The Countries Whose Authors Collaborate On Arabic Vocabulary Learning Through Smartphone Applications

Some countries have many documents indicating significant research output in this field. For example, Saudi Arabia, Malaysia, and Egypt have high numbers of documents. Similarly, some countries have a high number of citations, indicating the impact and influence of their research. Saudi Arabia, the United States, and Jordan have notably high citation counts.

The total link strength represents the strength of collaboration between countries regarding co-authored documents. Countries with higher link strengths indicate stronger collaboration ties. Saudi Arabia stands out with a remarkably high total link strength, indicating extensive collaboration with other countries in the field.

Other countries with notable collaboration strengths include the United States, Egypt, and Jordan. Collaboration patterns can also reveal regional trends. For example, countries within the Middle East, such as Saudi Arabia, Egypt, Jordan, and the United Arab Emirates, show significant collaboration.

Similarly, Southeast Asian countries, such as Malaysia and Indonesia, exhibit strong collaboration. Some countries, such as the United States and the United Kingdom, demonstrate a strong presence in terms of both the quantity and impact of their research output. They have many documents and citations indicating their global influence in the field.

China, although not as prominent in terms of citation counts, shows substantial collaboration with other countries, as evidenced by its relatively high total link strength. Countries like Saudi

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Arabia, Malaysia, and the United Arab Emirates have shown significant growth in their research output and collaboration over time, indicating emerging trends and increasing investment in Artificial Intelligence (AI) for teaching and learning.

In summary, the analysis reveals diverse collaboration patterns, regional trends, and the global influence of various countries in the field of AI for teaching and learning. Collaboration strengths highlight the importance of international cooperation in advancing research in this area.

What Network Mapping Is Based On Citation By Country?

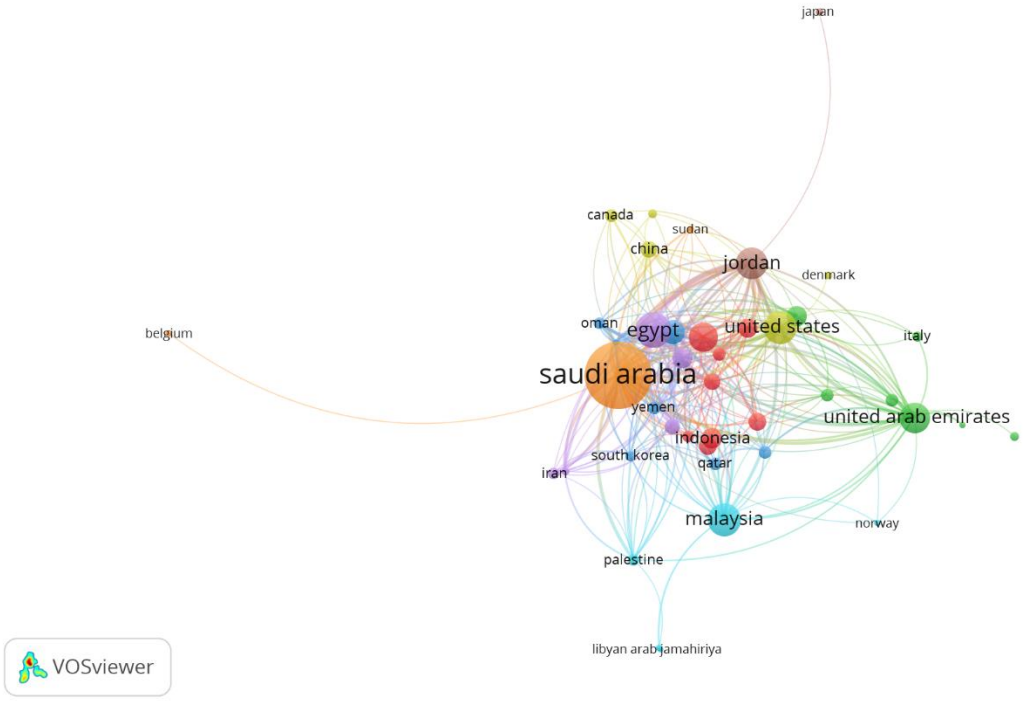

Figure 5: Network Visualization Map Of Citations By Countries.

The table provides insights into the relationship between countries in terms of their contributions to AI research for teaching and learning, as depicted through document publication, citations, and total link strength. Notably, countries like Saudi Arabia, Egypt, and Jordan stand out with substantial numbers of documents, citations, and high total link strength, indicating a significant presence and impact in this research domain. Saudi Arabia, in particular, emerges as a prominent contributor, with a high number of documents (578), citations (4282), and total link strength (337), reflecting its strong involvement and influence in AI research for teaching and learning.

Countries such as Malaysia, Pakistan, and Tunisia also demonstrate considerable activity in this field, with notable document counts, citations, and total link strength. Additionally, countries like Singapore and the United Arab Emirates exhibit relatively high citation counts compared to their document counts, suggesting a high impact of their research output in the global AI landscape for education.

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Conversely, some countries have lower levels of activity and impact in this domain, as indicated by their lower document counts, citations, and total link strength. For instance, countries like New Zealand, Nigeria, and the Syrian Arab Republic have minimal representation and impact in the analyzed dataset.

Overall, the analysis highlights the diverse global participation in AI research for teaching and learning, with certain countries playing significant roles while others have relatively lower levels of involvement. Understanding these patterns can provide valuable insights for policymakers, educators, and researchers aiming to foster collaboration and advancement in AI-driven education initiatives worldwide.

Discussion and Conclusion

The bibliometric analysis provides valuable insights into the trends and contributions within Arabic language learning through smartphone applications. The high-impact articles shed light on significant research endeavors and thematic directions that have shaped the landscape of this domain. Let us discuss the comprehensive implications of these findings:

The analysis reveals various research themes within Arabic language studies, ranging from sentiment analysis to language impairments in mathematical development. Notable contributions include studies on author identification, the role of language in mathematical development, sentiment analysis, and the validation of automated speaking tests. These themes underscore the interdisciplinary nature of research in this field and its practical applications.

The research prominently features the utilization of technological advancements, particularly machine learning algorithms, for language processing tasks. Studies such as investigating the whale optimization algorithm for feature selection in Arabic sentiment analysis highlight the innovative use of computational techniques to address language-related challenges.

Collaboration emerges as a key factor driving impactful research, as evidenced by the high citation counts of collaborative studies. Works like Barak, Watted, and Haick's study on motivation in massive open online courses, De Olde et al. (2016) research on sustainability assessment, and Tubishat et al. (2019) paper on feature selection in sentiment analysis showcases the significance of collaborative endeavors in advancing knowledge and addressing complex research questions.

The findings have implications for both research practice and educational policy. They provide insights into effective pedagogical strategies, technological interventions, and language assessment methodologies that can enhance Arabic language learning outcomes. Policymakers and educators can leverage the insights gained from these studies to inform curriculum development, instructional design, and technology integration in language learning environments.

The analysis underscores the need for continued research in Arabic language studies, particularly in leveraging emerging technologies and computational methods for language processing tasks. Consequently, future research directions may include exploring the intersection of language learning with other disciplines, investigating the effectiveness of mobile learning applications in diverse linguistic contexts, and addressing language-specific challenges in educational settings.

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The bibliometric analysis provides a comprehensive overview of the research landscape in Arabic language learning through smartphone applications. The identified trends, themes, and high-impact articles contribute to our understanding of the field's development and offer valuable insights for future research endeavors and educational practices.

In conclusion, the text emphasizes the significance of diverse collaboration patterns, regional trends, and global influence in AI for teaching and learning. Countries like Saudi Arabia, Egypt, and Jordan are notable contributors with substantial research output, citations, and collaboration, underscoring the importance of international cooperation in advancing AI research in education.

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References

Akmaliyah, Gumilar, S., Pamungkas, M. I., Addriadi, I., Hapriyonita, S. E., Suherman, M., & Nuri, Z. (2023). Imitating Quranic sentences as a learning strategy for translating Arabic into Indonesian. *Indonesian Journal of Applied Linguistics*, *13*(1), 217–228. https://doi.org/10.17509/IJAL.V13I1.58265

Al-Ahdal, A. A. M. H., & Aljabr, F. S. (2023). Linguistic relativity: A study of the role of L1 in L2 Vocabulary acquisition in an EFL setting. *Theory and Practice in Language Studies*, *13*(12), 3232–3239. https://doi.org/10.17507/tpls.1312.21

Al-Ayyoub, M., Khamaiseh, A. A., Jararweh, Y., & Al-Kabi, M. N. (2019). A comprehensive survey of arabic sentiment analysis. *Information Processing and Management*, *56*(2), 320 – 342. https://doi.org/10.1016/j.ipm.2018.07.006

Al-Hajj Mohamad, R., Likforman-Sulem, L., & Mokbel, C. (2009). Combining slanted-frame classifiers for improved HMM-based arabic handwriting recognition. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *31*(7), 1165–1177. https://doi.org/10.1109/TPAMI.2008.136

Al-Khoury, A., Hussein, S. A., Abdulwhab, M., Aljuboori, Z. M., Haddad, H., Ali, M. A., … Flayyih, H. H. (2022). Intellectual capital history and trends: A bibliometric analysis using scopus database. *Sustainability*, *14*(18), 1–22. https://doi.org/10.3390/su141811615

Alves, J. L., Borges, I. B., & De Nadae, J. (2021). Sustainability in complex projects of civil construction: Bibliometric and bibliographic review. *Gestao e Producao*, *28*(4), 1–21. https://doi.org/10.1590/1806-9649-2020v28e5389

Assyakur, D. S., & Rosa, E. M. (2022). Spiritual leadership in healthcare: A bibliometric analysis. *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, *7*(2), 355–362. https://doi.org/10.30604/jika.v7i2.914

Az Zahrah, R. amalia, & Anwar, K. (2023). The effect using wordwall game applications to improve student's vocabulary in Chumchon Ban Phanokkhao School. *DIDAKTIKA : Jurnal Pemikiran Pendidikan*, *29*(1), 18–28. https://doi.org/10.30587/didaktika.v29i1.5246

Barak, M., Watted, A., & Haick, H. (2016). Motivation to learn in massive open online courses: Examining aspects of language and social engagement. *Computers and Education*, *94*, 49 – 60. https://doi.org/10.1016/j.compedu.2015.11.010

Bernstein, J., van Moere, A., & Cheng, J. (2010). Validating automated speaking tests. *Language Testing*, *27*(3), 355 – 377. https://doi.org/10.1177/0265532210364404

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume 6 Issue 22 (September 2024) PP. 409-427
DOI: 10.35631/IJMOE.622029

Brown, A. (2023). Monolingual versus multilingual foreign language teaching: French and Arabic at beginning levels. *Language Teaching Research, 27*(6), 1634–1659. https://doi.org/10.1177/1362168821990347

De Olde, E. M., Oudshoorn, F. W., Sørensen, C. A. G., Bokkers, E. A. M., & De Boer, I. J. M. (2016). Assessing sustainability at farm-level: Lessons learned from a comparison of tools in practice. *Ecological Indicators, 66*, 391–404. https://doi.org/10.1016/j.ecolind.2016.01.047

di Stefano, G., Peteraf, M., & Veronay, G. (2010). Dynamic capabilities deconstructed: A bibliographic investigation into the origins, development, and future directions of the research domain. *Industrial and Corporate Change, 19*(4), 1187–1204. https://doi.org/10.1093/icc/dtq027

Donlan, C., Cowan, R., Newton, E. J., & Lloyd, D. (2007). The role of language in mathematical development: Evidence from children with specific language impairments. *Cognition, 103*(1), 23 – 33. https://doi.org/10.1016/j.cognition.2006.02.007

Fahimnia, B., Sarkis, J., & Davarzani, H. (2015). Green supply chain management: A review and bibliometric analysis. *International Journal of Production Economics*, *162*, 101–114. https://doi.org/10.1016/j.ijpe.2015.01.003

Fakhruddin, A. A., Firdaus, M., & Mauludiyah, L. (2021). Wordwall application as a media to improve arabic vocabulary mastery of junior high school students. *Arabiyatuna : Jurnal Bahasa Arab*, *5*(2), 217–234. https://doi.org/10.29240/jba.v5i2.2773

Farhan, Y. H., Mohd Noah, S. A., Mohd, M., & Atwan, J. (2023). Word-embedding-based query expansion: Incorporating Deep Averaging Networks in Arabic document retrieval. *Journal of Information Science, 49*(5), 1168–1186. https://doi.org/10.1177/01655515211040659

Fitriah, P., Eusabinus Bunau, Eka Fajar Rahmani, Rahayu Apriliaswati, & Eni Rosnija. (2023). Effectiveness of learn English vocabulary application in enriching students' vocabulary learning. *Journal of Scientific Research, Education, and Technology (JSRET)*, *2*(2), 849–859. https://doi.org/10.58526/jsret.v2i2.166

Gabarre, C., Gabarre, S., Din, R., & Fung, Y. M. (2013). Action research to explore the future language classroom with iPads. *The European Conference on Technology in the Classroom 2013*, 86–95.

Gu, D., Li, T., Wang, X., Yang, X., & Yu, Z. (2019). Visualizing the intellectual structure and evolution of electronic health and telemedicine research. *International Journal of Medical Informatics*, *130*, 1–11. https://doi.org/10.1016/j.ijmedinf.2019.08.007

Guerrero-Quiñonez, A. J., Quiñónez Guagua, O., & Barrera-Proaño, R. G. (2023). Gamified flipped classroom as a pedagogical strategy in higher education: From a systematic vision. *Ibero-American Journal of Education & Society Research*, *3*(1), 238–243. https://doi.org/10.56183/iberoeds.v3i1.622

Haider, A. S., Alzghoul, O., & Hamadan, Y. (2023). Creating and experimenting a new parallel corpus of english-arabic subtitles of culinary shows: A useful guide for translating food across cultures. *World Journal of English Language*, *13*(8), 358–372. https://doi.org/10.5430/wjel.v13n8p358

Hashim, M. N. N., & Ghani, A. A. (2023). The Borrowing of Sanskrit Words in the Malay Language: Research from the Perspective of Meaning. *GEMA Online Journal of Language Studies*, *23*(1), 244–260. https://doi.org/10.17576/gema-2023-2301-13

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume 6 Issue 22 (September 2024) PP. 409-427
DOI: 10.35631/IJMOE.622029

Irrazabal, N., & Burin, D. (2021). Effects of emotional valence and arousal on comprehension and assembly of instructions. *Trends in Psychology*, *29*(1), 104–122. https://doi.org/10.1007/s43076-020-00057-9

Jones, L. (2013). Supporting listening comprehension and vocabulary acquisition with multimedia annotations. *CALICO Journal*, *21*(1), 41–65. https://doi.org/10.1558/cj.v21i1.41-65

Jones, L. C. (2003). Vocabulary acquisition with multimedia. *CALICO Journal*, *21*(1), 41–65.

Khiste, G. P., & Paithankar, R. R. (2017). Analysis of bibliometric term in scopus. *International Research Journal*, *1*(32), 78–83.

Münchow, H., Mengelkamp, C., & Bannert, M. (2017). The better you feel the better you learn: do warm colours and rounded shapes enhance learning outcome in multimedia learning? *Education Research International*, *2017*(1), 1–15. https://doi.org/10.1155/2017/2148139

Mustafa, E., & Bouzoubaa, K. (2023). A bi-gram approach for an exhaustive Arabic triliteral roots lexicon. *Languages*, *8*(1), 1–15. https://doi.org/10.3390/languages8010083

Nurjannah, Malia, A. B., & Tahir, S. Z. (2023). Use of flash card media in improving maharah Al-kalam. *Kurdish Studies*, *11*(3), 2051–4883. https://doi.org/10.58262/ks.v11i3.019

Olioumtsevits, K., Papadopoulou, D., & Marinis, T. (2023). Vocabulary teaching in refugee children within the context of the Greek formal education. *Languages*, *8*(1), 1–19. https://doi.org/10.3390/languages8010007

Oueslati, O., Cambria, E., HajHmida, M. Ben, & Ounelli, H. (2020). A review of sentiment analysis research in Arabic language. *Future Generation Computer Systems*, *112*, 408 – 430. https://doi.org/10.1016/j.future.2020.05.034

Qadan, A.-R., & Shehab, E. (2023). Concept recognition deficiency among Palestinian learners of English vocabulary: cross-cultural communication. *Onomazein*, (59), 63–77. https://doi.org/10.7764/onomazein.59.04

Ricci, R. (2023). Added in Translation: Keywords for the Study of Javanese Islamic Texts. *Philological Encounters*, *34*(1), 1–24. https://doi.org/10.1163/24519197-bja10046

Rizky Setiawan, M., & Wiedarti, P. (2020). The effectiveness of quizlet application towards students' motivation in learning vocabulary. *Studies in English Language and Education*, *7*(1), 83–95. https://doi.org/10.24815/siele.v7i1.15359

Rosenhouse, J. (2023). The Little Prince A study of its translations into Hebrew and Arabic. *Babel*, *69*(2), 242–265. https://doi.org/10.1075/babel.00318.ros

Shawar, B. A., & Atwell, E. S. (2005). Using corpora in machine-learning chatbot systems. *International Journal of Corpus Linguistics*, *10*(4), 489–516. https://doi.org/10.1075/ijcl.10.4.06sha

Stamatatos, E. (2008). Author identification: Using text sampling to handle the class imbalance problem. *Information Processing and Management*, *44*(2), 790 – 799. https://doi.org/10.1016/j.ipm.2007.05.012

Tubishat, M., Abushariah, M. A. M., Idris, N., & Aljarah, I. (2019). Improved whale optimization algorithm for feature selection in Arabic sentiment analysis. *Applied Intelligence*, *49*(5), 1688 – 1707. https://doi.org/10.1007/s10489-018-1334-8

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

van Eck, N. J., & Waltman, L. (2017). Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics*, *111*(2), 1053–1070. https://doi.org/10.1007/s11192-017-2300-7

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume 6 Issue 22 (September 2024) PP. 409-427
DOI: 10.35631/IJMOE.622029

Verbeek, A., Debackere, K., Luwel, M., & Zimmermann, E. (2002). Measuring progress and evolution in science and technology - I: The multiple uses of bibliometric indicators. *International Journal of Management Reviews*, *4*(2), 179–211. https://doi.org/10.1111/1468-2370.00083

Wu, Y. C. J., & Wu, T. (2017). A decade of entrepreneurship education in the Asia Pacific for future directions in theory and practice. *Management Decision*, Vol. 55, pp. 1333–1350. https://doi.org/10.1108/MD-05-2017-0518

Zakraoui, J., Saleh, M., Al-Maadeed, S., & AlJa'am, J. M. (2023). A study of children emotion and their performance while handwriting Arabic characters using a haptic device. *Education and Information Technologies*, *28*(2), 1783–1808. https://doi.org/10.1007/s10639-022-11246-7

Zhanpeissova, N. M., Kuzembayeva, G. A., & Maydangalieva, Z. A. (2023). Semantic development of Arabic-Iranian borrowings in the Kazakh language: Analysis of Religious concepts. *RUDN Journal of Language Studies, Semiotics and Semantics*, *14*(1), 104–122. https://doi.org/10.22363/2313-2299-2023-14-1-104-122

Zibin, A., Altakhaineh, A. R. M., Suleiman, D., & Al Abdallat, B. (2023). The effect of using an Arabic assistive application on improving the ability of children with autism spectrum disorder to comprehend and answer content questions. *Journal of Psycholinguistic Research*, *52*(6), 2743–2762.