Bibliometric and Visualized Analysis of Research on English Learning Under Mobile-Assisted Language Learning based on CiteSpace

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Abstract

The development and application of mobile-assisted Language learning (MALL) has influenced the reform and development of English teaching and has gradually become a hot topic educational field. This paper employs the bibliometric analysis, which is conducted on CiteSpace, to visualize the relevant literature on MALL and English learning from Web of Science (WoS) core database. After applying the PRISMA framework for rigorous article selection, a sample of 327 published articles is scrutinized. Within this analysis, emphasis is placed on knowledge mapping, clusters, and keywords to unveil insights within the selected 327 articles. The study reveals several significant findings, including a discernible publication trend, identification of the top 10 influential and productive journals, an exploration of the top 10 influential articles, and the delineation of four principal research themes: enhancing classroom pedagogy, mobile learning modalities, the impact of text messages, and the sociocultural dimension. The meticulous analysis offers valuable insights into the evolving landscape of MALL and its intersection with English language learning. As the research unfolds, this study seeks to illuminate the intricate connections within this dynamic field and potentially inform educators, researchers, and policymakers about effective strategies and future directions in English language education through mobile-assisted platforms.

Keywords: Bibliometric Analysis, English learning, MALL

Introduction

The rapid development and wide application of mobile technology are leading the reform in education, and it also brings new opportunities and challenges to language learning. As an important branch of the application of mobile technology, mobile-assisted language learning (MALL) has gradually become a hot spot in educational research，especially in English language learning. The research on MALL combing English language learning is gradually attracting extensive attention from the academic circle.

In the past few years, as handheld devices like smartphones, tablets, and pads have become ubiquitous, the domain of integrated English language learning under the MALL paradigm has burgeoned. Scholars have embarked on a journey to harness the latent

potential of mobile technology to amplify English learning, thereby elevating learning outcomes and advancing linguistic competence. While a constellation of studies has investigated the synergy between MALL and English education, a systematic bibliometric review and comprehensive analysis remain conspicuously absent from the academic arena.

Therefore, the present study assumes the mantle of addressing this research gap by meticulously scrutinizing the landscape. It seeks to chronicle the trajectory of scholarly production, identify the vanguard journals and seminal articles with the greatest impact, and unravel the principal focal points that converge within this sphere. The articles under scrutiny are gleaned from the WoS core database, and their bibliometric analysis is executed utilizing the potent CiteSpace software.

In the introduction section, the background and significance of MALL and its relationship to English learning are presented. The subsequent sections delve into the research problems and objectives, followed by an elucidation of the research methodology. The fourth section showcases and discusses the research outcomes. Lastly, the article concludes by summarizing the research's current status and limitations within the field, while also proposing avenues for future development.

Research Questions and objectives
This study seeks to address the following research questions:

Research Questions
1. How has the publication landscape evolved for research related to Mobile Assisted Language Learning (MALL) and English learning in the Web of Science (WoS) database over the years?
2. Which are the top 10 journals that have garnered the highest number of citations for research on MALL and English learning in WoS?
3. Which are the top 10 articles that have received the highest number of citations in the domain of MALL and English learning within the WoS database?
4. What are the primary thematic areas of research within the realm of MALL and English learning in WoS?

Research objectives
With the above questions in mind, this study endeavors to achieve the following objectives:
1. To provide a comprehensive overview of the chronological publication trends of articles focused on MALL and English learning within the WoS database.
2. To identify and present the top 10 most cited journals that contribute significantly to the discourse on MALL and English learning in WoS.
3. To compile and present a list of the top 10 most cited articles that have significantly impacted the field of MALL and English learning within the WoS database.
4. To categorize and illuminate the key thematic dimensions that constitute the core of studies in the field of MALL and English learning in WoS.

Methodology

Bibliometric methodology is used in this research. Research instrument, data sources and research framework are illustrated in the following parts.

Research Instrument

In this research, the methodologies of bibliometrics and knowledge map visualization are used to meticulously analyze the scholarly literature. Bibliometric research is a branch of library and information science, and it is a method to review and evaluate scientific literature (Zupic & Cater, 2015). For the purpose of visualizing and exploring the scholarly landscapes, CiteSpace, a visual analysis tool rooted in scientific citation data, is employed. CiteSpace facilitates the revelation of developmental paths, knowledge networks, and research trends within research fields. Meanwhile, the knowledge map takes the knowledge domain as the research object, and shows the structural relationship and development process of scientific knowledge in the corresponding field in the form of mapping approach. By employing this mapping approach, intricate associations such as network structures, cross-interactions, and knowledge group evolutions can be elucidated (Chen et al., 2015).

Data Sources

The chosen data source for this investigation is the Web of Science (WoS), a comprehensive academic information repository developed by the Institute for Scientific Information (ISI). Renowned for encompassing a vast array of disciplines, the Web of Science houses over 8,700 academic journals, spanning domains such as engineering technology, natural sciences, biomedicine and various others.

The research endeavors to collect pertinent literature by employing targeted keyword searches within the WoS core database. Specifically, keywords relating to "mobile-assisted language learning" OR "MALL" OR "mobile learning" AND "English" OR "English language learning" are queried to ascertain a comprehensive selection of relevant articles. Initially, this query yielded a total of 537 articles.

Subsequently, in adherence to the systematic review and meta-analysis guidelines outlined in the PRISMA framework, a meticulous four-phase screening process was conducted, resulting in a refined collection of 327 articles. The procedural flow of data collection is visually delineated in Table 1.

Table 1

Data collection procedure based on PRISMA framework
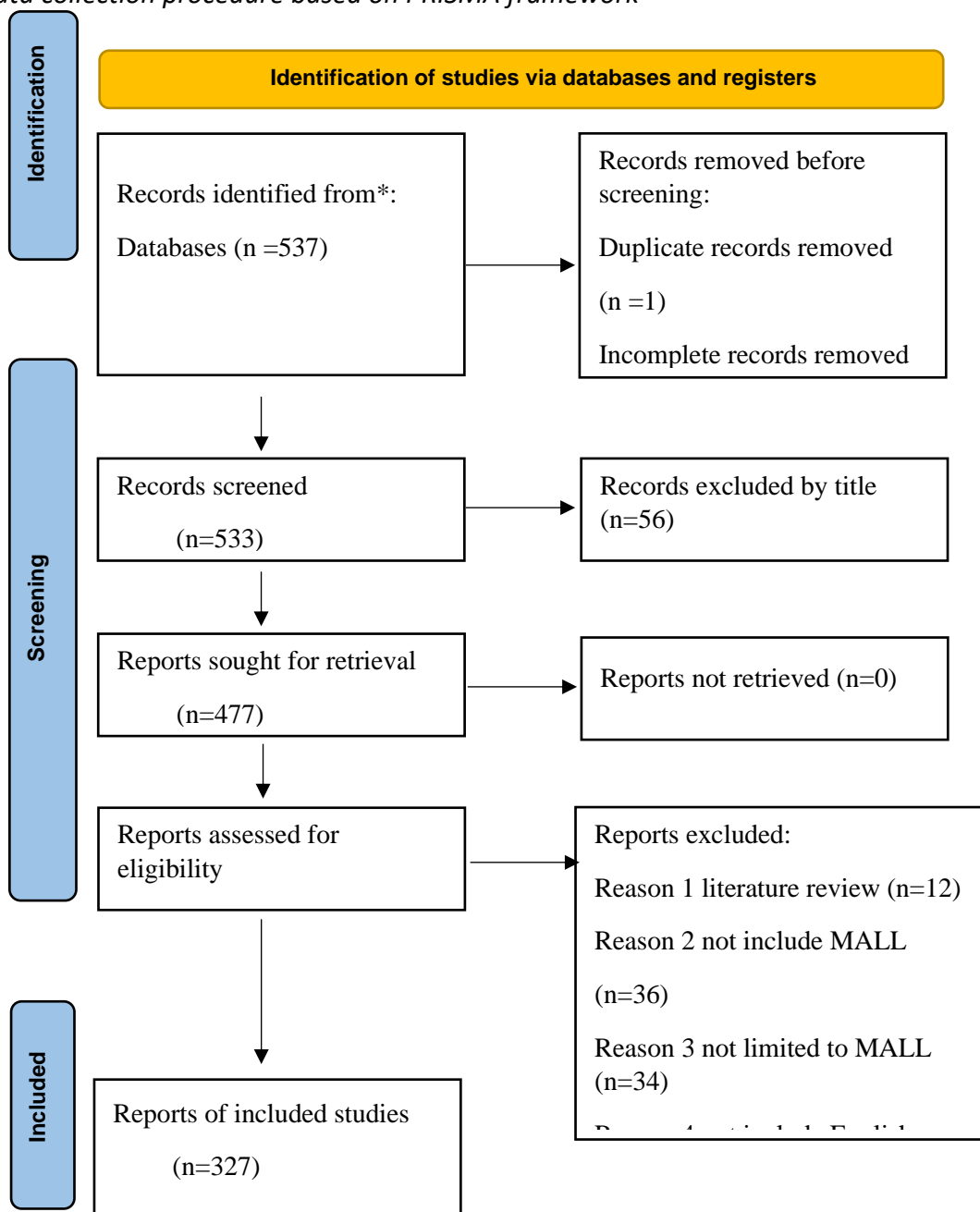
Research Framework

The research framework employed in this study, as depicted in Table 2, is designed to provide a systematic and comprehensive analysis of the landscape of Mobile Assisted Language Learning (MALL) and English learning research. The framework encompasses two key dimensions of investigation: Bibliometric Performance Analysis and Science Mapping Analysis.

Bibliometric Performance Analysis encompasses three vital components, each aligned with a specific research question:

Publication Trend (RQ1): This facet scrutinizes the evolution of publication trends over time. It captures the temporal trajectory of articles related to MALL and English learning in the WoS database, thereby addressing the first research question.

Top 10 Influential and Productive Journals (RQ2): Focusing on the second research question, this aspect identifies and evaluates the journals that hold sway in the discourse on MALL and English learning. Through meticulous citation analysis, the ten most influential and productive journals are unveiled.

Top 10 Influential Articles (RQ3): This component delves into the third research question, spotlighting the articles that wield substantial impact within the research domain. By examining citations, it discerns and presents the ten articles that have significantly contributed to shaping the discourse.

Science Mapping Analysis pertains to:

Main Research Themes (RQ4): This dimension delves into the core thematic areas of research within the realm of MALL and English learning. It elucidates the principal Themes that scholars have explored, addressing the fourth research question.

The synthesis of these two analytical dimensions forms a robust and comprehensive research framework, empowering this study to unravel the intricacies of MALL and English learning research and its scholarly landscape.

Table 2
Research framework
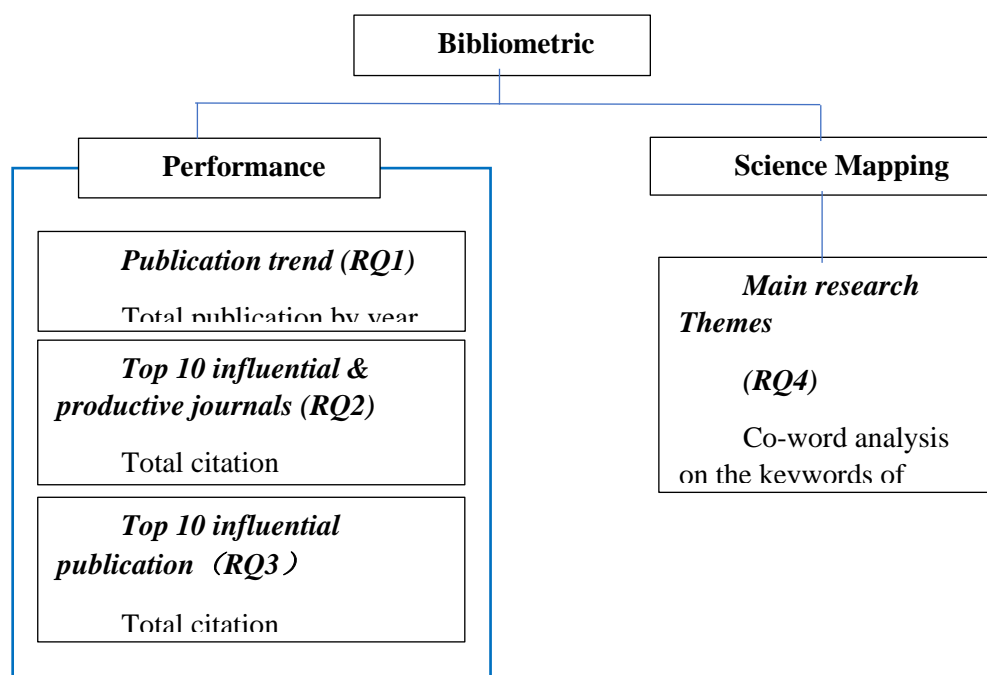
The ensuing sections of this paper delve into the outcomes and insights derived from each dimension of the research framework, culminating in a holistic comprehension of the intricate tapestry of MALL and English learning research.

Results and Discussion

The part reveals some significant findings, including a discernible publication trend, identification of the top 10 influential and productive journals, an exploration of the top 10 influential articles, and the delineation of four principal research themes: enhancing classroom pedagogy, mobile learning modalities, the impact of text messages, and the sociocultural dimension. These will be explained in details in the following parts.

Publication Trend

The analysis of publication trends within the domains of MALL and English learning, as illustrated in Table 3, reveals the evolving trajectory of scholarly engagement from 2005 to July 2023. Noteworthy insights emerge as we traverse the chronology:

Emergence of the Field (2005-2016): The inaugural years from 2005 to 2016 denote the nascent phase of research within this realm. During this period, the attention of scholars was relatively limited, evident by the presence of only one article in the WoS core database. This scarcity of contributions underscores the fiel's fledgling nature, with exploration still in its formative stages.

Sharp Uptick (2017-2021): A marked shift transpires from 2017 onward, coinciding with an upsurge in scholarly attention. This ascent is notably propelled by the burgeoning ubiquity of mobile devices, catalyzing heightened interest in MALL and English learning. The year 2017 records a twofold increase in publications compared to the preceding year, (from 14 articles in 2016 to around 30 articles in 2017-2021) indicative of an escalating curiosity. The subsequent years, from 2018 to 2021, illustrate a phase of steady growth. During this interval, approximately 30 articles per annum were introduced to the discourse, underscoring a sustained commitment to the field.

Steady Growth and Impacts of External Factors (2022-2023): A notable upswing is evident in 2022, with a total of 73 articles published, marking a doubling of publications compared to the previous year. This remarkable increase can be attributed to the catalyzing impact of the COVID-19 pandemic and the resultant surge in online education practices.

In summary, the depicted trajectory signifies a dynamic evolution in the realm of MALL and English learning. The journey unfolds from a modest beginning to a period of increased focus, ultimately culminating in a determined rise in recent times. This trajectory not only highlights scholars' adaptability to technological progress but also mirrors the broader contextual factors that shape research priorities.

Table 3
Publication trend
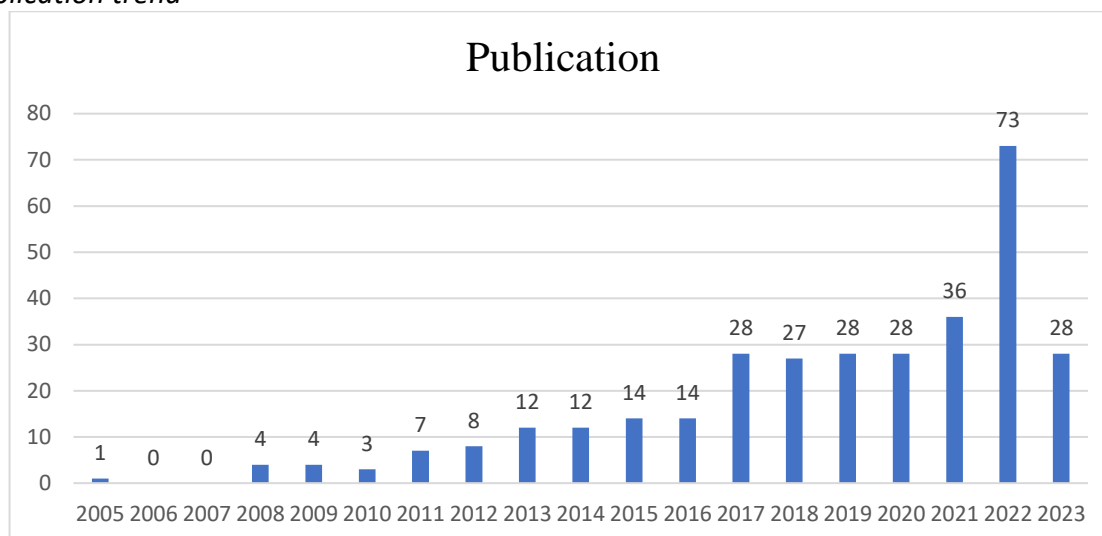
The following sections delve into deeper insights drawn from bibliometric analysis, shedding light on the noteworthy journals, influential articles, and thematic intricacies that navigate the complex landscape of MALL and English learning.

Top 10 influential and Productive Journals

Utilizing CiteSpace with a "year per slice" parameter for each node type categorized as "cited journal", the top 10 most cited journals that have significantly contributed to the discourse of MALL and English learning are delineated as in Table 4.

Table 4
Top 10 cited journals

Number	Count	Cited journal
1	241	COMPUTERS & EDUCATION
2	194	COMPUTER ASSISTED LANGUAGE LEARNING
3	183	LANGUAGE LEARNING & TECHNOLOGY
4	175	BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY
5	154	JOURNAL OF COMPUTER ASSISTED LEARNING
6	148	EDUCATIONAL TECHNOLOGY & SOCIETY
7	145	RECALL
8	120	COMPUTERS IN HUMAN BEHAVIOR
9	95	SYSTEM
10	82	INTERACTIVE LEARNING ENVIRONMENTS

The first cited journal is COMPUTERS & EDUCATION with 241 citations. The second is COMPUTER ASSISTED LANGUAGE LEARNING with 194 citations. The third is LANGUAGE LEARNING & TECHNOLOGY with 183 citations. The fourth is BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY with 175 citations. The fifth is JOURNAL OF COMPUTER ASSISTED LEARNING with 154 citations. The sixth is EDUCATIONAL TECHNOLOGY & SOCIETY with 148 citations. The seventh is RECALL with 145 citations. The eighth is COMPUTERS IN HUMAN BEHAVIOR with 120 citations. The ninth is SYSTEM with 95 citations. The tenth is INTERACTIVE LEARNING ENVIRONMENTS with 82 citations.

The classification of these journals based on their citation counts emphasizes their significant contributions to the progress of knowledge at the juncture of MALL and English learning. The following sections will further explore the implications of these impactful journals, offering a nuanced comprehension of their significance within the scholarly terrain.

Top 10 Influential Articles

In the domain of MALL and English learning, a myriad of scholarly works have made a profound impact, influencing discussions and driving progress. The following section uncovers the most influential among these, focusing on the top 10 articles that have garnered significant recognition due to their substantial citation impact.

Two distinctive citation indicators are harnessed for a comprehensive assessment of these articles:

- WoS Core Citation: This metric denotes the number of times an article is cited by other academic documents within the core collection of Web of Science. It signifies the resonance and influence of the article in mainstream academic circles.
- Global Citation: This index encompasses the aggregate number of citations an article has amassed across all citation databases. It offers a broader gauge of the attention and citation impact the article commands across the entirety of the academic community.
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The high number of citations shows that these articles have aroused widespread concern and discussion in academic circles. What's more, it has an important influence on the research and application of MALL in English learning. The top 10 cited articles are listed in Table 5.
Fig

The following section spotlights the top 10 most influential articles that have left an indelible mark on the discourse of MALL and English learning. These articles have garnered substantial recognition through their citation impact and have offered pivotal insights into the interplay between technology and language education.

1. "Using mobile phones in English education in Japan" (2005)
   - Citation: 335 (Global: 351)
   - This seminal article explores three distinct mobile learning studies, elucidating Japanese college students' inclinations towards mobile phones for learning and communication. It underscores the potential of mobile phones for English vocabulary lessons and idiomatic learning, serving as a beacon for MALL applications.
   - The first study revealed that Japanese college students generally preferred to use mobile phones, especially mobile phones for learning and communication. The second study showed that sending English vocabulary lessons to mobile phones regularly can promote students' learning effect. The third study found that the feasibility of using mobile phones to learn English idioms is highly recognized by students. This study provided some reference and enlightenment for M-learning or MALL.

2. "Personalized mobile English vocabulary learning system based on item response theory and learning memory cycle" (2008)
   - Citation: 231 (Global: 235)

- In this study, a personalized mobile English vocabulary learning system was presented. It offered appropriate English words for learning depending on the vocabulary skills and memory cycles of each learner. The study showed that, due to the efficient and flexible learning mode, the system could clearly increase learners' learning performances and interests.

3. "m-Learning: An experiment in using SMS to support learning new English language words" (2009)

- Citation: 230 (Global: 240)

- This paper explored the utilization of wireless technologies in education, with a specific focus on exploring the potential of using Short Message Service (SMS) text messaging for learning new technical English language words. The results showed using the MOULT system as a teaching tool will help students succeed.

1. "The impact of mobile learning on students' learning behaviours and performance: Report from a large blended classroom" (2009)

- Citation: 198 (Global: 207)

- In this study, researchers created a cutting-edge mobile learning system that allows students with mobile devices to participate in live broadcasts of classroom teaching. The results showed that mobile learning activities can significantly increase student engagement. In this study, students transitioned from passive learners to truly engaged learners on a behavioural, intellectual, and emotional dimensions. It is a supplement to the research on mobile learning promoting interactivity.

2. "Using the flipped classroom to enhance EFL learning" (2017)

- Citation: 195 (Global: 201)

- The paper discusses the importance of English instruction worldwide and the need for updated instructional methodologies. The researchers created a comprehensive oral training course using flipped learning and Wen's Output-driven/Input-enabled model. The results demonstrated that theory-based flipped training via online interaction increased participants' motivation and greatly expanded their idiomatic knowledge. In addition, the study offered valuable insights for educators to apply in their teaching practices.

3. "Effectiveness of vocabulary learning via mobile phone" (2008)

- Citation: 192 (Global: 199)

- The purpose of the study was to evaluate the efficacy of vocabulary lessons provided by short message service (SMS) on mobile devices. Results showed that students who had participated in SMS lectures had grasped more vocabulary than those who read in printed material. However, there were possible impediments to SMS lessons engagement, including technology constraints, unusual presenting techniques, and learning activities.

4. "Mobile English learning: An evidence-based study with fifth graders" (2011)

- Citation: 185 (Global: 186)

- The study focused on assessing the impact of mobile technology on English language learning for primary school students. This study presents three different approaches of teaching and learning，This suggests that students' motivation to use the mobile app during their free time contributed to improved learning outcomes. Overall, the study highlights the potential of informal learning contexts to enhance formal classroom learning.

5. "A personalized recommendation-based mobile learning approach to improving the

reading performance of EFL students" (2013)
- Citation: 168 (Global: 169)
- A personalized recommendation-based mobile language learning approach is proposed in the study. The results demonstrated that both students learned with recommendation system outperformed those learned with the individual annotation function, however there was no difference in learning outcomes between with or without the shared annotation function.

6. "Personalised context-aware ubiquitous learning system for supporting effective English vocabulary learning" (2010)
- Citation: 153 (Global: 153)
- This study proposed a personalised context-aware ubiquitous learning system (PCULS) for learning English vocabulary based on learner location, learning time, individual abilities, and leisure time. It found that students who used personalised English vocabulary learning systems with context awareness (i.e. PCULS) outperformed students who used personalised English vocabulary learning.

7. "Perceived convenience in an extended technology acceptance model: Mobile technology and English learning for college students" (2012)
- Citation: 146 (Global: 148)
- In the current study, David (1989)'s technology acceptance model (TAM) was expanded to include perceived convenience. There haven't been many studies on mobile learning that look at the connections between perceived convenience and other TAM factors. Therefore, the findings served as a guide for upcoming research on TAM and mobile learning.

In conclusion, High citations mean that the research questions and findings of these articles have aroused widespread interest and concern. These articles probably propose important research questions, provide valuable research methods, or make important contributions to the application of MALL in English learning. Through in-depth study of these highly cited articles, researchers can understand the research progress, main research trends and future development so that gain useful enlightenment and reference for their own research. At the same time, these highly cited articles can also be used as important evidence in academic circles for recognition of MALL in the field of English learning.

Main Research Subjects
The researchers used Citecpace to category 327 articles by subject according to keywords. Setting year per slice for 5, using top n% as the selection criteria, where n=25, and select k=4 when showing clusters. the graph generated are shown in Figure 1. The top four subjects are: 1) improving classroom teaching; 2) mobile learning; 3) text messages; 4) sociocultural. This graph layouts in timeline, which shows the evolution trend of MALL and English learning from 2005 to 2022. In the graph, nodes are keywords with a frequency of five or more times, which reflect the key points of research under each subject. The larger the node is, the more the research.
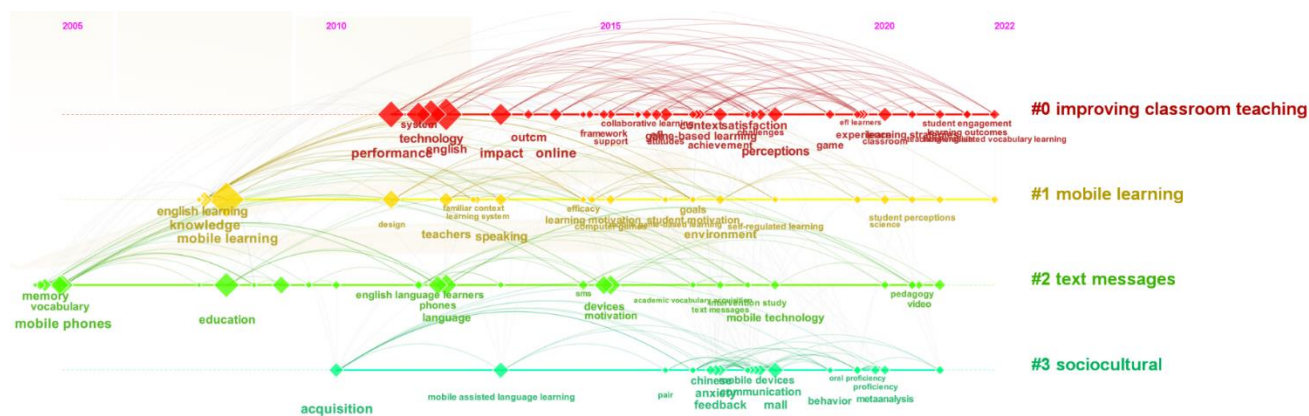
Figure 1 Knowledge mapping about subjects

The four themes appeared in Figure 1 are automatically generated by CiteSpace. Through literature reading, in order to be easily understood by readers the researchers polish the four themes as follows: enhancing classroom pedagogy, mobile learning modalities, the impact of text messages, and the sociocultural dimension. Utilizing the insights gleaned from CiteSpace's classification, the following synopsis delves into the evolution and central tenets of the four main research themes that have commanded attention:

Enhancing Classroom Pedagogy
(Emergence: 2011)
The first subject is enhancing classroom pedagogy. This subject first appeared in 2011. During the five years from 2010 to 2015, researchers combined technology with English learning to develop system and other online learning environments. During this period, researchers focused on the impact of MALL and the performance and outcome of learners. For example, in a Taiwanese primary school, Lan et al (2013) adapted a mobile-supported cooperative reading system into regular English as a foreign language (EFL) classes and discovered that the system's adaptation and use were successful, indicating that it could benefit young students in developing their reading skills.

In the five years from 2015 to 2020, researchers continued to optimize the research on the combination of MALL and English learning, and established the framework and context to support MALL. Teaching methods such as collaborative learning and game-based learning were integrated into the mobile technology learning environment. In addition, researchers began to concern learners' experience, especially their spiritual level, such as perceptions, attitudes and satisfaction. In addition, they also pay attention to the challenges occurred. For instance, Hwang et al. (2019) applied a peer-tutoring technique that combines academically gifted students with less gifted students and instructs them to use the smartphone app ezTranslate in a familiar, real-world context. They observed that by combining peer tutoring with mobile technology, teachers can make the most of their students' range of skills to encourage collaborative learning, which not only produces successful learning but also fosters positive social interaction and produces high-level cognitive learning.

Starting from 2020, the research on MALL and English learning is still continuing, which shows that such research field still has its vitality. During this period, researchers applied mobile technology into the classroom, not limited to online learning. What's more, learning

strategies are proposed to support MALL, which increases the effectiveness of the MALL. For example, in a study published in 2021, Gao et al. detailed the learning strategies employed by a group of Chinese EFL students in a setting supported by mobile technology. the finding was the adoption of a certain set of learning strategies changed due to a mobile-technology-assisted environment. At the same time, it is worth noting that researchers focus on English vocabulary learning and put forward mobile-assisted vocabulary learning. For instance, the role of mobile-assisted vocabulary acquisition with digital flashcards in scaffolding academic vocabulary learning is examined by (Boroughani et al., 2023). The study demonstrated the superiority of mobile-assisted vocabulary acquisition over conventional resources for the advancement of academic literacy.

Mobile Learning Modalities
(Emergence: 2008)

The second subject is mobile learning modalities. This subject first appeared in 2008. From 2008 to 2010, English learning and knowledge received much concern. In order to improve the learning effect, researchers proposed mobile learning to assist language learning and gradually enriched the MALL. For example, the study conducted by Chen's group in 2008 applied the benefits of mobile learning to propose a personalised intelligent mobile learning system (PIMS) in order to provide an efficient and flexible learning environment for English learning. The findings showed that the such approach offered a effective and efficient mobile learning mechanism.

From 2010 to 2015, researchers designed software, courses, learning system learning environment and so on for mobile learning. These designs were mainly used for practicing English speaking. In addition, some researchers focused on teachers, especially teacher development and their technological literacy under the technological environment. For instance, the researcher created the Basic4Android smartphone app Word Learning-CET6 and examined its usefulness as a tool for assisting college students studying English as a Foreign Language to learn English vocabulary (Wu, 2015).

From 2015 to 2020, researchers attempted to integrate game into mobile learning, so as to increase the interest of learning and improve the learning environment supported by mobile technology. A gamified flipped classroom was proposed by Hung and Hsiu-Ting (2018), utilising the technology-enhanced board games (TEBGs) to foster student participation. The study found that such strategy helped English-language learners by lowering their anxiety about speaking in front of the class and boosting their desire to participate in activities.

From 2020, with the further development of science and technology, more technologies will be integrated into learning and teaching, such as virtual reality and digital flashcards. The goal of Hoang et al.'s research in 2023 was to investigate how virtual reality (VR) might help students of English as a Foreign Language (EFL) improve their oral English skills. The findings indicated that there had been significant changes in oral proficiency by using VR.

In conclusion, these reflect the evolution of mobile technology.

The impact Text Message
(Emergence: 2005)

The third subject is the impact text messages. This theme first appeared in 2005. From 2005 to 2010, some researchers found that vocabulary learning was an important part of English learning. Therefore, in order to strengthen students' memory of vocabulary, some researchers used text messages to help learners in English language learning, and mobile phones served as learning tools. For example, Short Message Service (SMS) text messaging has the potential to help people learn new technical English terminology, according to (Cavus et al., 2009). The findings demonstrated that students appreciated using their mobile devices to learn new words.

From 2010 to 2015, on the basis of the previous studies, many researchers paid attention to learners' motivation. For instance, the push feature of SMS was effectively used by Hayati et al. (2013) to offer short lessons on English idioms. The findings showed that students who received mini-lessons through SMS on their phones were more engaged and absorbed more knowledge.

After 2015, more Internet-based mobile technology emerged, so the research on text messages decreased, but some researchers are still focusing on it. For instance, Li et al. (2019) investigated the efficiency of a text message-based intervention to improve English language learners' (ELLs) academic vocabulary acquisition. The findings showed that after the intervention, pupils dramatically increased their knowledge of the target words.

In a summary, this reflects the development process of text messages as a carrier of mobile learning.

Sociocultural Dimension
(Emergence: 2010)

The fourth subject is sociocultural dimension. This subject first appeared in 2010, which indicated that MALL has been related to sociocultural since 2010. For instance, Palalas (2010), claimed that mobile technology served as a socio-cultural artefact that facilitates communication and might even make it possible to learn a language; just like language, the technology allows for a mediated contact with others and the rest of the world.

Especially after 2015, the feedback and communication of English learning in the MALL environment has received more attention, which also showed that the research has shifted from focusing on technology，and teaching as well as learning to the relationship among people, and between people and society. More in-depth study is conducive to easing learners' anxiety and improving their proficiency. For example, according to Xue et al (2023)'s research, there are several factors that contribute to students' anxiety when using e-feedback, chief among them being the use of smartphones as a communication tool for conducting formal learning activities and the absence of interpersonal and English communication skills on the part of the students when providing e-feedback.

In summary, these central research subjects highlight the complex journey of MALL and English learning's evolution. Ranging from enhancing classroom instruction through technology integration, delving into the multifaceted aspects of mobile learning, utilizing text messages for vocabulary retention, to embracing the sociocultural dimensions of language

education, these subjects collectively contribute to the enrichment of discourse and innovation within this dynamic field.

Conclusion and Limitation
Conclusion

This paper offers a comprehensive exploration of the intersection between MALL and English learning, facilitated by bibliometric analysis and the CiteSpace software. The synthesis of 327 articles from the WOS core database provides insights into the field's dynamics, elucidating publication trends (RQ1), identifying influential journals (RQ2) and articles (RQ3), and delineating key research subjects. This study serves as a guiding beacon for researchers seeking to navigate the academic landscape, offering valuable insights and reliable references for their scholarly pursuits.

By dissecting the key research themes—namely, enhancing classroom pedagogy, mobile learning modalities, the impact of text messages, and the sociocultural dimension—this inquiry transcends a mere overview. It equips researchers with a refined comprehension of the evolving academic landscape. Armed with this insight, scholars can chart a more informed path for their research, enabling them to make substantial contributions to the field's progress and align their work effectively with current trends and societal demands.

In essence, this study not only furnishes a snapshot of the field's present state but also lays a foundation for future research directions and practice, fostering a collaborative environment where academic inquiry and practical application harmoniously intersect.

Limitation

While this study has delved into a comprehensive review and analysis of the confluence of MALL and English learning, there exist certain research limitations that warrant acknowledgment. These limitations present opportunities for future investigation and refinement of the field's understanding.

1.   Database Scope

This study only focuses on the analysis of the literature in WoS core database, but there may be related literature that is not covered in other academic databases, which may affect the comprehensive understanding of this field. To attain a more comprehensive grasp of the field, future research endeavors could encompass a broader range of databases, thereby enriching the analysis.

2.   Software Driven Analysis

Although CiteSpace software has played an important role in the analysis, but the results still need to be combined with manual in-depth interpretation to ensure more accurate understanding and interpretation of the literature. Striving for a synthesis of both automated and human-driven analysis can potentially yield more robust insights.

3.   Research Methodology and Experimental Design

While this study has meticulously addressed publication trends, journal citations, and article citations, the exploration of research methodologies and experimental designs could be

further extended. Delving into the intricacies of these facets can yield insights into the approaches employed by researchers, enriching the comprehension of the field's dynamics.

4. Qualitative Analysis
While quantitative measures have underpinned the analysis, integrating qualitative approaches, such as content analysis or thematic analysis, could offer a deeper exploration of the underlying themes, trends, and narratives within the field.

5. Interdisciplinary Insights
The study has predominantly focused on MALL in conjunction with English learning. To foster interdisciplinary connections, future investigations might consider exploring how MALL interacts with other language disciplines, pedagogies, or technological trends.

In our endeavor to enhance our understanding of MALL and English learning, addressing these limitations in future research endeavors holds the potential to elevate the discourse and influence of the field. This effort can lead to a more comprehensive understanding that holds relevance in both academic and practical contexts.

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