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Review

Sustaining Education with Mobile Learning for English for Specific Purposes (ESP): A Systematic Review (2012–2021)

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Abstract: Mobile learning for English Language Teaching (ELT) has become an emerging trend to sustain education, providing the option to learn English for Specific Purposes (ESP). However, the review of mobile learning in ESP is scarce, despite its importance in sustaining education. Thus, this review systematically identifies the trends of mobile learning concerning ESP. Using three databases, namely Web of Science (WoS), Scopus, and Educational Resources Information Centre (ERIC), 28 articles were extracted out of 139, from 2012 to 2021, with exclusion and inclusion criteria taken into consideration. First, the significant findings portrayed that mobile apps are the most commonly used means of mobile learning. Second, vocabulary and language competency is more emphasised in mobile learning for ESP. Third, mobile learning in ESP mostly dominated the business field of studies. These three findings implied that there are still gaps in research on mobile learning and ESP. Generally, this review is valuable for practitioners to know which mobile learning tool is ready to be used and in identifying gaps for research in mobile learning and ESP, to sustain education for the future.

Keywords: educational scenarios; English for Specific Purposes (ESP); English Language Teaching (ELT); mobile learning; sustainable education; vocabulary

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1. Introduction

Mobile learning has become a trend in the educational field, whereby it is one of the tools used in addressing challenges of education in this pandemic era. Mobile learning is one of the steps in providing quality and equity in education, particularly in encouraging lifelong learning opportunities for everyone, as stated in the fourth goal of the Sustainable Development Goals (SDG). This goal emphasises the importance of education in sustaining future industries, geared towards the year 2030, as mentioned by the United Nations [1]. Although the SDG seems big, changes can occur with small steps. Narrowing the scope of education, one particular field which is as essential as other industrial fields is the language field, mainly English. English is an international language and recognised worldwide due to its importance as a means of interaction.

Mobile assisted language learning (MALL) is a popular term among mobile learning in English Language Teaching (ELT). Research in MALL regarding ELT is vast, including English as a Second Language (ESL) and English as a Foreign Language (EFL). One crucial aspect of learning the English language is acquiring the vocabulary to ensure that it can be used for various skills, such as listening, reading, speaking, and writing [2–4]. However, with the expanding industries and lifelong learning goals for sustainable education, one crucial aspect in ELT is English for Specific Purposes (ESP). Schools and various fields, particularly the working field, use English as a medium of instruction [5,6]. This means that the English vocabulary used for a specific context is not similar to general English. This difference has brought the term English for Specific Purposes (ESP) into light, used by a particular community for a specific context [7].

English for Specific Purposes (ESP) is, undeniably, more challenging because it deals with the terms and jargon of the English language for a particular context [8]. For instance, learning medical words in English requires specific vocabulary, which might not be part of common ESL. Despite learning ESL since a young age, most learners still face difficulties grasping the language [9,10], even more so for ESP learning. Irrefutably, ESP has been regarded as an essential branch in teaching and learning the English language because different contexts require different mastery of the language. Plus, the role of ESP started to emerge since the development of science and technology, which requires a specific use of the language to suit their environment [7,8,11]. Due to that, ESP should be recognised, as it could assist in lifelong learning opportunities for sustainable education.

Despite the growing trends of research in ESP, systematic reviews are more towards the ESL [12–14], EFL [15–17], and ELT fields [18], thereby leaving a gap. Nevertheless, it is undeniably vital to look into the research trends in ESP, specifically in mobile learning, because ESP is specific. Therefore, the growing body of research needs to be addressed and highlighted for the community in those particular contexts. Hence, this systematic review aims to review the current trends and research in mobile learning for ESP, with three research questions as follow:

RQ1: What are the types of platforms used for mobile learning in ESP?
RQ2: What are the language skills focused on in mobile learning in ESP?
RQ3: What are the field of studies involved in mobile learning in ESP?

1.1. Trends in ESP

The growing research on ESP has become a trend since the 1960s. The needs of ESP have been researched for many years. In [19], researchers studied the needs of the public and environmental health undergraduates in learning ESP. Similarly, ref. [20] conducted an ESP needs analysis study towards mechanical engineering undergraduates. Likewise, ref. [21] investigated Chinese undergraduates' needs in learning ESP. These studies reported that learners need ESP vocabularies for their future. Unlike general English, ESP has specific terms, jargon, and words related to a particular context, benefiting learners of all ages [22]. This statement shows that vocabularies are the main attribute that contributes to language learning. Many studies agreed that obtaining vocabulary is the first step in acquiring language [23–25].

Aside from that, many studies investigated the pedagogical impacts of ESP vocabulary for undergraduates [5,9,21,26,27]. These studies reported that undergraduates performed better in English language learning because of specific vocabularies. ESP vocabularies are specific, thus emphasising the learners' context. Furthermore, the language taught in ESP is meant explicitly for learners to perform tasks efficiently in a particular context. Hence, ESP could bridge the interdisciplinary gap of the language barrier to cater to a sustainable industry.

1.2. Trends in Mobile Learning

Mobile learning is a branch under Mobile-Assisted Language Learning (MALL). Since MALL began to increase in popularity, previous studies in a likewise field have been growing remarkably with regards to mobile learning. Recent studies in MALL portrayed positive acceptance among secondary school learners in mobile learning to enhance their English language. In [28], researchers studied the writing competency of English as a foreign language (EFL) among learners in a secondary school setting, using Twitter as part of the writing curriculum, and reported that learners used more word expressions and had an improved quality of summary-writing. Likewise, a study by [29] examined the use of the instant messaging app Telegram to improve the EFL grammar accuracy of female adult learners. Findings reported improvement in learners' grammar accuracy with guidance from instructors. Other studies that looked into the perceptions of university learners said that learners were positively inclined to use MALL as a means of learning [30,31]. Additionally, ref. [32] studied employees' perceptions of using MALL, to improve their

communicative English, reported that they were motivated to learn because of the flexible learning hours.

Aside from learners, teachers also accepted mobile learning. Teachers who use mobile learning believe that it helps with the teaching and learning process. Plus, mobile learning provides extra materials for learners and encourages self-paced learning. Plus, mobile learning is motivating for school learners. Furthermore, various studies reported positive impacts from using MALL in the teaching and learning process, such as accessibility of exciting activities in the mobile form [33,34] and learner convenience [35]. Thus, the teaching and learning of English for Specific Purposes (ESP) is feasible with a mobile application.

1.3. Reviews on Mobile Learning

Several reviews related to education level and mobile learning have. been conducted. For example, ref. [36] reviewed mobile learning apps for social, emotional, and cognitive development of Greek preschoolers. The results portrayed that most apps only aimed to teach primary language and numeric literacy, which emphasised memorization, thus discouraging the evolution of thinking skills. Similarly, ref. [37] studied mobile learning in fostering fun learning for preschoolers and found that preschool teachers were not ready to use mobile learning apps in the classroom. Meanwhile, ref. [38] analysed the trend of mobile learning in preschool settings, which reported that only 35% of the studies used mobile devices for language literacy. Most studies paid attention to children's cognitive development. Aside from preschool, ref. [39] reported the roles of mobile learning for learners in 9 to 14 year olds. These reviews show that mobile learning is beneficial in encouraging learning, but also that academic achievement is not associated with mobile apps. The authors of [40] reviewed studies on the issues of mobile learning for hospitality, leisure, sport, and tourism education. The common problem they reported was learners' experiences using mobile learning, as not many mobile learning platforms could teach higher-order thinking skills.

Recent systematic reviews focus more on mobile learning for ESL and EFL purposes. In [15], they reviewed the integration of mobile learning for secondary school EFL learners and discussed the challenges. The highlight from this study showed that mobile learning encourages collaborative learning for EFL learners, similar to another review carried out by [16]. Mobile learning enhances collaborative skills, one of the keys to sustainable and lifelong education. Contrasting the two reviews, another review by [17] reported the improvement of cognitive abilities of EFL learners through mobile learning. Other studies on mobile learning in the ESL or EFL classroom portrayed the benefits of the implementation of mobile learning, in terms of usability [12] and feasibility [18]. These reviews show that mobile learning is tangible and feasible in language classrooms.

However, other reviews on mobile learning for ESP are still scarce. Despite being similar to ESL and EFL, ESP is nevertheless another distinctive branch of English language teaching and thus presents unique challenges for the implementation of mobile technology. To this end, the effectiveness of mobile technology and ESP needs more assessment in light of the current pandemic and its effect on education. The review that follows in the remainder of this paper fills this gap and examines the potential benefits mobile learning can have on ESP.

2. Methods

This systematic review adheres to the method of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), consisting of four processes, known as identification, screening, eligibility, and included, as shown in Figure 1. Researchers have widely used PRISMA due to its comprehensiveness and adaptability to other studies. Therefore, the aim of this study and the process of the systematic review are as follows.

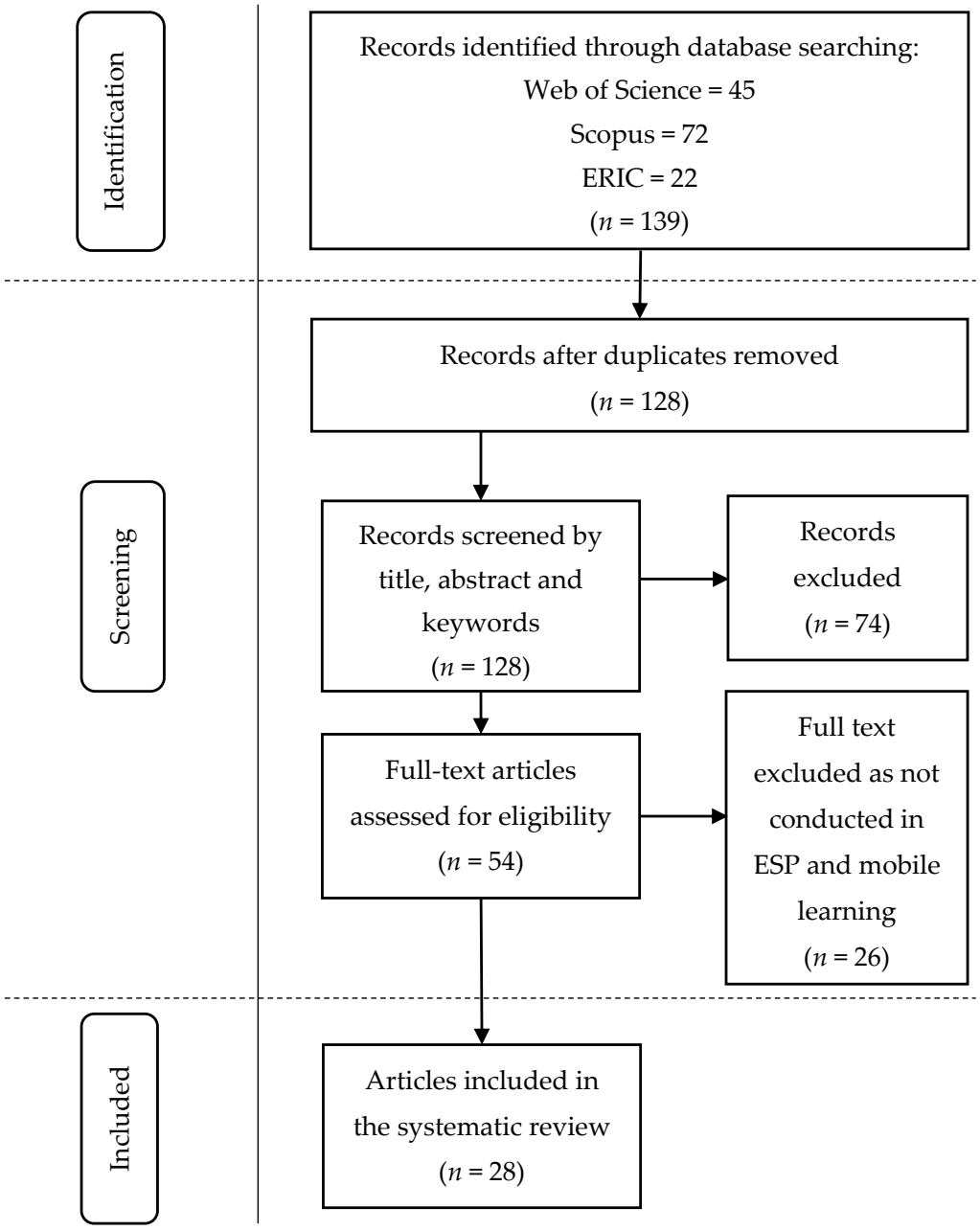

Figure 1. PRISMA systematic review adapted from [41].

2.1. Identification

The first step in the systematic review covers the Identification process as reported in the PRISMA guidelines. Three databases were chosen, deemed suitable for this study's aim: Web of Science (WoS), Scopus, and the Educational Resources Information Centre (ERIC). The key terms included in this systematic review were carefully constructed to reflect the constructs meant to be reviewed. Words related to mobile learning and English for Specific Purposes (ESP) were included. Table 1 below displays the search string used in this study for each database.

Table 1. Search string used in this study.

Database	Search String
Web of Science (WoS)	TS = ((“English for Specific Purpose *” OR “ESP” OR “English for Science and Technology” OR “English for STEM” OR “English for Business” OR “English for Social Study *”) AND (“mobile learn *” OR “mobile assisted language learning *” OR “mobile app *” OR “m-learning” OR “mobile device *”))
Scopus	TITLE-ABS-KEY ((“English for Specific Purpose *” OR “ESP” OR “English for Science and Technology” OR “English for STEM” OR “English for Business” OR “English for Social Study *”) AND (“mobile learn *” OR “mobile assisted language learning *” OR “mobile app *” OR “m-learning” OR “mobile device *”))
ERIC	English for Specific Purpose and mobile

*: Search String.

2.2. Screening

After identifying articles, the screening process occurs, whereby the first step in this stage was excluding duplicate articles appearing in more than one database. Based on the first screening step, 11 duplicate articles were removed, resulting in 128 articles eligible for further screening. These 128 articles were screened by title, abstract, and keywords, with the notion that these articles should be related to English for Specific Purposes (ESP) and mobile learning. From this screening process, 74 articles were excluded due to their unrelatedness towards the aim of this study. After exclusion, the remaining 54 articles were screened by inclusion and exclusion criteria as shown in Table 2.

Table 2. Inclusion and exclusion criteria.

Inclusion Criteria	Exclusion Criteria
Studies conducted between 2012 and 2021 (10 year timespan)	Studies conducted before 2012
Articles from journals	Conference proceedings, review articles, book chapters, reports
The text was written in English	Text not written in English
Related to mobile learning and English for Specific Purposes (ESP)	Not related to mobile learning and English for Specific Purposes (ESP)

After careful selection based on the inclusion and exclusion criteria, 28 articles were potentially included in this systematic review. Although reviewed, we excluded conference proceedings and book chapters because they were less comprehensive [42].

2.3. Included

The articles for this systematic review revolved around mobile learning in English for Specific Purposes (ESP). The studies included are displayed in Table 3.

Based on the table above, twelve articles were chosen from WoS, ten from Scopus, and six from ERIC. These databases were selected due to the quality of the articles, particularly in the education field. The aims of the studies were all related to mobile learning in the ESP context. The majority of the studies were carried out at the higher education level, including universities and colleges [43–65]. On the other hand, only one study focused on the vocational secondary school students and teachers [66], and two other studies focused on the working adults’ proficiency in English [67,68].

Table 3. Summary of the selected studies.

Study	Database	Aim	Samples	Findings
Yamada et al. (2012)	WoS, Scopus	To verify the effectiveness of English language materials using mobile devices for business, in terms of the effect on motivation, overall learning performance, and practical performance in real business situations	39 employees in sales (19) and non-sales (20) personnel	The audio materials distributed to respondents enhanced their listening skills and were closely related to their work context, which also improved their English for business operations.
Hoven & Palalas (2013)	WoS	To develop practical design principles for learning materials for students of English for specific purpose (ESP)	Business major undergraduates	The app enhanced learners' listening skills aside from promoting cooperation and active learning among learners in specific contexts and flexibility for individual learning.
Liu, Hwang, Kuo & Lee (2014)	WoS, Scopus	Design and development of a context-aware ubiquitous learning (u-learning) system for users to increase fitness-related reading comprehension in a fitness centre	Customers in a fitness centre	The QR code app enhanced the customers' Fitness English vocabulary and reading comprehension for exercise.
Šimonov (2015)	WoS	To identify the perceptions of technical and engineering students mobile-assisted instruction of English for specific purposes	203 technical and engineering undergraduates	Online course and learning management systems through mobile learning encouraged specific learning activities and contents, which received positive acceptance by learners.
Batsila, Tsihouridis & Tsihouridis (2017)	WoS, Scopus	To identify the ways ESP teachers have employed mobile learning scenarios in the teaching of English to Vocational Secondary school learners	Six teachers and 157 vocational secondary students	Results showed that teachers use mobile learning to enhance students' ESP because of its feasibility in catering to individuals' needs. Students positively accept mobile learning because it's easy and not biased towards language proficiency.
Kirovska-Simjanos (2017)	WoS	To show whether mobile phones used in the ESP classroom have the potential to help students learn more and grasp that knowledge	10 ESP undergraduates from Computer Sciences and Technology programme	Results show that mobile learning encourages personalized learning, but could not replace a teacher's role in the classroom.
Shih (2017)	WoS, Scopus, ERIC	To investigate the effects of teaching English for specific purposes (ESP)	27 business major college students	Students had positive attitudes and were satisfied with using the mobile LINE app as a teaching and learning tool.
Bikowski & Casal (2018)	WoS, Scopus	To explore non-native English-speaking students' learning processes and engagement as they use customized interactive digital textbooks on a mobile device	13 fully matriculated undergraduates	Students had high expectations towards the digital textbook and positively accepted it, but reduced learning engagement.
Nickerson (2018)	WoS, Scopus	To give an account of an actual classroom experience of relevance for the teaching of English for Specific Business Purposes	407 business major undergraduates	The findings showed that students learned at their own pace, making mobile learning flexible, convenient, and encouraging.
Aghajani & Adloo (2018)	WoS, Scopus	To examine the impact of Cooperative online learning via mobile applications on writing skills among Iranian intermediate ESP learners	70 university ESP learner	Cooperative writing portrayed desirable results and scores through Telegram, and students were positive in using the app.

Table 3. *Cont.*

Study	Database	Aim	Samples	Findings
Valeeva, Pavlova & Zakirova (2019)	WoS, Scopus, ERIC	To investigate mobile learning of English for specific purposes to ecology students with the help of the Quizlet learning platform	68 second-year undergraduates and 70 third-year undergraduates in ESP for ecology	Mobile learning increased the effectiveness of teaching ESP because it's motivating and challenging. Mobile learning was satisfying for students because students were not segregated based on their proficiency levels.
Wu & Miller (2020)	WoS, Scopus, ERIC	To cast light on the use of mobile-assisted peer feedback to promote L2 speaking in English for Specific Purposes (ESP) course	25 Business School undergraduates in an English for Specific Purposes course	Mobile-assisted peer feedback was positively accepted, though some limitations were highlighted, such as screen size and limited rubrics for feedback.
Krivoruchko et al. (2015)	Scopus	To identify the conditions for effective development of foreign language competence using technologically oriented methods of teaching a foreign language	82 undergraduates from the engineering programme	Mobile learning encouraged an authentic learning environment, which provided opportunities for learning specific language terms. Mobile learning also improved the language competency of learners.
Alkhezzi & Al-Dousari (2016)	Scopus	To explore the impact of using a mobile application, namely Telegram Messenger, on teaching and learning English in an ESP context	40 undergraduates at the Faculty of Allied Health Science	The results showed that learners' vocabulary and reading comprehension improved. Learners also obtained technical vocabularies, but the grammar rules and writing skills did not show significant improvement.
Simonov (2016)	Scopus	To describe the state in mobile-assisted language learning (MALL)	203 undergraduates in the Faculty of Informatics and Management	The mobile device owned by respondents were notebooks, and smartphones. Students used mobile devices for communication purposes, and respondents were optimistic about using mobile devices in teaching and learning.
Łuczak (2017)	Scopus	To investigate the students' opinions about Memrise and to assess whether Memrise influences the test results achieved by the students during the legal English course	First, second and third-year undergraduates in B2+ legal English course.	Results showed that Memrise influenced the test results of learners positively. Their vocabularies in legal English improved due to the effective memorization revision in the mobile app.
Alizadeh (2018)	Scopus	To identify offline and online tools paramedical students use in the programs and investigate the purposes for and the conditions in which the tools are employed	114 students taking the ESP courses at the school of Paramedical Sciences	Many respondents used Google Translate, but technical terms were not correctly translated. The tool lacked comprehensive and specific features for the field of study, in translating technical words from Persian to English.
Petterson (2018)	Scopus	To find out undergraduates' attitudes towards the use of MALL in English for physiotherapy and anticipate whether possible drawbacks, such as cost, technological literacy, or storage capacity, would pose significant challenges for undergraduates	15 undergraduates of English for physiotherapy course	The result showed that a majority of the students successfully learned anatomy words through the mobile app. A challenge was the cost of the app. A highly developed mobile app in a specific discipline for ESP is more effective than standard language learning apps.

Table 3. *Cont.*

Study	Database	Aim	Samples	Findings
Khan et al. (2019)	Scopus	To explore the potential usage of M-Learning in English for specific purpose (ESP) classes	21 ESP undergraduates from College of Business Administration	Results showed that mobile learning improved learners' proficiency in ESP due to ease of use. Mobile learning provided accessible materials. Mobile learning can be challenging due to Internet connection and screen size.
Rajeswaran (2019)	Scopus	To identify students' digital literacy, competence, and knowledge of digital tools and the latter's use in language learning and also to find how competent teachers are to facilitate language learning in the classroom with computers, mobile phones, and the Internet	120 undergraduates from first-year Bachelor in Tech courses	The mobile phone was regarded as a helping tool, and participants agreed that the teacher's role would not be replaced. Instead, mobile devices acted as a support. Students were well equipped with the technological knowledge to use mobile learning in the classroom.
Balula et al. (2020)	Scopus	To verify if mobile learning motivates learners and improves vocabulary acquisition, over three different academic years	1st-year undergraduates enrolled in Management course	The results showed that students' motivation increased with mobile learning, aside from improving their vocabulary acquisition. The app did not prove effective in improving the writing skill of students with the vocabulary gained.
Alkhudair (2020)	Scopus	To investigate the effectiveness of using m- learning or MALL in EFL classrooms and how the use of such an apparatus correlates with the learners' academic achievements	126 undergraduates from different Saudi universities	Results showed a significant relationship between hours of using mobile learning tools and high GPA achievement. Results also showed positive acceptance towards mobile learning.
Ishikawa (2014)	ERIC	To investigate the use of an English-language reading practice application for an Android tablet computer with students who are not native speakers of English	Students studying international affairs	Findings showed that students enjoyed reading with the app and their reading speed increased without losing comprehension ability. Plus, the app allowed students to possess a hard copy of the materials, which received positive feedback.
Tayan (2017)	ERIC	To investigate learners' and teachers' perceptions towards the proposed implementation of a MALL programme	191 first-year undergraduates of Business English	Results showed that learners positively accepted mobile learning because learning could be scaffolded through a proper pedagogical mobile environment. Also, communication and motivation were highly increased through mobile learning, allowing collaboration and learner autonomy.
Saeed Alharbi & Meccawy (2020)	ERIC	To investigate the attitudes of EFL learners towards the use of mobile-based tests in English classes using Socrative as a model for assessment	35 female students completed all three stages of the experiment: initial survey, Socrative quiz, post-experiment survey	Findings reported that almost half of the respondents preferred mobile-based tests due to advantages such as fun.

Table 3. *Cont.*

Study	Database	Aim	Samples	Findings
Svalina & Ivić (2020)	ERIC	To analyse the support that one student with disabilities receives in high school in English and German courses	One student with disabilities (Case study)	Results from the case study reported that the student loved learning English because of the mobile games used in this study. Online learning enhanced the students' achievement. The student had difficulties with oral and written language but had good vocabulary and grammar
Simanjuntak (2020)	ERIC	To investigate the experiences of students in learning specific academic English vocabularies (ESAP) through the use of a mobile dictionary called SPEARA	113 Computer Science undergraduates	With MALL, learning ESAP showed significant improvement. The students also perceived MALL as rewarding and positive, but it could not replace human interactions.
Kohnke & Ting (2021)	ERIC	To assess the perceptions of EAP undergraduates at an EMI university in Hong Kong regarding the use of an in-house app, Books vs. Brains@PolyU, for discipline-specific vocabulary learning	16 first-year undergraduates	Findings from this study portrayed students' positive views towards the app for learning specific English vocabularies. The app met the needs of students, who required different terminologies for different disciplines.

2.4. Data Analysis Procedure

All articles selected were exported to a referencing software, Mendeley. Then, thematic analyses were carried out to identify the main themes to answer the following research questions:

(1) What are the types of platform used in mobile learning for ESP?
(2) What are the language skills focused on mobile learning for ESP?
(3) What are the field of studies involved in mobile learning for ESP?

This review analysed the articles interpretively, categorizing the themes for the research questions.

The themes were classified based on the platform mentioned in the literature review for the first research question. The platforms mentioned in each article were categorized into eight types of the mobile learning platform. For the second research question, language skills were classified based on the English language skills mentioned in the articles. The third research question was classified with reference to the Organisation for Economic Co-operation and Development (OECD). Findings from the articles are discussed in the following section.

3. Results

3.1. RQ1: What Are the Types of Platforms Used in Mobile Learning for ESP?

In this systematic review, mobile learning is categorised into (1) social networking sites (SNS), (2) learning management systems (LMS), (3) games, (4) assessment apps, (5) vocabulary apps, (6) reading apps, (7) listening apps, (8) mobile apps for language competency and (9) apps for engagement and motivation. These categories emerged from reviewing the literature and were classified as such for better categorizing mobile usage in learning English for Specific Purposes. Table 4 (below) shows the type of categorisation with the respective articles used in this study.

Table 4. Types of platforms used in mobile learning for ESP.

Type	Examples
Social Networking Sites (SNS)	Line app [46] Telegram app [49,53]
Learning Management System (LMS)	Blackboard Mobile Learn [44] Schoology [48] Edmodo [69]
Games	Quizlet [50] Socrative [58,61]
Assessment app	PeerEval (assessment site) [51]
Vocabulary app	Memrise [65] 3D Anatomical App [56] Mobile English Learn English on the go [43] Google Translate [55] Mobile dictionary SPEARA [62]
Reading app	Books vs. Brains@PolyU [60] Reading Practice App [64] Read with QR codes [67] Digital textbooks [47]
Listening app	Business English for sales department [68]
All four skills (listening, speaking, reading, writing)	Mobile app [52]
Not specified	[45,54,57,59,63,66,70]

As depicted in Table 4, three articles showed social networking sites (SNS) in English for Specific Purpose (ESP) classrooms. The results from these three studies [46,49,53] reported a similar notion, whereby using SNS tools through mobile platorms encouraged better comprehension of ESP. Both authors [49,53], who incorporated Telegram as a mobile learning intervention in their ESP classroom, stated that learners obtained better scores in writing and performed better in vocabulary and grammar, respectively. Likewise, ref. [46] reported the same findings of better performance despite using a different SNS, the LINE app, as a means to enhance the learners' lab language. Furthermore, this same study mentions that learners performed and had positive attitudes.

Another type of mobile learning in this systematic review is using a Learning Management System (LMS) through a mobile platform for ESP. LMS is a tool to flip the classroom by providing materials and tasks in cloud-form such as Blackboard Mobile Learn [44], Schoology [48], and Edmodo [69]. Despite the wide use of LMS, this systematic review focused on using LMS through mobile-use to learn ESP. In [48], they flipped the classroom and conducted a study to improve the communication skills of Business Major undergraduates through Schoology with three tasks uploaded in LMS. LMS encouraged learners to go at their own pace, and flipping with LMS proved to be effective.

As mentioned in the same study, LMS can solve learning challenges, including family issues and location. Although [44] reported similar findings, one point they highlighted was the teachers' view in using LMS. As mentioned in [44], "The ethical feeling of non–/contacting the teacher is connected to a general level of behaviour and good manners. And, current learners, being allowed to feel free, sometimes disrupt this gentle borderline" (p. 13). In [69], they studied the perceptions of teachers, students, and parents using LMS, and found that LMS was deemed fun by English as a foreign language learners from the vocational school because the LMS was interactive and allowed for engagement between teachers and students.

Games are platforms that include rewards and badges. Games for ESP have also shown positive results, particularly in motivating learners to learn ESP [50,58,61]. The authors of [50] mentioned that mobile games were challenging and inspiring, encouraging learners to keep using them to learn ESP. In the same study, Quizlet was shown to be motivating and effective for teaching ESP vocabularies. Likewise, ref. [58] mentioned that games improved learners' vocabularies, but not writing.

Aside from games, vocabulary apps motivated learners. Meanwhile, ref. [65] identified learners' perceptions towards Memrise. Likewise, ref. [43,56] studied learners' perceptions towards a 3D anatomical app and mobile Learn English on-the-go app, respectively. These studies reported positive perceptions in using vocabulary-related mobile apps. In [55], the authors' looked into the use of Google Translate for mobile learning. Many learners used Google Translate to translate technical words, but not every learner preferred it because some technical terms could not be correctly translated from another language to English. In [62], they studied learners' vocabulary acquisition and perceptions towards the mobile dictionary SPEARA. The findings showed that learners' vocabulary acquisition improved, and they found the mobile dictionary useful. Similarly, ref. [60] conducted a study on learners' perceptions of Books vs. Brains@PolyU, which was developed by the Hong Kong Polytechnic University, a discipline-specific vocabulary app, and reported that learners positively accepted the app as it helped build and expand their vocabulary in specific disciplines.

In [64], the authors' studied the use of a reading app to improve reading comprehension of non-native undergraduates. Findings reported that the app improved learners' reading speed without reducing their understanding. Learners enjoyed and preferred mobile reading apps rather than hardcopy materials. While in [67], they made use of QR codes to increase learners' reading comprehension in the context of a fitness centre. Learners scanned the QR codes to read about machines and muscles. Interestingly, there was an improvement in reading comprehension ability by these ESP learners, and their English for fitness vocabulary increased. The authors of [47] explored the learning processes and learner's engagement in reading via digital textbooks. The learners' engagement with the content was low because of the small screen size of a mobile device.

In [68], they studied the effectiveness of listening materials towards motivation and performance of Business English workers in a sales department. The findings showed that the materials were effective, and learners' overall performance improved, but learners perceived that the speaking skill was more important in a business field. On the other hand, ref. [52] studied the effectiveness of mobile learning towards the four language skills for engineering undergraduates. Their findings were positive, as the learners' language competence improved and was more enhanced.

Other studies did not specify the types of mobile learning used in their studies. The studies by [45,54,57,59,63,66,70], all looked into the perceptions of learners, teachers, or both in mobile learning, specifically in the field of Mobile Assisted Language Learning (MALL). These studies reported similar findings of positive acceptance of mobile learning in the teaching and learning of ESP. However, one noticeable result, in [57], stated that regardless of the positive acceptance towards mobile learning, the teachers' role remains intact and crucial in ensuring the success of ESP learners because teachers are not replaceable by mobile devices. On the other hand, ref. [70] reported challenges of mobile learning as perceived by learners, such as internet connection issues and screen size.

3.2. RQ2: What Are the Language Skills Focused on Mobile Learning for ESP?

In the second research question, we examined the skills practised by the various mobile learning platforms. The language skills in ESP are listening, speaking, reading, writing, vocabulary, and all skills in general. Though grammar is also a language skill, it is not displayed in the following results because none of the studies focused on grammar. Table 5 below shows the language skills focused on in mobile learning for ESP.

Table 5. Language skills focused on mobile learning for ESP.

Language Skills	Study
Listening	[68]
Speaking/Communication	[48,51]
Reading	[47,50,64,67]
Writing	[49]
Vocabulary	[43,55,56,58,60,62,65]
All skills (language competency)	[46,52,53,69]
Not specified (engagement and motivation)	[44,45,54,57,59,61,63,66,70]

The articles were analysed and categorised according to their English language skills to address the second research question for this systematic review. In [68], they used English language materials in mobile phones to enhance the listening skills of business employees. These materials include listening audios and gap-filling, which were related to their business context. Findings showed that the overall performance improved with the listening materials, but the business employees required more speaking. In [48], authors' conducted a flipped mobile learning classroom, using Schoology for business undergraduates' speaking skills by providing interaction, production, and reflection tasks. The learners improved as the LMS platform allowed them to access the materials anytime. Likewise, ref. [51] used mobile technology as a peer feedback tool to assess the speaking skills of business undergraduates, and learners agreed that the mobile device provided real-time feedback. However, limitations such as screen size were prominent.

In [64], they used a mobile reading app to improve reading comprehension through reading materials and tasks. Likewise, ref. [67] used QR codes as a means for learners to read about fitness machines and their uses in a fitness centre while exercising. Both studies reported that the learners' reading comprehension improved, and they preferred reading using the mobile platform rather than hardcopy materials. However, ref. [47] reported that learners' engagement decreased when they use mobile platforms to read digital texts.

On the other hand, ref. [49] used Telegram to improve learners' writing skills and reported an improvement in learners' writing performance. Vocabulary is one of the skills focused on in mobile learning. Studies conducted to identify learners' perception towards using mobile learning in improving their vocabulary acquisition reported positive perceptions [43,56,62,65]. Other studies said mobile learning helped learners acquire more vocabulary, and showed that specific discipline apps expanded their vocabulary [55,60].

The authors of [59] investigated the effectiveness of mobile learning in the classroom and found that mobile learning hours correlated with learners' achievement. Likewise, ref. [70] conducted a study with business English undergraduates towards their perceptions of mobile learning and their proficiency. The findings reported that the undergraduates agreed that mobile learning developed their learning proficiency in general. In [45], they carried out a study on learners' satisfaction with their learning achievement and found out that learners could improve their learning when they were in control of their education. Teachers played a role in assisting learners in the classroom. Other studies [46,52] conducted experimental studies towards mobile learning in ESP and learners' language achievements. Both studies reported that mobile learning effectively enhances the language competency of learners, particularly in acquiring specific vocabularies. However, ref. [53] investigated mobile learning with learners' achievement in ESP, their findings reported that mobile learning enhanced learners' achievement, vocabulary acquisition showed a more notable improvement. In [69], they conducted a case study towards a student with disabilities in using mobile technology to assist learning. The student performed satisfactorily in acquiring the language, and showed improvement in both listening and reading skills. However, the teachers involved stated that they had difficulties in preparing materials and required specific teacher training.

Many articles did not specify the skills in their papers, but the articles still focus on mobile learning to enhance ESP, regardless of the unmentioned skills. Studies by [44,54,61,63,66]

looked into learners' engagement in mobile learning. Mobile learning is engaging and motivating for learning ESP. On the other hand, ref. [57] conducted a study on the challenges of mobile learning in an ESP classroom and reported that the learners were enthusiastic, but teachers were still adapting to the use of mobile technology in the classroom

3.3. RQ3: What Are the Field of Studies Focused on in Mobile Learning for ESP?

The third research question addresses the field of study. It is crucial to know the field of study to identify the gap in addressing language issues for a specific context. The categorization of areas is based on [71]. Based on the findings, the business field of studies employed mobile learning for ESP the most, in the domain of social sciences. A more detailed data representation is shown in Table 6.

Table 6. Field of studies focused on in mobile learning for ESP.

Field	Programme/Course	Study
Social Science	Business	[43,46–48,51,58,60,63,68,70]
	Law	[65]
	Linguistics and translation	[59]
	Administration	[61,64]
Engineering and Technology	Engineering	[44,49,52,54]
	Computer Science	[45,62]
	Technology	[57]
Medical and Health	Allied Health Science	[53]
	Medical	[55]
	Physiotherapy	[56]
	Fitness	[67]
Natural Sciences	Ecology	[50]
Others	Vocational	[66,69]

Knowing the field of studies will help identify the gap and the main focus of ESP in terms of mobile learning. From the data analysis, most of the articles were centralised towards the field of social sciences, mainly in Business-related studies [43,46–48,51,58,60,63,68,70]. Next, more articles represented the Engineering programmes [44,49,52,54]. Various mobile learning alternatives could help other learners in the same field. Hence, this finding is significant.

4. Discussion

The findings highlight the types of mobile learning used in ESP teaching and learning. Overall, the results from the study depict that the mobile learning tool for ESP assists in language acquisition. The sources of mobile learning included various types, including games and SNS, which encouraged learners' engagement in learning ESP. When mobile technology is adopted in ESP teaching and learning, materials suitable for a particular context are helpful, especially for lifelong learning [72–74]. ESP is relatable to learners, which allows more retention of language skills. Plus, specific language skills are more important than others in certain fields. Relating ESP to mobile learning, apps for ESP will benefit specific individuals in particular contexts or situations. Hence, more apps for ESP can be potentially developed for the future of sustainable education and lifelong learning.

Next, this review also looked into the language skills focused on by ESP learners in mobile learning. The ESP skill focused on in mobile learning is vocabulary acquisition. One possible reason is due to the different technical terms and jargon of ESP [75]. Specific fields of study or work require their technical terms. For instance, vocabularies used by business majors differ from the engineering majors, which gives an utmost emphasis on the role of ESP. Furthermore, since the English language in schools is more towards academic English or general English [22], learning vocabularies are different, which focuses on obtaining specific vocabularies in learning ESP.

Aside from vocabulary, one interesting aspect is the focus on all language skills, i.e., language competency. In ESP, the skills are different, as the language does not mainly

focus on the form; instead, it is more of fluency. Thus, it emphasises how language is used in the real-life context [21,26]. This highlights the role of ESP as a branch in English Language Teaching (ELT) which emphasizes competency rather than accuracy. Learners of ESP deal with the functional language, using language to function in specific tasks [7]. Hence, language competency is more focused on mobile learning for ESP as individual skills tend more towards general English learning.

Finally, this review examines the field of study focusing on mobile learning for ESP. From the findings, it is essential to look into studies focusing on mobile learning for ESP to show which mobile learning applications or tools are available for different fields of study. The field of study that has been most popular among mobile learning for ESP is business. Most ESP learning is clustered in business due to the wide range of business opportunities across the globe. Business is, indeed, a field to focus on because business majors are closely related to dealing with people. Hence, ESP focuses on the business major. Plus, business is paid more attention to because of its role in sustaining industry.

In the science-related field, engineering seems to have more studies on it. In the engineering field, studies showed that there are mobile apps to learn English for engineering. This demonstrates that there are opportunities already out there in improving the engineering learners' ESP. Yet, it is crucial to note that engineering has different subfields, which should be further examined. Similar to a study by [76], mobile learning dominated the science field.

One limitation of this review is it does not look into the level of education of the ESP because research related to mobile learning and ESP are geared more towards higher education [43–65], which would not provide enough resources for other levels of education. Furthermore, ESP is more geared towards the higher proficiency of learners, but [8] mentioned that ESP could also be used for secondary school learners. Hence, there are still limited ESP studies that could be further explored in other levels of education.

5. Conclusions

In conclusion, this systematic review has reviewed papers related to mobile learning in ESP. Thus, the gap of not having any systematic review on ESP and mobile learning has been filled. Three databases, namely the Web of Science (WoS), Scopus, and Educational Resources Information Centre (ERIC), were used, and 28 final articles were included in this review based on the inclusion and exclusion criteria above. The main findings highlight three aspects of the trends in mobile learning in ESP, as follows:

1. There are eight types of mobile learning in this review: Social Networking Sites (SNS), Learning Management System (LMS), games, assessment apps, vocabulary apps, reading apps, listening apps, and language competency apps; 19 apps contribute to mobile learning. However, the most common type of mobile learning is through the use of vocabulary apps. With this finding, educators and practitioners can develop or use specific apps in the teaching and learning of ESP. Also, the app's types allow educators to use mobile learning as a supplementary tool in education.

2. The skills focused on in mobile learning include, listening, speaking, reading, writing, vocabulary, and all skills. Most mobile apps focus on the ESP vocabulary enhancement or language competency as a whole, without specifying other language skills. The skill focus is vocabulary acquisition. Additionally, ESP apps focused on language competency as a whole. This finding contributes to the specific apps that educators of ESP can use to improve the different skills of learners.

3. The fields of study consist of five categories; Social Science, Engineering and Technology, Medical and Health, Natural Sciences, and others. The most researched field of study is the Business field, followed by engineering. The fields of study indicate a gap in research for the field of studies in ESP and benefitting others in the related fields of study.

Based on the results, mobile apps assist the learning of ESP, particularly in specific vocabulary acquisition because ESP is not the same as general English. Thus, vocabularies used in specific contexts should be taught to learners in various fields. This notion itself

renders more opportunity for mobile learning as a supplementary tool for learning ESP at their own pace. Plus, referring to these findings, business majors have more mobile learning alternatives that could help other learners in the same field, thus making the findings from this review significant. One limitation of this review is that education is not highlighted as a trend because most ESP studies generally focus on undergraduates in universities and colleges. This limitation, however, clearly opens up a new research opportunity to be carried out in the future, particularly in identifying ESP research for other levels of studies. Furthermore, future research can address the ambiguity of mobile learning in ESP and the language skills involved in the relationship. Regardless of the limitations that open up a new path for upcoming research, this systematic review contributes significantly to mobile learning in ESP, benefitting practitioners in related fields. This review also contributes to the knowledge gap in encouraging lifelong learning through mobile learning and ESP, which could be critical to achieving the fourth Sustainable Development Goals (SDG) goal.

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