Saudi Undergraduate Students' Perceptions of Using Technology to Develop Research Skills

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ABSTRACT

This study examined Saudi undergraduate EFL students' perceptions of technology's role in enhancing their research abilities. A mixed-methods approach was employed, involving a questionnaire completed by 86 undergraduate students and interviews with 10 students. The questionnaire assessed students' technology use, perspectives on research skills development and views on university support. The interviews provided deeper insights into the students' experiences and challenges. The results highlight the role of technology in enhancing various research skills, including information searching, data analysis, organization, collaboration and language support. These findings underscore the potential of technology to transform research education and empower English as a foreign language (EFL) learners as potential capable researchers. The study also identified limitations and challenges associated with integrating technology into research skills development. Difficulties in accessing reliable and up-to-date information and evaluating sources, language barriers and the risk of overreliance on technology emerged as significant challenges. These limitations highlight the need to address these issues to fully harness the potential of technology in research skill development among undergraduate EFL students.

Key words: EFL, Research Skills, Technology Use, Saudi Undergraduates

INTRODUCTION

In the field of language learning, specifically in the context of English as a foreign language (EFL), learners often encounter challenges when they conduct a project, write a research paper or develop a presentation due to language barriers. However, this struggle seems to have vanished because of technology. Technology is also changing how we study and conduct research, as it shrinks the planet and democratizes data (Murshed & Alasali, 2020).

Developing learners' research skills enhances a wide range of abilities, such as critical thinking, data collection, publishing, digital literacy. 'Digital literacy means having the skills needed to live, learn, and work as an EFL student" (Indah et al., 2022, p. 318). Due to the challenges students encounter when searching for information, these skills can be constrained or made even tougher to master. Nevertheless, technology offers promising solutions for learners by providing extensive resources, information and collaborative learning. According to Kapur (2019), technology has not only been proven to achieve educational goals but has also developed learners' skills and abilities. Furthermore, as Chowhan and Mishra (2020) indicate, it is necessary to develop research abilities and communication skills, which have become the most important workplace skills. Most international students face difficulties in overcoming the language barrier, leading to heightened stress levels (Ali et al., 2020). One of the most important factors affecting how undergraduate EFL students develop their research skills is the language barrier. Their capacity to conduct in-depth research and critically assess scholarly materials may be hampered by their restricted access to academic English resources and literature. The language barrier may also make it difficult for them to understand complicated research concepts and communicate effectively with other students and with academics.

This research plays a crucial role in bridging the gap between technology use and academic skill development in non-native English-speaking contexts, particularly in Saudi Arabia. While educational technology has been widely explored, its specific impact on EFL students' academic skills, such as research abilities, is often overlooked. By focusing on Saudi EFL students, this study highlights how integrating technology can foster essential academic competencies in a context where English is not the first language. Addressing this gap is critical for improving educational outcomes and ensuring that technology use effectively supports skill development in diverse linguistic environments.

LITERATURE REVIEW

Significance of Research Skills for EFL Students

Research skills encompass a set of abilities used to comprehend the process of generating knowledge across various scientific disciplines, assess the validity of scientific claims, evaluate the relevance of new scientific concepts, methods and findings, and generate novel knowledge using these concepts and methods (Fischer et al., 2014). These skills encompass diverse competencies that empower individuals to navigate the intricate labyrinth of information, evaluate sources critically and construct well-structured arguments based on evidence. The primary reason for developing research skills as a new student is to boost confidence, self-esteem and empathy with one's own knowledge (Gordillo, 2019). Research skills involve the capacity to challenge assumptions, think critically and engage in profound analysis. They encourage individuals to challenge established paradigms and explore ideas with rigor, fostering a spirit of inquisitiveness that transcends disciplines and domains.

One of the most vital components of research skills is information literacy. Researchers should possess satisfactory information literacy skills, including the ability to effectively seek, evaluate and communicate information (Ahmad, 2017). Research literacy is marked by an overwhelming abundance of information and misinformation. The ability to seek, access and evaluate information from diverse sources is paramount. Information literacy equips individuals with the skills to differentiate credible data from unreliable sources, enabling them to make informed judgments and decisions. It empowers learners to navigate the vast sea of information, extracting valuable knowledge while avoiding the pitfalls of misinformation, bias and false data. Research skills are not just a set of tools; they are the keys to unlocking the treasure trove of human knowledge and the catalysts for intellectual exploration and informed decision-making. These skills empower individuals to think critically, communicate effectively and solve complex problems.

The journey of EFL learners is a multifaceted expedition transcending linguistic boundaries. The development of foreign language research skills increases intrinsic motivation to experience stimulation among language learners' (Denkçi Akkaş et al., 2022, p. 154). Elmas and Aydın (2017) found that research activities improved EFL content knowledge, research abilities and target language competence. Research skills empower language proficiency by offering a structured approach to navigating academic discourse, evaluating scholarly sources and synthesizing information effectively. EFL learners currently need to navigate a vast digital landscape, critically evaluate online information and utilize technology as a powerful language learning and research tool. Llewellyn (2019) suggested that digital transformations have impacted the nature of learning and created new opportunities for academic libraries to transform their engagement with learning, teaching and research within universities.

Technology Tools for Research Skills Development

The effects of technology on the development of research skills among undergraduate students in education have been the topic of numerous studies. Al Fadda et al. (2020) reported that the use of technology facilitated the cultivation of learners' applied knowledge and cognitive references. Additionally, some researchers have demonstrated that integrating technology into instruction has a positive impact on students' research abilities. This integration can improve their ability to find information and critically analyze, evaluate and synthesize knowledge. Studies have demonstrated that using technology in the classroom helps learners' study independently, enhances their information literacy and stimulates higher-order thinking. Boussebha (2023) reported that learners can develop motivation, autonomy, communication skills, adaptability, critical thinking and problem-solving skills through the use of technology. Additionally, the e-learning style fosters students' personal growth and research skills, in addition to their language proficiency.

Technology tools in education have emerged as powerful catalysts of change, fundamentally reshaping the way we teach, learn and engage with knowledge. These tools encompass a broad spectrum of digital resources, software applications and hardware devices that have revolutionized educational practices across the globe. According to a study by Ihrmark (2023), applying technological tools for learners helps develop their research abilities. As a result, using digital tools contributes significantly to the development of the learner's mentality, independence and self-learning. Al-Khatib (2009), found that using technology tools helped raise students' enthusiasm and interaction.

One of the most prominent contributions of technology tools in education is the democratization of learning. Online learning platforms, open educational resources and (MOOCs) have made education accessible globally. Salas et al. (2022) reported that MOOCs represent a technological alternative that can potentially transform school activities in the 21st century. Learners from diverse backgrounds and geographical locations can now access high-quality educational content and engage in learning experiences once confined to traditional classrooms. Additionally, technology tools have ushered in a new era of personalized learning. Adaptive learning platforms and data analytics allow educators to tailor educational content to individual student needs. These tools can analyze student performance, identify strengths and weaknesses and provide targeted interventions, ensuring that each learner can progress at their own pace. According to Chen et al. (2020), the use of machine learning and adaptability in educational systems has led to modifications and customization of curricula and content to cater to students' specific needs. This personalized approach has increased uptake and retention, ultimately enhancing learners' experiences and overall learning quality.

Moreover, technology tools have transformed the classroom experience. Interactive whiteboards, tablets and educational software engage students in dynamic and immersive learning activities. Virtual reality (VR) and artificial reality (AR) technologies transport learners to historical landmarks, distant planets and the microscopic world of cells, offering experiential learning opportunities that were once inconceivable. The findings of the study conducted by Alalwan et al.

(2020) suggest that incorporating VR and AR into educational practice facilitates various reflective and exploratory tasks. These tools enhance learning by making it more engaging, memorable and relevant, catering to diverse learning styles. Furthermore, technology tools have empowered educators with innovative teaching methods. Learning management systems streamline administrative tasks, enabling teachers to focus more on instructional design and student support. Online collaboration tools can facilitate global connections and project-based learning, allowing students to collaborate across borders and time zones. Hwang et al. (2020) mentioned that AI technologies are being used in educational settings to support teaching, learning and decision-making, and the proposed framework can help researchers with backgrounds in both computer science and education perform AI investigations.

Technology tools have impacted the educational landscape by democratizing learning, personalizing instruction and enhancing the classroom experience. These tools have the potential to unlock new realms of knowledge and empower learners to thrive in the digital age. However, their successful integration requires a balanced approach that addresses challenges while harnessing the transformative power of technology for the benefit of students and educators alike.

Challenges and Opportunities in the Development of Research Skills in the EFL Context

In the EFL context, the impact of technology on the development of research skills presents a set of challenges and opportunities. EFL learners often grapple with language barriers that can complicate their research journey. However, technology can serve as a powerful tool to mitigate these challenges while offering novel opportunities for skills development. EFL learners encounter inherent language challenges when interacting with research materials, particularly because most scholarly content is in English. Zheng and Guo (2019) emphasized the importance of considering the unique situations of various languages. The language barrier can impede EFL learners' comprehension of complex research articles, leading to frustration and potential disinterest in research. In addition, limited access to English language libraries, academic databases and research materials further limits learners' ability to conduct in-depth research.

Understanding the cultural context of academic writing can be challenging for EFL learners. Singh (2019) suggested that educators should develop some policies and programs to overcome the problems of international EFL students' academic writing and reading skills to ensure their academic success. The nuances of citation styles and academic conventions and the structuring of research papers may differ from students' native languages, adding an additional layer of complexity.

Technology enables EFL learners to engage in collaborative research projects with peers from diverse language backgrounds. Collaborative online platforms and communication tools facilitate cross-cultural exchanges, offering a unique opportunity to gain exposure to various academic writing styles and perspectives. Shadiev et al. (2021) suggested that future study participants should employ a variety of technological tools to enhance communication and content creation during cross-cultural learning. EFL learners can also benefit from enrolling in online courses and webinars that focus on research skills. These courses often provide guidance on academic writing, research methodologies and effective use of digital resources, equipping learners with the necessary skills to navigate the academic landscape successfully.

Although the EFL context presents challenges related to language barriers, limited access to resources and navigating cultural differences in academic writing, technology offers a multitude of opportunities to overcome these challenges and enhance research skills development. Online resources, language support tools, collaborative learning environments and digital literacy initiatives empower EFL learners to engage in research effectively and might enable them to actively participate in the global academic discourse and benefit from the digital age's educational advancements.

Therefore, this study holds importance in the field of Computer Assisted Language Learning as it addresses the urgent need to incorporate technology into research skills development among EFL students. It is hoped that this study's findings will provide valuable insights for educators, curriculum designers and policymakers, guiding the development of effective pedagogical strategies and tools to improve EFL instruction and curricula. Furthermore, the study's implications extend beyond education, as proficient research skills are vital for decision-making, problem-solving and critical thinking in various professions. By bridging the gap between technology and research skills development, this research has the potential to empower EFL students with essential competencies for success in a digitized and research-oriented world.

Research Questions

The current study examined the following research questions:
1. How do undergraduate EFL students perceive the impact of technology on the development of their research skills?
2. What challenges and limitations are associated with integrating technology into research skills development among undergraduate EFL students?

METHODOLOGY

Participants

The participants comprised 86 female undergraduate students who completed the questionnaire, and 10 of them were interviewed. All the participants shared the common characteristic of being Arabic speakers and were aged from 18 to 22 years. Participant selection was carried out through random sampling from different disciplines. The questionnaire sample used in this study included 86 students from diverse academic departments, such as engineering, law, the English language department, and medicine, ensuring a broad representation of different fields of study. The participants were

also from various stages of their university education, spanning the second, third, and final years, and came from different backgrounds. This diversity in the sample enhances the generalizability of the findings across a range of student experiences. As for the interviews, the 10 interviewees were selected to complement the questionnaire data and were interviewed only once. The sampling method for the interviews was designed to capture a range of perspectives from students within these diverse groups, further strengthening the study's exploratory nature.

Instruments

The research design adopted a mixed-methods approach, encompassing both quantitative and qualitative data collection methods. A structured questionnaire was distributed to undergraduate EFL students to gauge their perceptions of technology's role in developing research skills. The questionnaire aimed to provide valuable quantitative insights into technology usage frequency and perceived effectiveness. To complement these data, semi-structured interviews were conducted, enabling a deeper exploration of the qualitative aspects. These interviews allowed participants to share their experiences, challenges and thoughts on technology and research skills development. By combining these two approaches, our study aimed to offer a comprehensive and nuanced understanding of how technology could influence research skills development among undergraduate EFL learners.

Pilot Study

We conducted a pilot study to refine the research instruments and procedures, involving five participants who completed the questionnaire and participated in interviews. The insights gained from this pilot study led to adjustments that improved the overall robustness of the research methodology.

The Pearson correlation coefficient was calculated to check the questionnaire's validity. The results were as follows:

As Table 1 shows, all the Pearson correlation coefficients were positive and statistically significant at .01 level of significance. The internal consistency was calculated using Cronbach's alpha. The questionnaire's Cronbach's alpha coefficient was 0.839, and for each section it was 0.809, 0.775 and 0.884, respectively. This indicated that the questionnaire was reliable.

Data Analysis

The questionnaire data were analyzed using the Statistical Package for the Social Sciences (SPSS V27). A 5-point Likert scale was used in the questionnaire responses, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Descriptive statistics, including percentages, means and standard deviations, were used to identify the frequency distribution of the categorical variable.

The interviews, which were recorded with consent and transcribed afterwards, typically lasted 15–20 minutes

each. The transcripts underwent thematic coding, involving multiple readings, coding relevant segments based on our research questions and grouping these codes into broader themes. While our research questions provided a framework, the analysis was not entirely deductive. Instead, it was an emergent process with specific codes and categories evolving from the data itself. One researcher analyzed the interviews, while another ensured the reliability of the analysis by cross-checking it. This involved confirming that the interview extracts were correctly categorized. Additionally, one researcher translated the chosen interview extracts into English, which were then reviewed for accuracy by another researcher.

FINDINGS

Questionnaire Results

The influence of technology on the development of research skills among undergraduate EFL students?

Section one: Technology and research skills development

Table 2 shows strong agreement regarding the impact of technology on research skills development, as perceived by the participants. The overall mean (4.22 ± 0.62) indicated 'strongly agree'. This impact was expressed through five different statements, two of which indicated strong agreement, while the other three indicated only agreement, with the averages ranging between 4.09 and 4.40 out of 5.

The study yielded several key findings. First, most students strongly agreed that technology significantly enhanced their research skills, particularly in terms of information searching and data analysis. This highlights the value students place on technology in improving their ability to gather relevant information and effectively analyze data. Second, the students strongly agreed that technology had facilitated the organization and management of their research findings and citations. Additionally, students generally agreed that technology tools, such as online databases and search engines, had improved their access to research materials and expanded their resources for academic research. Moreover, the students acknowledged the significant role of online collaboration tools, such as Google Docs, in facilitating group research projects, promoting collaboration and teamwork. Lastly, the students expressed confidence in utilizing digital tools and software for academic research. These findings emphasize the importance of integrating technology into the academic curriculum to equip students with the necessary skills and confidence to navigate digital tools effectively.

Section two: Technology usage and preferences

Table 3 shows the participants' strong agreement about the impact of technology usage and preferences. The overall mean score of 4.23 ± 0.60 indicates a strong consensus, corresponding to a 'strongly agree' level of agreement. The findings revealed that most students strongly agreed that collaborating with peers on research projects using online

Table 1. Results of the pearson correlation coefficient between each item and its section total degree

Section One		Section Two		Section Three	
Items no.	Pearson correlation	No. Items	Pearson correlation	No. Items	Pearson correlation
1	0.730**	1	0.809**	1	0.822**
2	0.813**	2	0.779**	2	0.835**
3	0.741**	3	0.641**	3	0.830**
4	0.733**	4	0.667**	4	0.813**
5	0.778**	5	0.748**	5	0.841**

** (p<0.01)

Table 2. Students' opinions on technology and research skills development

Items	M	SD	Degree	Rank
1. Technology tools, such as online databases and search engines, have improved my ability to access research materials.	4.14	0.85	agree	3
2. Using technology has enhanced my research skills, such as information searching and data analysis.	4.40	0.70	strongly agree	1
3. I feel confident in utilizing digital tools and software for academic research.	4.09	0.87	agree	5
4. Online collaboration tools (e.g. Google Docs) have facilitated group research projects.	4.13	0.90	agree	4
5. Technology has made it easier for me to organize and manage my research findings and citations.	4.34	0.76	strongly agree	2
Technology and research skills development	4.22	0.62	strongly agree	

Table 3. Students' opinions on technology usage and preferences

Items	M	SD	Degree	Rank
1. I frequently use technology for conducting literature reviews and gathering research materials.	4.24	0.75	strongly agree	3
2. Online tutorials and digital resources have been helpful in improving my research skills.	4.26	0.82	strongly agree	2
3. I prefer using digital note taking and organization tools for managing my research materials.	4.13	0.86	agree	5
4. Online databases and academic search engines are my primary sources for academic research.	4.21	0.84	strongly agree	4
5. I find it easy to collaborate with peers on research projects using online platforms.	4.31	0.84	strongly agree	1
Technology usage and preferences overall	4.23	0.60	strongly agree	

platforms was easy and preferred. The students also strongly agreed that online tutorials and digital resources had been beneficial in improving their research skills, demonstrating their recognition of the value these resources provide in enhancing their research capabilities. Furthermore, the students emphasized their frequent use of technology for literature reviews and gathering research materials, highlighting the essential role of technology in supporting these aspects of the research process. Additionally, the students expressed a strong preference for online databases and academic search engines as their primary sources for academic research, underlining the trust and reliance placed on these digital resources. Lastly, the students agreed that digital note taking and organization tools were preferred for managing their research materials, acknowledging the advantages these tools offer in terms of organization, searchability and

productivity. These findings collectively highlight the significance of online platforms, digital resources and tools in supporting effective collaboration, enhancing research skills and streamlining the research process for students.

Students' opinions on technology support and resources

Table 4 shows that the participants perceived that they were satisfied regarding technology support and resources. The overall mean score of 3.86 ± 0.75 indicates 'satisfied', as expressed through five different statements. All the responses to the statements indicated satisfaction, with averages of 3.77 and 4 out of 5. The students expressed satisfaction with the university's online learning platforms, which they found effectively enhanced their research skills development. This suggests that these platforms provide valuable resources

Table 4. Students' Opinions on Technology Support and Resources

Items	Mean	SD	Degree	Rank
1. The university provides adequate access to technology resources for research purposes.	3.84	0.89	Satisfied	3
2. The university offers sufficient training and support for using technology in research.	3.79	0.84	Satisfied	4
3. Online academic libraries and databases at the university meet my research needs effectively.	3.92	0.93	Satisfied	2
4. The university's technical support team is responsive to my technology-related issues.	3.77	1.00	Satisfied	5
5. The university's online learning platforms enhance my research skills development.	4.00	0.86	Satisfied	1
Technology support and resources overall	3.86	0.75	Satisfied	

and interactive activities that support students' acquisition and improvement of research skills. The students were satisfied with the university's online academic libraries and databases, perceiving them as comprehensive and relevant resources that met their research needs. This highlights the students' appreciation for the access to scholarly materials and literature review resources provided by the university. Furthermore, the students expressed their satisfaction with the university's provision of adequate access to technology resources for research purposes, indicating that the university is equipped with the necessary tools and software to support their research activities. The students were also satisfied with the university's offering of sufficient training and support for using technology in research, suggesting that the university provides resources and guidance to help students develop their technological skills. Finally, the students expressed satisfaction with the university's responsive technical support team, indicating that they felt supported in resolving any technology-related issues they encountered during their research activities.

Challenges and limitations associated with integrating technology in research skill development among undergraduate EFL students

Figure 1 illustrates several findings. A substantial proportion of students encountered difficulties in evaluating the credibility and reliability of online sources, highlighting the need for additional guidance and support in developing critical evaluation skills. Second, a significant percentage of the students reported neglecting traditional research methods due to their reliance on technology, highlighting the importance of striking a balance between traditional approaches and technology. A significant percentage of students faced technical problems that interrupted their research. A notable percentage of students identified language barriers as a challenge when using English language research tools, suggesting the need for language support for EFL students. The students also reported receiving limited guidance and support from instructors regarding technology use, indicating the importance of improved instruction and assistance.

INTERVIEW RESULTS

The most significant common elements from the study participants' responses were extracted from the content of the interviews, and the results are as follows (Table 1):

The detailed results of these interviews and their questions can be reviewed as follows:
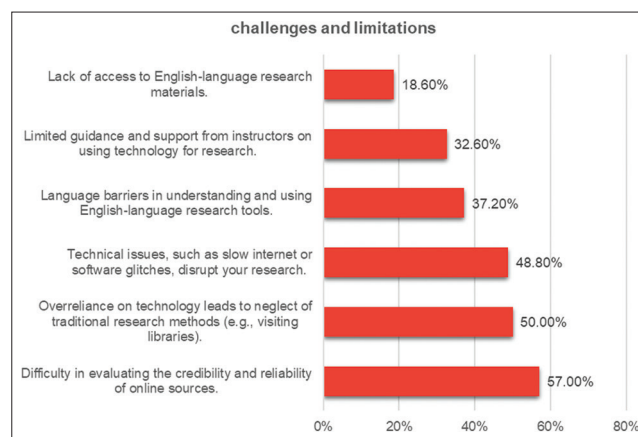

Figure 1. Relative distribution of participants' responses about the most important challenges and limitations

Use of Technology to develop research skills among undergraduate EFL students

From Table 1 and based on the 10 interviews, all participants (100%) used technology for information gathering, with 80% reporting improved access to resources, 70% citing enhanced efficiency, and 60% using it for other research tasks. The following detailed results emerged regarding how university students use EFL for research in their studies:

Use of Technology for Information Gathering

All the students agreed that they used technology to gather information from various sources, such as search engines and databases. This was the most common use of technology in academic research: "Yes, I use technology to gather information from various sources, such as search engines and databases, like Google Scholar" (Interview 1).

Improved Access to Resources

Technology helped the students access a wider range of research sources, such as books and electronic journals, and made sources more easily accessible: "Yes, I use technology to access books and other research references. I search for the information I need on search engines, and then I read the books and journals that I find links to" (Interview 10).

Improved Efficiency, Speed and Accuracy

Technology helped the students conduct research operations more efficiently, quickly and accurately: "If technology is

Table 1. Extraction of the most important findings from the interviews

Items	f	%
Use of Technology Aspect		
Information Gathering	10	100
Improved Access to Resources	8	80
Improved Efficiency, Speed, and Accuracy	7	70
Use of Technology in Other Research Areas	6	60
Advantages of Technology		
Improved Access to Information	9	90
Enhanced Research Efficiency	8	80
Improved Research Quality	7	70
Perceptions of University Support		
Providing Training and Support	8	80
Offering Educational Courses on Research Sources	7	70
Providing Resources (Digital Libraries and Tools)	9	90
Encouraging Collaboration (Competitions, Joint Projects)	6	60
Recognizing Achievements	5	50
Research Skill Level		
Excellent	3	30
Very Good	3	30
Good	4	40
Challenges		
Difficulty Accessing and Evaluating Information	6	60
Credibility Issues and Paid Resources	5	50
Language Barriers and Technical Issues	7	70
Suggestions for Improvement		
Translation of Scientific Journals	4	40
Use of Language Development Applications	6	60
Use of Translation Tools and Dictionaries	5	50
Addition of Training Courses	3	30
Concerns About Reliance on Technology	2	20

used correctly and accurately, research can be prepared in the best and fastest way possible" (Interview 5).

Use of Technology in Other Research Areas

In addition to information gathering, students used technology in other research areas, such as writing and proofreading articles, searching for references, finding rare samples and images for identification and illustration and accessing previous experiments and research: "I used technology in the research process, writing and proofreading articles, searching for references, finding rare samples and images for identification and illustration and accessing previous experiments and research" (Interview 7).

Advantages of using technology in developing research skills

From Table 1 and based on the 10 interviews, the findings revealed that technology had a significant positive impact on the development of research skills among EFL students. The main benefits include improved access to information

(90%), enhanced research efficiency (80%), and better research quality (70%). The following detailed results emerged regarding the main benefits as follows:

Improved Access to Information

Technology enabled the students to access a wide range of information from diverse sources, including books, articles, studies and previous research.

Enhanced Research Efficiency

Technology helped the students conduct research faster and more efficiently by providing new tools and techniques: "Technology helped me save a lot of time and effort" (Interview 1).

Improved Research Quality

Technology assisted the students in writing more accurate and objective research papers by providing new tools and

techniques: "Technology helped me save time and effort, and it also helped me improve my grammar writing skills" (Interview 2) and "Technology helped me quickly access information from diverse sources, and it also helped me select reliable sources" (Interview 3).

The analysis indicated that technology has become an essential tool for developing research skills among EFL students. Technology provided the students with the ability to access a wide range of information from diverse sources, enabling them to conduct more comprehensive and accurate research. It helped the students research faster and more efficiently, saving them time and effort. Moreover, technology aided the students in writing more accurate and objective research papers by providing new tools and techniques.

Perceptions of universities' support for undergraduate EFL students in using technology for research

From Table 1 and based on the 10 interviews, the findings revealed several ways in which universities could support EFL students in using technology for research. Participants felt that universities could support them by providing training (80%), offering educational courses (70%), providing resources like digital libraries (90%), promoting collaboration (60%), and recognizing achievements (50%). The following detailed results emerged regarding universities' support as follows.

Providing Training and Support

Universities could offer training courses and support for students on how to use technology for research purposes. This could include training in using search engines, databases and other helpful tools: "By providing training courses and tutorials on how to use technology for research purposes" (Interview 1).

The students suggested offering educational courses on research sources. This could help them understand how to use technology to find information from reliable sources: "By providing educational courses on research sources, which will make it easier for students to use technology in research" (Interview 2).

Providing Resources

Universities could provide resources for students, such as digital libraries and assistive tools, to help students find the information and references they need.

Encouraging Collaboration

Universities could encourage collaboration among students through activities such as research competitions and joint projects. This could help students learn how to effectively use technology for research.

Recognizing Achievements

Universities could recognize student achievements in research. This could help students develop their research skills and motivate them to continue learning.

Ability to use technology effectively for research

From Table 1 and based on the 10 interviews, EFL students had different opinions about assessing their research skills and their ability to use technology effectively for research. 30% rated their skills as excellent, 30% as very good, and 40% as good. The following detailed results emerged regarding the ability to use technology effectively for research as follows:

> Good. I am proficient in using various types of technology for scientific research or assignments. (Interview 3)
> Excellent. I always get full marks in my research. (Interview 4)
> Very good, excellent. I think it comes down to practice and the ability to manage the vast and growing amount of information available on academic research websites. (Interview 5).

The students believed that their research skills were very good. This assessment was based on their personal experience in conducting research, as well as their ability to manage the vast and growing amount of information available.

The analysis indicated that EFL students rely on a variety of factors to assess their research skills. These factors include grades obtained in research, the ability to find information and references, the ability to analyze and evaluate information and the ability to write a good research paper.

Challenges when integrating technology into the research process

From Table 1 and based on the 10 interviews, the findings revealed that EFL students faced a variety of challenges and limitations when integrating technology into the research process, including difficulty accessing information (60%), credibility issues and paid resources (50%), and language or technical barriers (70%). The following detailed results emerged regarding the challenges when integrating technology into the research process as follows:

> Yes, it is possible for the research content to be like someone else's, as the same source was used, and there might be a lot of rumors in the sources. (Interview 3)
> Yes, I had to verify the credibility of the information, and there was some information that was available on the internet but was difficult to understand due to social distancing. Also, there were some research papers that required payment to access. (Interview 4)

The following results about specific instances where language barriers or technical issues affected the undergraduate EFL students' research were obtained:

> Yes, my English language skills are weak, so it becomes difficult for me to conduct research when it is in English. (Interview 1)
> In general, the language barrier is a problem, especially when I can't translate Arabic sources into English. Sometimes, words are translated literally, leading to inaccurate information. (Interview 2)
> Language barriers and technical issues can be obstacles at times. For example, insufficient English

language proficiency can be a barrier since scientific studies and research are published in English. (Interview 3)

I faced language difficulties in expressing ideas and scientific terms. Additionally, writing in English takes more time to ensure linguistic accuracy. For example, I wrote a research paper about the university prayer room and mistakenly referred to it as a mosque because mosques have specific requirements that do not apply to prayer rooms. (Interview 4)

Language barriers and technical issues can be significant challenges for EFL students when conducting research. These challenges can lead to research delays or the production of inaccurate or unhelpful research.

Suggestions to improve the use of technology in research skills development among undergraduate EFL students

From Table 1 and based on the 10 interviews, the findings revealed that EFL students had different opinions about the role of technology in developing their research skills. Recommendations included translating scientific journals (40%), using language development apps (60%), translation tools (50%), adding training courses (30%), and concerns about over-reliance on technology (20%). The following detailed results emerged regarding the suggestions to improve the use of technology in research skills development among undergraduate EFL students as follows

I hope there is a faculty or an accredited entity that translates scientific journals and research for us. (Interview 2)

There is no doubt that technology has provided numerous language development applications for every skill, smoothly and easily accessible to anyone. For example, I use websites like Cambly, Notability and English learning websites. (Interview 3)

Translation tools and dictionaries can be used as means to enhance reading and listening skills. They also help in remote communication, working on collaborative research projects and utilizing data in a foreign language. (Interview 4)

It is possible to add a training course. (Interview 5)

Generally, the students believed that technology was a powerful tool that could help them enhance their research skills. However, some students pointed out that technology could also have some limitations, such as distracting their attention or a reliance on tools instead of basic research skills and a lack of training.

DISCUSSION

Impact of Technology on Development of Research Skills

The results indicate that technology has a positive influence on the development of research skills among undergraduate EFL students. Specifically, technology was found to enhance students' research skills in areas such as information searching and data analysis. This finding is consistent with

previous research conducted by Al Fadda and Afzaal (2020), who also concluded that technology improves students' ability to find and critically analyze information. Furthermore, using digital tools was found to aid in research management and organization, thereby fostering skills like independence and self-learning. This finding aligns with the findings of Al-Khatib (2009), who highlighted the role of digital tools in facilitating research-related tasks and promoting skills related to autonomy and self-directed learning.

The results also showed that technology enables students to access research materials through online databases and search engines. This finding is supported by a study conducted by Owusu-Ansah et al. (2019), which emphasized how technology democratizes access to information and knowledge through digital libraries and open resources. The availability of online collaboration tools was found to facilitate group research projects, which is consistent with the work of Tarun (2019), who discussed how technology fosters collaborative learning by connecting learners globally.

Additionally, it was observed that technology provides translation tools and dictionaries that assist EFL students in conducting research. This finding is supported by studies conducted by Zheng and Guo (2019) and Singh (2019), which highlight how technology can mitigate language challenges for EFL learners by offering language support tools.

Overall, the results suggest that technology plays a significant role in enhancing research skills among undergraduate EFL students. It improves information searching, data analysis, research management, collaboration and language support, thereby fostering higher-order thinking, autonomous learning and critical analysis skills. These findings emphasize the importance of integrating technology into EFL research education to optimize students' research capabilities.

Challenges and Limitations Associated with Integrating Technology into Research Skills Development among Undergraduate EFL Students

The results indicate that incorporating technology in research skill development among undergraduate EFL students has both challenges and limitations. First, difficulty accessing reliable and up-to-date information emerged as a significant challenge. Some students struggled to find the necessary information for their research, especially in English. This finding aligns with previous research by Zheng and Guo (2019), which highlighted limited access to English language resources as a potential issue. Additionally, some students faced challenges in assessing the accuracy of online information, which can be attributed to language barriers and difficulties in comprehending complex research articles, as noted by Zheng and Guo (2019).

Another challenge identified was difficulty in using technology tools. Certain students lacked proficiency using search engines, databases and other research tools. Previous research by Owusu-Ansah et al. (2019) and Tarun (2019) has emphasized the importance of training EFL learners to utilize digital resources to overcome these challenges effectively.

Language barriers were also identified as a significant limitation. Some students faced difficulties due to their

English proficiency, which impacted their ability to conduct research effectively. This finding is consistent with the work of Zheng and Guo (2019) and Singh (2019), who confirmed that language challenges are inherent for EFL learners in an English-dominated academic context. Moreover, a lack of strong English skills posed problems in understanding translated information or expressing scientific concepts. Cultural and citation style differences were also noted as adding complexity to the research process.

Furthermore, the results revealed that overreliance on technology can lead to neglecting traditional research methods. This suggests that students may become overly dependent on technology and overlook the importance of developing foundational research skills.

Suggestions for Future Research

Future studies should consider examining the longitudinal effects of technology on research skills development. Understanding how sustained use of digital tools influences students' abilities over time will provide deeper insights into the lasting impact of technology on academic growth. This could be achieved through long-term studies that follow students as they progress through their academic careers, measuring their research capabilities at different stages of technology use.

Comparative Studies

Another valuable avenue for future research would be to compare these findings with students in other regions or with different linguistic backgrounds. Such comparisons could highlight unique challenges or advantages experienced by Saudi EFL students and provide a broader understanding of how context influences the integration of technology in research education. These insights could guide more tailored approaches to implementing digital tools in EFL education globally.

CONCLUSION

This study sheds light on the profound impact of technology on research skills development among undergraduate EFL students. The results revealed that technology plays a significant role in enhancing various research skills, including information searching, data analysis, organization, collaboration and language support. These findings underscore the transformative potential of technology to revolutionize research education and empower EFL learners as proficient scholars.

However, the study also uncovered several limitations and challenges associated with integrating technology into research skill development. Significant challenges identified included difficulties in accessing reliable and up-to-date information, evaluating sources, language barriers and the potential risk of overreliance on technology. These limitations highlight the need to address these issues to fully harness the potential of technology for research skills development among undergraduate EFL students.

This study underscores the transformative potential of technology in research education for undergraduate EFL students, particularly in enhancing information searching, data analysis, collaboration, and language support. However, the challenges identified, such as language barriers, difficulty accessing reliable information, and overreliance on technology, highlight areas that need improvement.

To mitigate these challenges, practical interventions should be considered. For instance, universities could implement faculty training programs focused on integrating technology into the curriculum effectively. Enhancing digital literacy among students through targeted workshops would also empower them to navigate and evaluate digital tools and resources more confidently. Moreover, improving access to reliable research databases and academic resources would ensure students can leverage the full potential of technology in their research pursuits. These measures would not only address the current limitations but also promote a more balanced and effective use of technology in fostering research skills development.

The implications of these findings are noteworthy. On the one hand, the study emphasizes the positive influence of technology on research skills, indicating its potential to enhance various aspects of the research process. On the other hand, the identified challenges and limitations underscore the need for a comprehensive approach to effectively address these issues. Strategies such as providing enhanced guidance, tailored language support, comprehensive training in utilizing digital resources and promoting critical evaluation skills can mitigate these challenges.

Recommendations

Based on the findings, the study recommends the following:

- Offer explicit guidance and support in developing critical evaluation skills. This can be achieved through the incorporation of information literacy training and by teaching students how to assess the quality of online information.
- Encourage students to create a comprehensive and well-rounded research experience by utilizing a combination of online resources and materials available in libraries.
- Provide students and researchers with reliable technical support, ensure adequate internet connectivity and offer effective training or assistance in utilizing technology tools.
- Prioritize providing enhanced guidance and support to students by offering targeted language support and resources, such as specialized English language courses focused on research and academic writing. Additionally, institutions should organize specialized workshops and one-on-one consultations and provide instructional materials that effectively utilize technology in the research process, ensuring that students receive comprehensive assistance and guidance.
- Improve access to English language research materials by considering collaborating with other institutions, subscribing to relevant databases or exploring partnerships.

Limitations

The study had limitations, including a small sample size. With only 86 students completing the questionnaire, concerns arise about the generalizability of the quantitative findings to the larger population of undergraduate EFL students. While the study included interviews with 10 students for deeper insights, it is important to acknowledge that these perspectives might not fully represent the diverse experiences and viewpoints of the entire undergraduate EFL population. Additionally, the study's single-university setting restricts the generalizability of the findings to other EFL contexts. Different universities and educational settings may have unique characteristics that influence the integration of technology into research skills development, potentially limiting the transferability of the study's conclusions to broader contexts.

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