An Analytical Study on the Impact of Implementing Technology to Teach Speaking Skills at Saudi Universities: A Meta-Analysis

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Abstract:

This study is one of only a limited number to have synthesized the existing literature on technology use in teaching and learning EFL speaking skills at universities in Saudi Arabia. In the current study, the investigation includes a decade-long study spanning the evolution of the use of technology in EFL speaking classes. Through the present meta-analysis of seven studies, technology was found to be effective and that it is mainly used in blended approaches in undergraduate EFL speaking classes, where it has a good reception and a measurable positive impact. Based on the analysis of the selected studies, it was found that technology must be implemented in a suitable educational design, in order to obtain optimal benefit beyond its implementation. However, further investigation is needed in future, using enhanced technologies like artificial intelligence (AI).

Keywords: Undergraduate EFL learners, speaking skills, technology, online course, blended course, Saudi Arabia.

1. Introduction:

A supportive teaching and learning environment is necessary to enhance language skills, in the EFL context. Learners also need additional exposure to the language outside the classroom to help them develop their comprehension and language production. Technology can be a means of resolving this issue. In the context of the current study, which sampled the literature on undergraduate students who continue to face significant problems with their English language abilities (for example, Alaraj, 2016; Kashmiri, 2020), technology can play a significant role, giving students the chance to practice their English with native speakers.

In terms of the speaking skills identified in this study, it would appear that Saudi EFL students still need to improve their pronunciation, comprehension, and language production. However, improving these skills requires more than just practicing them in class with a teacher or peers. Instead, additional opportunities and practice facilities are required, which is where technology can be used to address the deficit. Different implementation procedures may be used, depending on the type of programme and its requirements. For example, a programme can be exclusively online or blended, which would mean combining online and classroom approaches.

During the Covid-19 pandemic between 2019 and 2020, an online environment was urgently deployed to teach EFL classes in Saudi Arabia, whereupon fully online classes were organized to continue the educational process. However, both before and after the pandemic,

technology was used in blended or flipped strategies. Many studies were conducted to investigate this change during that period. In any case, technology is evolving at a rapid rate, and variations in its use are necessary to examine its impact on students' attainment and attitudes.

Thus, the current study analyses the existing literature related to technology use in EFL classes and its impact, either used in an online or blended form, in order to answer the following research question:

How do EFL learners perceive the use of technology to teach and learn speaking skills in Saudi Universities based on the existing literature?

2. Literature Review:

2.1 Saudi Undergraduate EFL Students and Their Speaking Abilities:

Productive skills like speaking are some of the most challenging for EFL learners to master, especially since students might not be exposed to the English language outside the classroom. Thus, their only opportunity to practice the language is usually in class with their teacher or classmates. This can be problematic for many students as it may hinder them from adequately acquiring the specified skill or cause them anxiety about making mistakes in front of others. Technology offers a possible solution to this issue, as suggested in several studies conducted in Saudi Arabia to understand the factors impacting on the quality and acquisition of English communication skills. In an early study conducted by Ashra (2018), the results refer to significant factors affecting the development of speaking skills, wherein the researcher suggests increasing students' exposure to the language outside the classroom. One way of achieving this exposure is to maximize students' English language use in everyday life. Ashra further adds that the youth tend to have very high mobile phone usage and can be fanatical about buying the latest versions of devices. They also enjoy occupying themselves with different types of social media. This propensity is therefore something that parents, institutions, and governments can use to beneficial effect.

To date, it has been found that EFL learners in Saudi Arabia need to improve their English speaking skills. The undergraduates sampled in this study still appear to have a low level of English language ability, despite being aware of the importance of mastering such a global language. In a study conducted by Ali et al. (2019) to understand the attitudes of male and female EFL university students, with regard to their speaking skills, it was found that the lack of an appropriate environment, poor interest, and low motivation were the most significant factors impacting on students' speaking skills. In another study by Alsiyat (2021), the researcher used semi-structured interviews with EFL students and teachers at a university in Saudi Arabia to understand the causes of weak speaking abilities. The above author found that multiple components contributed to this

low level of speaking ability. These components related to teaching methods, teacher-centred approaches, students' motivation, and inauthentic English materials.

Irrespective of the shift that took place prior to Alsiyat's study, due to the pandemic – which transferred education completely online – adequate implementation of modern teaching instruments is limited. To elucidate, the following section presents the various approaches adopted to teach speaking skills.

2.2 Emergence of Online and Blended Learning to Teach Speaking Skills at Universities in

Saudi Arabia:

With rapid changes taking place in technology, smartphones and tablets have caused a new shift in education. These devices may be used in multiple ways, either in an online or blended environment, in order to serve the needs of educators and students. Moreover, the coronavirus caused a sudden shift from a face-to-face to an online environment, with no chance to plan the adopted change.

Nevertheless, Saudi Arabia is one of the countries that managed to make a smooth transition in education during the pandemic, due to its solid infrastructure of schools and universities (Tanveer et al., 2020). For schools, a unique learning management system (LMS) called Madrasty was launched to teach all subjects to all school grades. Meanwhile, each university already had its own LMS, most commonly Blackboard, which was used to teach all undergraduate and graduate courses. However, initially, most students and educators at all educational levels faced difficulties using an LMS, since they had never been trained to do so. To overcome this issue, several workshops were organised by the Ministry of Education to train people in general education, while universities arranged workshops for their beneficiaries through their Deanships of online and distance learning.

As mentioned previously in this section, it was necessary to teach all university courses online during the Covid-19 pandemic (Tanveer et al., 2020). However, before and after the pandemic, technology use was the result of a personal effort by the teacher or suggestions made by researchers to investigate its impact on learners' psychological state and attainment, as well as examining teachers' attitudes. The situation is similar to the one currently facing the teaching of English language skills. However, the use of technology in education can be demanding since it requires a great deal of effort from teachers, and students are obliged to practice more. The following section synthesizes the studies selected in relation to the research topic.

2.3 Synthesis of Studies Included in the Meta-analysis:

This synthesis is grounded on the following criteria: participants, data collection, type of technology implemented, and results, which are all considered in this meta-analysis with no attention to gender. The procedure for examining the included studies was based on the essential elements of investigating the attitudes of EFL teachers and students, specifically with regard to the implementation of technology to teach speaking skills.

These elements include:

- 1. Age and number of participants (male and female teachers and students): The participants were required to be undergraduates or academic staff at universities in Saudi Arabia.
- 2. How the technology was implemented (fully online, blended, or flipped if blended, was the online material the core or supportive aspect of the course? For example, were activities added for completion in class or at home?): Consideration of the teaching and learning mode is vital in courses or programmes that implement technology and online tools. Even the portion of the course that is delivered via technology must be determined according to the goals of the programme or course, as indicated by Russell and Murphy-Judy (2020).
- 3. Type of technology: For example, an LMS like Blackboard, discussion applications,

AI like a chatbot, etc. This choice must be based on the availability, accessibility, and the ease of using the technology (Russell & Murphy-Judy, 2020).

- 4. Data collection instrument.
- 5. Results obtained from the data analysis.

Table 1:Synthesis of the reviewed studies

Study	Participants (Sample Size, Gender, Academic Position)	Data Collection Tools	Technology Implemented	Results
Abugohar et al. (2019)	45 EFL teachers working in higher education in different institutions in Saudi Arabia (gender not identified)	Questionnaire and focus groups	Blended learning (partial implementation of different phone apps to practice speaking skills outside class)	Positive attitude of the participants
Alamri & Bano (2021)	Sample of 50 female EFL teachers and students in their second	Questionnaire	Blended learning (partial implementation of mobile phone use to practice speaking and other skills	Positive attitude of the participants
	year at Bisha University		outside class by watching videos, accessing online dictionaries, and communicating via social media apps)	
Alshabeb, & Almaqrn (2018)	102 EFL male and female students Five participants for follow-up interviews	Questionnaire and semi- structured interviews (eight students)	Partial use of mobile social media apps (Twitter and Instagram) to practice different language skills, including speaking, outside the classroom, based on the student's preference)	Positive attitude of the participants
Alzamil (2021)	18 second- year male students studying English in a Saudi University	Questionnaire	Fully online learning to teach speaking skills during the pandemic between 2019 and 2020, after starting a short period of face-to- face teaching (attending online classes with students required to give an online presentation, which is then recorded; students receive immediate email feedback from their teachers)	Positive attitude to the importance of speaking English

Khan et al. (2021)	70 EFL male university students at a public university in Saudi Arabia (35 students in the control group; 35 students taught using a blended approach)	Placement test Pre- and post- speaking test Questionnaires and semi- structured interviews (10 students selected randomly by the researcher)	Blended learning (partial implementation of WhatsApp to practice vocabulary by receiving audio- and visual messages in a WhatsApp group used for speaking outside class)	Positive attitude of the participants
Mohammed & Mohammed (2021)	120 undergraduate EFL male and female learners at a university in Bisha	Questionnaire Observation (2 teachers) Semi- structured Interviews (six students)		1. Learners had a positive attitude to using the online environment 2. No significant difference between male and female learners
Sheerah & Yadav (2022)	32 undergraduate EFL female students at King Khalid University	Questionnaire	Flipped classroom (equal emphasis between face-to- face and online learning using an LMS)	Positive attitude

Based on an analysis of the selected studies, recommendations will be made for researchers, educators, and stakeholders to promote the best options for teaching and learning speaking skills in the EFL context.

3. Methodology:

This section discusses the methods used to select studies, as reported in the existing literature, and the analytical procedures applied to ensure that the selected studies were appropriate.

3.1 Inclusion and Exclusion Criteria:

Over 200 studies were reviewed, each drawn from the literature relating to task-based language instruction and EFL teaching at undergraduate level. Both Google Scholar and Proquest were searched. The studies were reviewed to determine their relevance to the research question. Those selected for the meta-analysis are synthesized in the Literature Review of this paper and meet the following criteria.

3.1.1 Inclusion Criteria:

- Studies that include male and /or female university students (adults, young adults) studying EFL.
- Studies that include male and/or female EFL teachers.
- Studies based on collecting participants' attitudes.
- Studies published between 2012 and 2022 (most of the relevant studies were conducted during this period because of radical developments in technology, with the emergence of various

applications and smartphone devices up to the time of the Covid-19 pandemic. However studies in 2023 and 2024 have been more limited in their exploration of participants' attitudes).

- Studies that describe the use of technology in EFL speaking classes.
- 3.1.2 Studies that employ a questionnaire as a significant tool to collect participants' attitudes.

3.1.3 Exclusion Criteria:

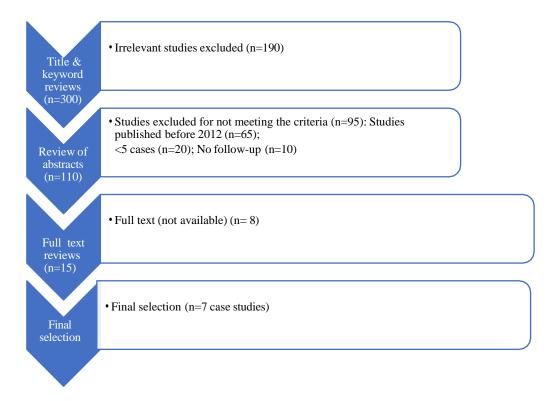
Conversely, studies were excluded from the analysis on the basis of the following criteria:

- Studies published before 2012.
- Action research and experimental research.
- Studies where the use of technology is applied to teach writing, reading or listening skills, whether individually or in the context of teaching grammar or lexical forms.
- Studies that include samples comprising participants who are younger than those in the current study (such as primary or high school students).

Hence, out of the 300 studies gathered in the initial search relating to this research topic, 190 were excluded because they were irrelevant or failed to meet the specified criteria. A further 95 studies were excluded because they were published before 2012, had fewer than five cases, or lacked any follow-up, and eight studies were excluded because the full text was unavailable. Finally, the researcher included the seven remaining studies, following the process illustrated in Figure 1, and listed in Figure 2. This number is suitable to construct a meta-analysis investigation as the minimum number is two (IntHout, et al., 2015).

Figure 1:

Included studies



3.2 Data Preparation:

In preparing the data, the researcher used the proportions for seven studies, regarding attitudes to implementing technology to teach speaking skills in Saudi universities.

3.3 Data Analysis and Results Discussion:

This section reports on the results of a Forrest plot to determine the appropriate effect size (fixed or random). The Cochrane Q test and I^2 (inconsistency) were applied to determine the appropriate effect size, and a T-test was conducted to determine the overall difference between the control and experimental groups. These techniques were applied using **MedCalc** Software.

3.3.1 Analysis for Proportion:

3.3.2.1 Selecting the Appropriate Effect Size

In this part of the data analysis, the researcher used two different methods to determine the appropriate effect size: a Forrest plot and a homogeneity test.

3.3.2.2 Forrest Plot

The researcher created a Forrest plot to determine the appropriate effect size based on the width of the diamond in the graph: the wider the diamond, the more appropriate the effect size.

Figure 2:

Forrest plot

Khan et al. (2021)
Abugohar et al. (2019)
Elamri,H.,& Bano, A. (2021)
Mohammed And Mohammed (2021)
Sheerah, & Yadav (2022)
Alshabeb, & Elmaqrn (2018)
Alzamil (2021)
Total (fixed effects)
Total (random effects)

0.3 0.5 0.7 0.9

Proportion

From Figure 2, it may be noted that the **random effect size** is the appropriate effect size, with the diamond for random effects being wider than the diamond for fixed effects.

3.3.2.3 Homogeneity Tests

The researcher adopted two homogeneity measures, the first being the **Cochrane Q test**, which has two hypotheses: the null hypothesis – 'the fixed effect size is better', and the alternative hypothesis – 'the random effect is better'. Based on the p-value, the researcher choose a fixed effect size (p-value>0.05) or random effect size (p-value<0.05). The second

measure is I^2 (inconsistency), which determines the appropriate effect size from a specific percentage. Values >50% indicate that the random effect size is better, while values <50% indicate that the fixed effect size is better.

Table 2: *Test for heterogeneity*

Test for Heterogeneity					
Q	37.5509				
DF	6				
Significance level	P < 0.0001				
I ² (inconsistency)	84.02%				
95% CI for I ²	68.71 to 91.84				

From Table 2, it may be noted that the random effect size is more appropriate, with the p-value for the Cochrane Q test being <0.05 and I2 (inconsistency) of 84.02%, which is greater than 50%.

3.3.2 Effect Size:

In this part of the data analysis, the researcher depended on the random effect size results to determine the proportion of the impact of technology use to teach speaking skills in Saudi universities.

Table 3:
Random effect size

Ctude	Sample Size	Proportion (%)	95% CI	Weight (%)	
Study				Fixed	Random
Abugohar et al. (2019)	150	88.667	82.475 to 93.258	33.26	16.66
Mohammed & Mohammed (2021)	120	65.000	55.761 to 73.480	26.65	16.38
Sheerah & Yadav (2022)	50	74.000	59.655 to 85.370	11.23	14.66
Alshabeb & Almaqrn (2018)	45	62.222	46.541 to 76.232	10.13	14.38
Alzamil (2021)	32	81.250	63.561 to 92.792	7.27	13.34
Alamri & Bano (2021)	32	56.250	37.663 to 73.636	7.27	13.34
Khan et al. (2021)	18	55.556	30.757 to 78.470	4.19	11.24
Total (fixed effects)	447	74.499	70.227 to 78.447	100	100
Total (random effects)	447	70.253	58.460 to 80.817	100	100

From Table 3, it may be noted that there is a **high proportion** (70.25%) of good impact from implementing technology to teach speaking skills in Saudi universities, with a p- value for the T-test of less than 0.05. Abugohar et al.'s (2019) study is weighted as most effective, with a result of 16.66.

From an examination of the included studies, it is evident that all the EFL participants, whether teachers or students, had a positive attitude to implementing technology to teach English speaking skills. This was consistent across the different types of technology used and the teaching mode: online, blended, or flipped classroom.

Various positive attitudes were discussed in the results of the studies analyzed.

Concerning the technology itself, the participants found it convenient, due to its availability, accessibility, ease of transfer of information, and ease of communication with peers and tutors. This was apparent across all teaching modes (Alamri &

Bano, 2021; Alshabeb & Almaqrn, 2018; Alzamil 2021; Khan et al., 2021; Mohammed & Mohammed, 2021; Sheerah & Yadav 2022). All the studies also shared ease of use of the recommended technology since smart devices are integrated into everyday life. These advantages are all approved in the literature on technology use in EFL classes, for example, Taghizadeh and Hajhosseini (2021) and Mohamed (2022).

In terms of the participants' positive attitudes to new ways of teaching and learning speaking skills using technology, a number of factors were at play. In Khan et al.'s (2021) study, the learners found that using WhatsApp helped them practice their

vocabulary, so they became more confident about participating in speaking activities in class. Images were also sent via the WhatsApp group to illustrate and explain vocabulary. Therefore, it was easier to retain these words. Confidence-building is one of the essential factors reported in a study by Sharma (2019), who found that it helped promote learning among EFL students.

Likewise, Abugohar et al. (2019) reported that teachers express a positive attitude to using technology to develop students' speaking skills, finding that smartphone applications help develop fluency and confidence but only marginally increase accuracy. This was also reported by Hamadeh et al. (2020), with confidence increasing through technology use among EFL learners.

Furthermore, in Alamri and Bano's (2021) study, the participating students mentioned that they could look up translations for difficult words in electronic dictionaries using their mobile phones, thereby developing their language comprehension and production. This was also reported by Alamri and Hakami (2022), who found that the use of electronic dictionaries helps with learning new vocabulary. In addition, Alamri and Bano (2021) included videos and communication via social media platforms, accessed using mobile phones. All these methods positively impacted on language attainment, as presented in studies by Melnikova (2019) and Hamadeh et al. (2020).

Meanwhile, Mohammed and Mohammed (2021) found that a sample of EFL students improved their speaking skills through online learning, deploying tools such as recordings of virtual classes, websites, mobile applications, and social media, alongside strategies like taking notes in class. This corresponds to findings for being supportive of a more student-centred approach. For example, in a previous study by Kassem (2019), a student-centred approach was

adopted to teach EFL students at a university in Saudi Arabia, comparing their data with that of other groups being taught using a teacher- centred approach. The results showed that a student-centred approach enhanced the effectiveness of English-language learning. In particular, the students appeared to have more intrinsic motivation, more positive attitudes towards the language, greater self- efficacy, more autonomy, and more positive beliefs about language learning. In turn, their anxiety was reduced. The student-centred approach adopted in Kassem's study also increased the students' instrumental motivation, but not to a level of significance.

In a study by Sheerah and Yadav (2022), the students agreed in their questionnaire responses that the online sources provided by a flipped classroom offered them an additional opportunity to practice their speaking skills. From the observations of two teachers, it was found that in the flipped classroom, the teachers utilized a question-and- answer technique, which is normally limited in traditional classrooms. The student- centred approach was also emphasized, and the students in the flipped classroom always had an opportunity to listen to audio-material, watch videos, and make notes to use in their class activities. In the data gathered through six semi-structured interviews, the students stated that the flipped classroom leveraged their learning because they were exposed to the class topic via an LMS, which gave them a chance to prepare for each class. This supports the findings of an earlier study by Oraif (2018), who investigated the impact of a flipped classroom on the intrinsic motivation of EFL students and the development of their writing skills.

In Alshabeb and Almaqrn's (2018) study, the participants indicated that social media like Twitter encouraged them to discover new vocabulary and use it in their communication. Searching for specific language knowledge to serve distinct communication needs is necessary, as it facilitates access to and the retrieval of information, which is also supported by Amin and Rahimi (2022).

However, Alzamil (2021) found that students have opposing views, with one group stating that they preferred receiving face-to-face feedback rather than emails. This was despite their appreciation of emails containing feedback from their teachers, which allowed them time to reflect on the feedback at their own convenience. As such, email feedback would appear to prompt a more student-centred approach (Kassem, 2019).

With all of these advantages, however, it can be concluded that smartphones and social media are banned from the classroom. Technical issues and limited teacher-training in technology use were also mentioned as factors hindering future implementation. Therefore, stakeholders need to take action. Theoretically, even though the selected studies showed a comprehensive analysis of the data, the way in which technology was implemented in them needs to be more systematic and purposeful, supported by a theoretical framework to underpin the use of educational technology.

4. Research Recommendations for Further Research Based on the Given Data:

The following recommendations were determined based on the included studies:

- 1. More case studies are required, looking at the implementation of technology to teach speaking skills.
- 2. Participants' attitudes and the possible impact of using more advanced technologies like AI in EFL speaking classes could be investigated, either online or in a blended

environment.

3. A meta-analysis could be conducted to investigate the impact of using different research designs to explore the implementation of technology to teach EFL skills.

5. Conclusion:

This research forms part of a very limited number of studies that examine the existing literature on technology use in higher education EFL speaking classes. The investigation was conducted to understand the attitudes of EFL university students and staff, with regard to the application of different types of technology in an online or blended environment, using questionnaires. Positive attitudes were found among all the participants. The examination considered the participants' attitudes to using technology in an EFL speaking class and the capacity of technology to help them develop their speaking skills. Based on the analysis given in this study, technology plays an integral and positive role in EFL classes' learning and teaching process.

Conversely, the use of technology can have a number of unwanted side effects. For example, smartphones may impair concentration. Therefore, teachers must develop an optimal implementation approach, choose the appropriate type of technology, and recognize the necessity for speaking classes and other language skills development.

Moreover, this inclusion must be approved at institutional level, in order to be formalized and to facilitate implementation.

Compliance with Ethical Standards: This research has no potential conflicts of interest and it does not involve human participants and/or animals.

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دراسة تحليلية حول تأثير تطبيق التكنولوجيا في تعليم مهارات التحدث في الجامعات السعودية: تحليل تجميعي

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المستخلص:

تُعد هذه الدراسة من بين الدراسات القليلة التي قامت بتجميع وتحليل الأدبيات الموجودة حول استخدام التكنولوجيا في تدريس وتعلم مهارات التحدث باللغة الإنجليزية كلغة أجنبية في الجامعات السعودية. في الدراسة الحالية، شمل التحقيق فترة تمتد لعقد من الزمن تغطي تطور استخدام التكنولوجيا في صفوف التحدث باللغة الإنجليزية كلغة أجنبية. من خلال التحليل التلوي الحالي لسبع دراسات، تبين أن التكنولوجيا فعالة، وأنها تُستخدم بشكل رئيسي في الأساليب المدمجة (blended approaches) في صفوف التحدث للطلاب الجامعيين، حيث تحظى بقبول جيد وتأثير إيجابي قابل للقياس. وبناءً على تحليل الدراسات المختارة، وُجد أن تطبيق التكنولوجيا يجب أن يتم ضمن تصميم تربوي مناسب لتحقيق أقصى استفادة تتجاوز مجرد استخدامها. ومع ذلك، هناك حاجة لمزيد من البحث المستقبلي باستخدام تقنيات متقدمة مثل الذكاء الاصطناعي.

الكلمات المفتاحية: متعلمو اللغة الإنجليزية لغة ثانية في مرحلة البكالوريوس، مهارة التحدث، التكنولوجيا، مادة عن بعد، مادة بنظام التعليم المدمج، المملكة العربية السعودية.