

Technical Oral Presentations (TOP) in EFL Engineering Education: A Systematic Literature Review on Workplace Communication Preparedness

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Received: June 29, 2025

Accepted: August 6, 2025

Online Published: October 21, 2025

doi:10.5430/wjel.v16n2p229

URL: <https://doi.org/10.5430/wjel.v16n2p229>

Abstract

Workplace communication is a critical skill for engineering graduates, particularly those in English as a Foreign Language (EFL) contexts, where language proficiency can impact career success. This systematic literature review examines the effectiveness of Technical Oral Presentation (TOP) in enhancing workplace communication skills among EFL engineering undergraduates. The review synthesises recent studies (2015-2024) on TOP, focusing on its role in improving technical articulation, fluency, audience engagement, and professional presentation skills. There were a total of studies ($n = 60$) that were analysed. The analysis indicates that TOP fosters clarity in delivering complex engineering concepts, enhances confidence in spoken English, and develops essential soft skills such as teamwork and adaptability. Additionally, structured feedback and repeated practice contribute to the reduction of language-related psychological factors such as anxiety, lack of self-confidence and fear of making mistakes and speaking in public. However, challenges such as limited exposure to authentic workplace scenarios and language communication barriers persist. The study highlights the need for pedagogical frameworks integrating industry-relevant communication strategies with engineering curricula. This review concludes that while TOP is a valuable tool in preparing EFL engineering students for professional environments, its effectiveness depends on structured implementation, targeted feedback, and alignment with real-world communication demands. Future research should explore innovative approaches, such as digital tools and immersive learning, to further enhance TOP's impact.

Keywords: Technical Oral Presentation (TOP) Skills; English as a Foreign Language (EFL), engineering undergraduates, workplace communication skills; needs analysis; work readiness

1. Introduction

Today, effective communication has become just as important as technical competence due to globalization in the engineering sphere. Almeida et al. (2020) state that prior to any employment liability, there are expectations from the engineering graduates not only to possess good communicative skills but also to explain technical concepts, actively engage with multidisciplinary teams, and present solutions before diverse audiences. The demand is amplified by global issues, namely the rising dependence on multinational collaborations and the 4th Industrial Revolution (4IR), since these compel engineers to operate in an environment now linguistically and culturally diverse (Mohd Kamaruzaman et al., 2020). Nonetheless, local impediments exist, especially in the non-Anglo world. A number of studies conducted in Malaysia and Saudi Arabia illustrate that EFL engineering students often do not receive authentic exposure to workplace communication scenarios, creating gaps between academic training and industry expectations (Azmi et al., 2018; Alsamadani, 2017). A stark remark by Beckner (2024) states, "Communication is not a secondary skill in engineering-it is the bridge between innovation and implementation."

Although engineering programs increasingly stress the importance of communication skills (Zhao & Brunhaver, 2020), statistics tell a rather different and disturbing tale. On a recent 2023 survey of 1,200 engineering firms in Asia, 68% of employers cited "poor English presentation skills" as one of their primary reasons for rejecting otherwise qualified graduates (Wu et al., 2023). Similarly, in EFL contexts, 57% of students report experiencing severe anxiety while delivering technical oral presentations which badly hinder their performance (Soomro et al., 2019). These statistics illustrate systemic flaws in equipping students with communication skills ready for the workplace. The effects of TOP activities addressing these challenges have been investigated in substantial previous literature. Bhattacharyya (2017), for instance, showed that systematic modules in TOP result in clarity of technical expression, while Shahar and

Abdul Raof (2021) related practice opportunities to decreased language anxiety. Nevertheless, there are considerable gaps in this body of work. First, while most studies focus almost exclusively on the development of linguistic skills, they largely ignore psychological constraints such as the fear of public speaking (Kashinathan & Aziz, 2021). Second, few longitudinal studies exist to substantiate the impact of TOP training on long-term enhancement of employability. Third, most of these frameworks are not aligned with real-world communication requirements, as pointed out by Hirudayaraj et al. (2021): "Current ESP modules often simulate classroom rather than real-world scenarios."

This systematic literature review (SLR) will try to fill these gaps through three different approaches. First, it will combine evidence from both global and local studies regarding the effectiveness of TOP in bridging workplace communication gaps for EFL students in engineering. Second, it will engage with these pedagogical approaches and their limitations, examining the interaction of linguistic, psychological, and contextual factors. Finally, it will provide concrete recommendations for integrating industry-relevant TOP frameworks into ESP curricula. In so doing, this review thus advances the discussion around engineering education and provides an encompassing view on the ways of effectively preparing graduates to face the communicative challenges of a globalized workforce. The objectives guiding this review are as follows:

1.1 Objectives

- a. To explore the effectiveness of technical oral presentations (TOP) in equipping English as a Foreign Language (EFL) Engineering undergraduates' workplace communication skills.
- b. To identify challenges faced in implementing technical oral presentations within engineering English for Specific Purposes (ESP) courses.

2. Literature Review

2.1 Workplace Communication as part of Engineering Competencies

Engineers are often believed to be professionals working in a technical industry where problem-solving, mathematical calculations, and design precede communication. Beckner (2024) pointed out that these are serious misconceptions as communication is not a secondary skill and is as essential as technical expertise in the engineering field. She asserted that apart from needing communication abilities to express and explain their ideas to ensure smooth project management, engineers should know how to interact and keep the public well informed. Being transparent in the engineering sector is critical to building trust, as effective communication between the engineers and the technical and non-technical audience can increase engagement and help the targeted population understand and support engineering projects (Ofem et al., 2024). In short, engineers are professionals who do not work in isolation, as they belong to a highly collaborative industry that requires them to have strong workplace communicative skills.

According to Abouabdelkader et al. (2023) and Suardika et al. (2023), communication, from an engineering perspective, is not limited to verbal communication, as they are also expected to have good writing abilities. With the global market calling for more well-rounded engineering graduates to have a strong combination of technical, interpersonal and communicative skills, program providers are responsible for ensuring that their graduates will have the desired abilities upon graduation and before entering the workforce (Kakepoto et al., 2022).

The need for engineers with good technical and workplace communication skills is also part of the Accreditation Board of Engineering and Technology (ABET) (2017) general requirement that necessitates accredited engineering programs to train and produce engineers who, apart from capable of identifying and using suitable technical literature as part of the work, have the ability to effectively communicate in written, oral and graphical forms in technical and non-technical environments (Azmi et al., 2018; Hirudayaraj et al., 2021). Azmi et al. (2018) and Thongprasit and Piriyaawong (2023) also highlighted that Malaysia's Ministry of Higher Education's International Engineering Skills lined communicative and interpersonal abilities as part of the core skills that must be integrated into the engineering programs offered in the country's tertiary academic institutions.

These requirements prioritise communicative abilities as failure to prepare the undergraduates with workplace communicative skills could affect their employability as many engineering graduates have faced rejections despite having excellent academic qualifications (Azmi et al., 2018; Thareja & Thareja, 2019; Irudayasamy et al., 2020; Wan Muda et al., 2020). In other words, the local and international engineering education guidelines expect program providers to equip students with both hard and soft skills, ensuring their readiness for a competitive and internationalised job market (Baukal et al., 2022; Teshome & Oumer, 2024).

2.2 English language Proficiency and Soft Skills' Roles in Engineering

Soft skills and English language proficiency go hand in hand for engineers as their line of work and expertise give them opportunities to work in multinational corporations, lead or be part of international projects, and diverse workplace environments where English may be used extensively as the main mode of formal and informal communication (Migalos et al., 2023). Moreover, employers expect engineers to present project updates, defend proposals, and explain technical processes in clear, professional English.

For these undergraduates to possess the desired skill set upon graduation, it is important to note that improving their English proficiency not only improves their ability to use the language effectively in academic and professional contexts but the improved proficiency also helps in developing their soft skills, for example, the capacity to think critically, resolve problems, empathy and sensitive to different organisational and social cultures (de Campos et al., 2020; Madheswari and Madheswari, 2020; Polakova et al., 2023). According to

Prince et al., (2024), engineering programs should evolve continuously to cope with industrial and global demands where engineers, apart from being technically knowledgeable, should develop the mentioned practical skills to fit the humanistic aspect of the profession. These practical skills, which include personal and interpersonal characteristics, may not be seen as relevant to those in the technical line, but good soft skills are critical in a workplace environment as they help individuals to grow professionally. According to Hussien (2024), although hard skills, which are the individuals' technical and academic qualifications, play a critical role in employment and recruitment, soft skills determine their ability to collaborate, adapt, interact and lead in multidisciplinary teams.

The task of equipping and strengthening the engineering undergraduates' workplace communicative abilities is challenging, especially for those learning English either as a second or foreign language, as they tend to face challenges not only in learning how to use English for workplace purposes but also in improving their language proficiency in general, making the learning process even more complicated (Nghia et al., 2024). Alharbi (2021) mentioned that students with weak language proficiencies struggled to understand the subjects' contents which would affect their ability to apply the knowledge in a professional environment.

To address this issue, many universities have incorporated English for Specific Purposes (ESP) courses into their curricula, specifically designed to meet and support the engineering students' language needs (Muhammad & Abdul Raof, 2019; Bekteshi & Xhaferi, 2020; Thepseenu, 2020; Nateghian, 2024). According to Du (2021), English for Specific Purposes (ESP) courses, which are designed to enhance the learners' academic and professional communication skills, is a learner-centred approach to teaching English. ESP's main objective is to teach and train students to use English in their specific areas of work, as in this case, engineering.

For EFL engineering undergraduates, their struggle with the language is not limited to how they should use the language correctly and appropriately within the technical and non-technical contexts (Vandemeulebroecke et al., 2019). Therefore, to familiarise these students with workplace communicative skills such as managing active verbal discussions and conversations, and presenting and reporting findings clearly and accurately, the ESP programs should incorporate more technical oral presentation (TOP) activities to build the students' confidence in using the language. Technical oral presentation skills are essential for effectively conveying complex information in a clear, engaging, and professional manner (Bhattacharyya, 2014; Stapa et al., 2014; Barisova et al., 2019; Smirnov & Ibatova, 2020; Anwar, 2022). These researchers agreed that the inculcation of TOP skills will not only help the undergraduates cope academically but will also increase their employability opportunities after graduation.

2.3 Technical Oral Presentation (TOP) Skills in Engineering Curricula

DiSanza and Legge (2003) described technical presentations as formal scientific, engineering technological-related presentations targeted to inform expert and non-expert audiences. Eldeeb and Nazir (2020) stated that TOP-related skills a critical 21st century skills as they bridge English language learning and practical presentation and language application. In a technical oral presentation (TOP), Mohamed and Asmawi (2018) explained that both technical skills (mastery of content and tools) and communicative skills (effective delivery and audience engagement) are critical workplace communication skills for engineers. According to Prince et al., (2024), engineering programs should evolve to cope with industrial and global demands where engineers, apart from being technically knowledgeable, should develop practical skills. Jamaluddin (2008), as cited in Miskam et al. (2019), stated that those in the engineering industry, particularly those from Asia, are less competent in oral communication compared to their American-based peers, resulting in a notable skill gap between academia and the industry.

In contrast to the other language skills such as listening, speaking, reading and writing, which are extensively researched, TOP-related skills, for example, the individuals' ability to execute a technical presentation accurately and professionally using their knowledge and incorporating suitable visuals and analysis effectively in their delivery, requires more investigation to determine its effectiveness in developing individual workplace communication skills in an engineering context. TOP allows engineering undergraduates to not only be prepared with professional and technical communication but also build their confidence in using the English language to articulate their ideas and prepare them for their future careers (Lazar et al., 2023). The language enhancement activities will improve the students' ability to use English fluently and can gradually reduce their fear and anxiety levels when tasked to use the language in the classroom (Shahar & Abdul Raof, 2021). In the long term, Al-khresheh (2024) explained that for non-native English language speakers, skills obtained from being part of TOP practices would help in reducing the students' hesitation, enhance pronunciation and increase their confidence when using English to explain technical components in a professional environment.

Skills gained from TOP also created a bridge to narrow the gap between technical knowledge and the students' communicative abilities (Shahar & Abdul Raof, 2021). The learned skills enable the students, especially those with weaker English proficiency levels who face challenges in interpreting difficult theories and data, to produce comprehensible information without compromising technical accuracy. Furthermore, TOP-related activities allow the students to plan, structure and present the data logically using appropriate language and tone to connect with their target audiences (Bhattacharyya, 2017; Wu et al., 2022). Regarding employability, Soomro et al. (2019) posited that the graduates' chances of being employed after graduation could be higher if they are communicatively competent. Strong TOP skills increase students' ability to interact effectively in global and multicultural work environments.

Due to the need to secure employment after graduation, Tsang (2020) stated that undergraduates, regardless of their majors, should be taught to effectively present as they need the acquired skills not only for assessment purposes as they are to apply the knowledge when attending job interviews and presenting work-related assignments. Nordin et al. (2021) corroborated the importance of presentations in learning as they help students retain information longer, encourage them to become actively involved in the learning process, provide

them with practical language tasks that are applicable outside the language classroom and increase motivation and engagement. The researchers stated that for the tasks to be successful in instilling the skills and knowledge, the presentations could be tailored to meet students' academic and personal development needs.

In terms of communication skills, TOP activities can teach future engineers how to transfer knowledge and information by creating and organising content comprehensible to both technical and non-technical audiences using appropriate verbal and non-verbal language to engage with their intended audience (Madheswari & Madheswari, 2020; Uncu, 2024). For oral communication, Wu et al. (2023) reported that oral presentation skills, which is one of the seven crucial entry-level-employer workplace communication skills, help in enhancing the graduates' career opportunities. However, despite the skills' role in personal and professional development, the component is not taught extensively enough in the programs, hence, depriving the undergraduates from getting the exposure and practice needed for self-improvement.

Therefore, academic institutions offering engineering programs should not overlook technical oral presentations' (TOP) significance in preparing and equipping engineering undergraduates for the workplace communication challenges that could affect their employability and minimise the opportunities they need for professional and personal growth. Integrating structured presentation training into engineering curricula can equip future engineers with the communication skills necessary for career success in a competitive global landscape. Mohamed et al. (2023) pointed out that enhancing the students' language skills may not seem as important as technical expertise but is critical in ensuring that the engineering graduates can use the language effectively when communicating professionally with their stakeholders, peers, collaborators and the general public.

2.4 Challenges in Implementing Technical Oral Presentation (TOP) Activities in Engineering English for Specific Purposes' Classrooms

The implementation of technical oral presentation (TOP) activities is critical to help develop engineering students' workplace communicative skills to complement their technical capabilities (Bhattacharyya & Sargunan, 2009; Mohamed et al., 2023). Nevertheless, several challenges can affect TOP's effectiveness, namely:

- i. lack of structured TOP modules and assessments in the current engineering curriculum
- ii. ESL/EFL engineering undergraduates' poor English language proficiency affects the quality of interpreted technical concepts' accuracy
- iii. language-related psychological factors (anxiety, fear of mistakes and public speaking, lack of confidence)

According to Bhattacharyya (2017), despite the need for future engineers to be well-equipped with technical knowledge and interpersonal skills to be active members of a community of practice, they should also have the linguistic competency that enables them not only to express and share their knowledge clearly but also to be understood well by others within and outside their community. Hadgraft and Kolmos (2020) opined that while engineering curricula design is aimed at building strong theoretical foundations and technical proficiency, several areas crucial for professional success, such as technical communication and soft skills, often receive less emphasis.

With a heavier emphasis on technical concepts, the present English for Specific Purposes (ESP) offered to engineering students does not include many oral presentation opportunities as part of the module. Although some modules may incorporate oral presentations as part of the coursework, the tasks lack structured practices, resulting in the students struggling with clarity, confidence and poor audience engagement (Gee et al., 2015; Mohamed & Asmawi, 2018; Hadi et al., 2020; Aziz et al., 2022). Inadequate formal training and exposure to delivering quality oral presentations can result in the students' inability to present research findings and explain technical solutions clearly and effectively.

Another factor that affects the successful implementation of TOP skills in the engineering curriculum is the students' poor English language proficiency. According to Irudayasamy et al. (2020), to help improve engineering students' language proficiency, ESP, to a certain extent, has been successful in providing the language support needed. Nevertheless, the researchers highlighted that the ESP modules would only be effective if they were designed and catered to meet the engineering students' specific language needs. These views aligned with Alsamadani (2017), who believed that in the context of EFL engineering students, for example, those in Saudi Arabia, the students' language proficiency could be supported better if the ESP courses offered were designed based on findings obtained using needs analysis. The researcher further reiterated that ESP must not only teach the students how to use the language but also when and how to use the language appropriately in a workplace environment.

Alsamadani's (2017) views on the use of needs analysis to improve ESP modules for EFL engineering students are also in line with Kim (2013) and Thepseenu (2020). Kim (2013), who investigated ESP modules' relevance for South Korean engineering students, mentioned that needs analysis allowed the curriculum and module developers to determine which areas of the students' present proficiency required more attention and how they could link the language skills to how they could be used in a technical presentation. Thepseenu (2020) also reported that the needs analysis conducted to identify the language skills Thai engineering students required more assistance with were two (2) components of communicative skills, i.e. speaking and listening in a workplace environment. Based on these studies, the researchers contended that EFL engineering students' language proficiency would be better addressed and improved when the ESP modules were designed to equip them with the skills they need.

Apart from weakly structured TOP tasks, students' poor language proficiency and the use of standardised ESP modules, the next issues affecting the implementation of TOP in ESP classrooms are psychological-related. Language researchers such as Afzal (2019), Kiliç

(2019), and Kashinathan and Aziz (2021) believe that poor speaking proficiency is related to weak knowledge of vocabulary and the language's mechanics (grammar, syntax); they do agree that most EFL learners could not speak well due to psychological factor such as underexposure to the language used in real-life events, anxiety, limited fluency, pronunciation problems, fear of making mistakes and speaking in public and lack of confidence when using English communicatively (Islam & Stapa, 2021).

Apart from lack of practice, Hadi et al. (2020), Rajitha and Alamelu (2020), Aziz et al. (2022), Bakhtiar and Suwandi (2022), Mohamed et al. (2023) and Al-khresheh (2024), ESL and EFL learners often experience i) language and speaking anxiety, ii) low confidence or poor self-esteem, iii) lack of motivation to learn English, iv) fear of making mistakes and v) speaking in public factors that contribute the difficulty in encouraging students to be actively involved in oral presentations to improve their TOP skills. These psychological factors are attributed to the EFL engineering undergraduates' speaking challenges, which are intensified by the lack of opportunity to practice using the language outside their classroom environment.

Therefore, to overcome these different sets of challenges hindering TOP skills from being effectively implemented in ESP classrooms, language instructors should take the necessary steps to minimise or reduce the negative effects of language learning, such as by lowering the students' affective filter (Getie, 2020; Algamal & Alqohfa, 2023; Bunghanoy & Sumalinog, 2023; Mubarak & Nurindah, 2023). The students should feel safe and empowered in the learning environment to increase their learning motivation and engagement (Pan, 2023; Firman & Sandiarsa, 2024; Hanib et al., 2024; Ma et al., 2024) to ensure that they acquire the key TOP skills and use them in practical situations simulated the ESP classrooms.

3. Method

This systematic literature review was conducted by merging and analysing literature related to technical oral presentation skills and EFL engineering undergraduates. As stated in the objectives, this review paper aimed to explore the effectiveness of TOP skills in enhancing the EFL engineering undergraduates' workplace communication skills and identify the challenges that affected TOP activities' implementation in ESP classrooms. This review's research papers were from various databases such as ERIC, Google Scholar, Elsevier, and other Scopus-indexed journals.

The search for relevant literature was conducted from November 2024 to January 2025. Throughout the analysis period, the connection between TOP skills and EFL engineering undergraduates' workplace communicative skills were scrutinised to determine whether TOP skills are effective in equipping and improving their ability to use English competently in technical and non-technical settings. The review included papers published from 2015 to 2024, which were sourced from key databases, namely Google Scholar, Elsevier, and other Scopus-indexed journals.

This review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure that the analysis was performed methodically. From the provided guidelines, the following inclusion and exclusion criteria were developed. The protocol's inclusion criteria are as follows:

- i. extensive database search
- ii. use of keywords specific to the topic of interest
- iii. research articles published from 2015 to 2024
- iv. papers' titles and abstracts were analysed and scrutinised based on the inclusion and exclusion criteria
- v. identify data or information related and relevant to the research questions
- vi. summarise and report finalised data

3.1 Selection of Studies

Studies selected for the review are based on the following inclusion criteria:

- i. studies on technical oral presentation (TOP) skills and EFL engineering undergraduates
- ii. studies exploring/investigating benefits of technical oral presentations in the context of engineering and EFL engineering undergraduates
- iii. studies exploring/investigating challenges implementing technical oral presentations in the context of engineering and EFL engineering undergraduates
- iv. studies discussing the link between technical oral presentation skills and workplace communication skills in the context of EFL engineering undergraduates

Apart from these criteria, the review only included peer-reviewed papers written and published in the English language. This review did not include other systematic literature review papers master's and doctoral theses. To prevent duplicates, the selected papers' titles and abstracts were read and analysed.

3.2 Data Extraction

For the database search, the papers were sourced from key databases, namely Google Scholar, Elsevier, and other Scopus-indexed journals. Relevant articles were searched based on their titles and abstracts and analysed based on their keywords and phrases, namely

‘technical oral presentation skills’, ‘EFL engineering undergraduates’, ‘English language proficiency’, ‘English for Specific Purposes (ESP)’, ‘workplace communication’, ‘challenges in implementing technical oral presentation’ (table 1).

Table 1. Keywords and Phrases’ with inquiries for database search

Keywords and phrases	Inquiries
Technical oral presentation (TOP) skills	Technical oral presentation (TOP) skills and English language proficiency, Technical oral presentation (TOP) advantages in an engineering context, Technical oral presentation (TOP) skills’ effects on employability and professional growth
EFL engineering undergraduates’ English language proficiency	EFL engineering undergraduates’ English language proficiency
Workplace Communication Skills	Importance of workplace communication skills for engineers, workplace communication skills and technical oral presentation
Challenges in Implementing technical oral presentation (TOP) – related activities	Difficulties in implementing TOP in engineering English for Specific Purposes modules, EFL engineering undergraduates’ English language proficiency effects on oral presentation classroom activities

Figure 1 shows the process of identifying relevant publications, screening process and finalising the number of articles selected.

PRISMA Chart

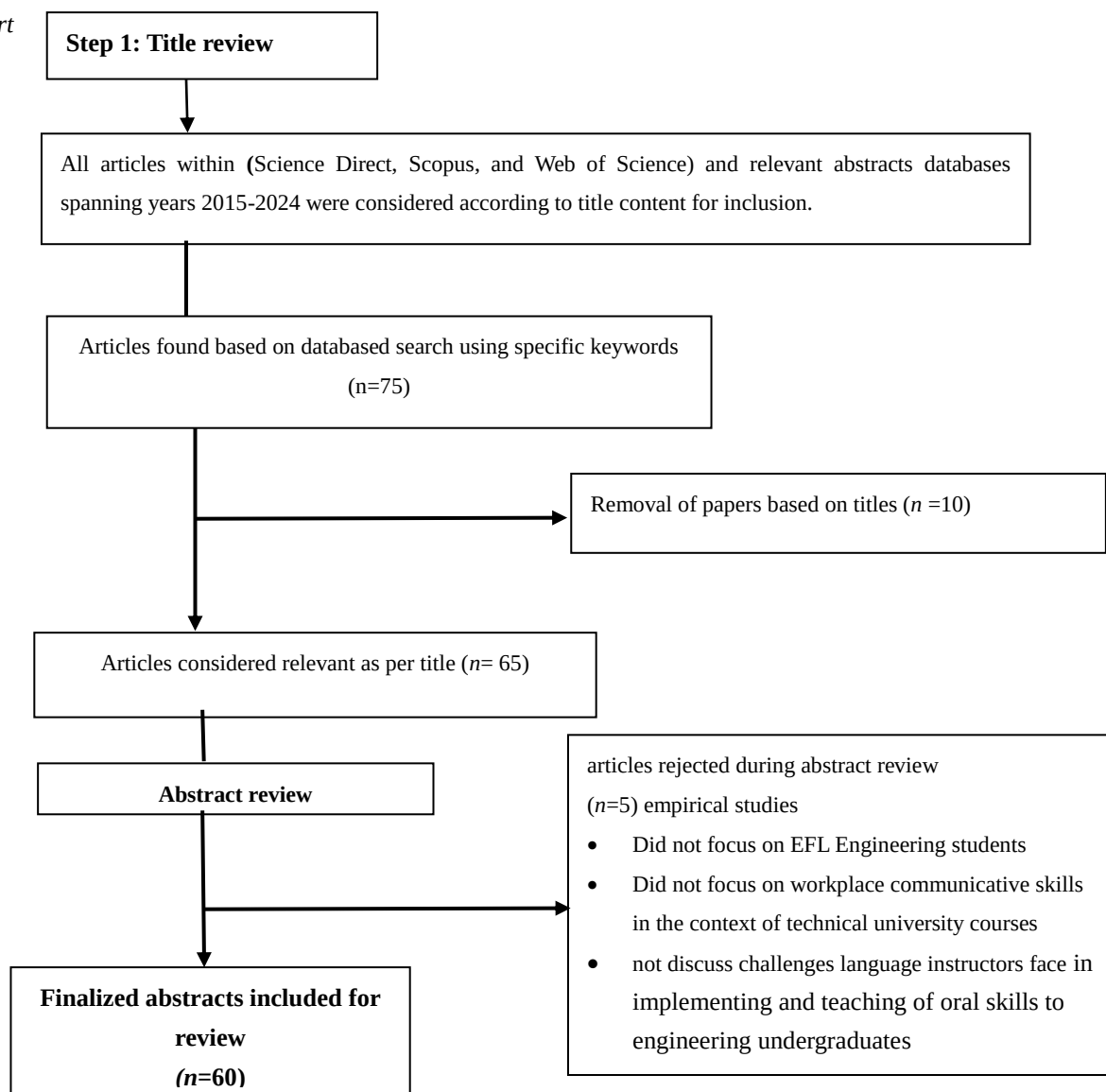


Figure 1. PRISMA Chart

4. Findings

The analysis revealed that technical oral presentation (TOP) skills are effective in enhancing EFL engineering undergraduates' workplace communication skills by improving their English language proficiency. The reviewed studies showed that the undergraduates' poor language proficiency affected their ability to master technical oral presentation skills as their anxiousness, fear of making mistakes and speaking in public caused them to refrain from using the language communicatively with those around them. To summarise, the analysis' outcomes showed that TOP skills could influence EFL engineering undergraduates' i) ability to use the English language effectively when interpreting and reporting data to technical and non-technical audiences; ii) reduce the psychological factors affecting the engineering undergraduates' language learning experience; and iii) bridge the gap between technical knowledge and their communicative abilities. On the other hand, TOP-based activities have to be carefully planned as the contents and language skills should be developed to address the students' language learning needs specifically. Several researchers point out that a needs analysis approach should be conducted to ensure that the modules developed meet the students' language learning needs. The outcomes are summarised and explicated in Table 2.

Table 2. Major works theme-wise

Themes	Explanation	Authors
Technical oral presentation skills enhance engineering undergraduates' workplace communicative skills and employability opportunities.	Enhances the engineering undergraduates' ability to use the English language effectively when interpreting and reporting data to technical and non-technical audiences	Beckner (2024); Ofem et al. (2024); Abouabdelkader et al. (2023); Suardika et al. (2023); Kakepoto et al., (2022); Azmi et al. (2018); Hirudayaraj et al. (2021); Azmi et al., (2018); Thareja & Thareja, (2019); Irudayasamy et al., (2020); Wan Muda et al., (2020); Baukal et al., (2022); Teshome & Oumer, (2024); de Campos et al., (2020); Madheswari and Madheswari, (2020); Polakova et al., (2023); Hussien (2024); Nghia et al., (2024); Vandemeulebroecke et al., (2019); Bhattacharyya, (2014); Stapa et al., (2014); Barisova et al., (2019); Smirnov & Ibatova, (2020); Anwar, (2022); Mohamed and Asmawi (2018); Lazar et al., (2023); Bhattacharyya, (2017); Wu et al., (2022); Soomro et al. (2019); Tsang (2020); Pinphet & Wasanasomsithi (2022)
Reduces the psychological factors affecting the engineering undergraduates' language learning experience	improve their confidence and reduce anxiety about making mistakes when using the language communicatively	Shahar & Abdul Raof, (2021); Al-khresheh (2024); Afzal (2019), Kiliç (2019), and Kashinathan and Aziz (2021); Islam & Stapa, (2021); Hadi et al. (2020), Rajitha and Alamelu (2020), Aziz et al. (2022), Bakhtiar and Suwandi (2022), Mohamed et al. (2023) and Al-khresheh (2024); Getie, (2020); Algamal & Alqohfa, (2023); Bunghanoy & Sumalinog, (2023); Mubarak & Nurindah, (2023); Pan, (2023); Firman & Sandiarsa, (2024); Hanib et al., (2024); Ma et al., (2024)
Bridges the gap between the undergraduates' technical knowledge, their communicative abilities and English language proficiency	Bridging and narrowing the gap between the undergraduates' technical knowledge and their current communicative abilities and language proficiency	Azmi et al., 2018; Hirudayaraj et al., (2021); Migalos et al., (2023); (de Campos et al., (2020); Madheswari and Madheswari, (2020); Polakova et al., (2023); Nghia et al., (2024); Alharbi (2021); Vandemeulebroecke et al., (2019); Eldeeb and Nazir (2020); Tsang (2020); Nordin et al. (2021); Madheswari & Madheswari, 2020; Uncu, (2024); Mohamed et al. (2023); Irudayasamy et al. (2020);
Current English for Specific Purposes (ESP) in engineering programs do not meet the undergraduates' language learning needs.	The current ESP modules often overlook the importance of oral presentations to improve the undergraduates' workplace communicative skills.	Gee et al., (2015); Mohamed & Asmawi, (2018); Hadi et al., (2020); Aziz et al., (2022); Kim (2013); Thepseenu (2020)
Needs Analysis	Conduct needs analysis to develop English for Specific Purposes' content to meet and support EFL engineering undergraduates' language needs to improve their workplace communicative skills.	Azmi et al., (2018); Thongprasit and Piriyasurawong (2023); Prince et al. (2024); Muhammad & Abdul Raof, (2019); Bekteshi & Khaferi, (2020); Thepseenu, (2020); Nateghian, (2024); Du (2021); Mohamed and Asmawi (2018); Alsamadani (2017);

5. Discussion

The results of this systematic review support the increasingly general opinion that Technical Oral Presentations (TOP) are a necessary teaching tool for matching the academic training of engineering undergraduates with workplace communicative demands in English as a

Foreign Language (EFL) contexts. A more critical reading of the literature, however, reveals that the effectiveness of TOP is neither constant nor beyond dispute, but rather mediated by context, language, and psychology, along with the design of the English for Specific Purposes (ESP) curricula.

There is a convergence in the studies in claiming that TOP facilitates students in the workplace communication competencies by allowing undergraduates to verbalize technical knowledge explicitly to both technical and non-technical audiences (Bhattacharyya, 2017; Beckner, 2024; Ofem et al., 2024). Findings indeed support that structured presentation practice helps develop fluency, confidence, and professional register (Stapa et al., 2014; Suardika et al., 2023; Lazar et al., 2023). Such skills are necessary from the employability perspective: according to Wu et al. (2023), substandard oral communication was found as a pivotal reason for disqualifying graduates from entering the labor market and is consistent with many other settings in their espousal of employer expectations (Azmi et al., 2018; Baukal et al., 2022; Teshome & Oumer, 2024). Indeed, although the literature has generally been in one accord about such pay-off's chances, most studies have been cross-sectional and mostly rely on benefits reported by the respondents themselves or measured in short timespans (Nordin et al., 2021; Anwar, 2022). Longitudinal investigations capturing whether TOP-induced improvements are relayed into persistent performance in the workplace are largely absent; this gap has also been pointed out by Hirudayaraj et al. (2021).

Evidence along this line also pertains to psychological impediments that engineering students face while learning EFL. Many researchers highlight anxiety, fear of making mistakes, and lack of confidence as serious constraining factors of oral performance among students (Soomro et al., 2019; Kashinathan & Aziz, 2021; Islam & Stapa, 2021). Structured-feedback pedagogical intervention and repeated exposure seem to reduce anxiety and increase confidence (Shahar & Abdul Raof, 2021; Al-khresheh, 2024). However, these results may tend to overemphasize the effectiveness of in-class simulations. As posited by Gee et al. (2015) and Mohamed & Asmawi (2018), many ESP curricula still prescriptive presentation tasks that do not mimic actual workplace communication. The argument against such reasoning is that such models, which suggest presentation-based skills alone can break down affective barriers entrenched in the student's concept of "work readiness," grossly underestimate the complexity that surrounds psychological preparedness for real work environments (Afzal, 2019; Mubarak & Nurindah, 2023).

In addition, literature highlighting the wide gap between the so-called "real-world" work environment and the realities of any given ESP curriculum gives evidence that real-world application is consistent with quality employment. While all ESP courses seek to be responsive to professional needs of learners, proof from Saudi Arabia, Malaysia, and other contexts from EFL indicates more often than not that modules center on general linguistic proficiency than on those communicative practices needed in industries (Alsamadani, 2017; Kim, 2013; Nateghian, 2024). Many of the studies thus call for systematic need analyses to change the current calibration of the curricula for ESP content (Azmi et al., 2018; Thepseenu, 2020; Thongprasit & Piriyaawong, 2023). Nevertheless, despite this agreement in these works, few empirical studies have been devoted to documenting the implementation of needs-analysis-driven curricula. The gap, therefore, when it comes to the institutional policy rhetoric and pedagogical practice remains wide. An interesting observation surfaces as a comparison of EFL and native-English contexts. Asian engineering graduates are found to suffer severely in oral communication competence compared to Western graduates, even when their technical knowledge is found to be at par (Jamaluddin, 2008, cited in Miskam et al., 2019; Wu et al., 2022). The difference between the two cannot be explained in terms of linguistic lacks only; many forms of public attitudes towards speaking in public, little exposure to real communicative scenarios, and hierarchical academic structures shape performance (Rajitha & Alamelu, 2020; Hanib et al., 2024). Thus, the issue is miscast as purely linguistic. It requires frameworks that are more holistic in considering sociocultural and institutional dimensions.

In the literature also is the continued discrepancy between the two paradigms in defining "soft skills." For instance, de Campos et al. (2020) and Hussien (2024) contend that the professional side of engineering should incorporate critical thinking, teamwork, and communication; all others treat them as add-ons to technical curricula. That is largely how this kind of dichotomy accounts for undervaluing oral presentation training in most engineering programs (Hadgraft & Kolmos, 2020). Initially, such argument, as provocatively stated by Beckner (2024): "The bridge between innovation and implementation" can be neither ancillary nor peripheral: thus, "instead of marginalized or optional capacities, TOP could become compulsory graduate competencies by direct integration into the curriculum." Finally, recent studies have indicated that digital tools and blended learning may also augment the efficacy of TOP applications (Miskam et al., 2019; Pinphet & Wasanasomsithi, 2022). Nevertheless, the evidence is still in its infancy. Improvements in student engagement and oral proficiency were claimed from studies of Flipgrid (Miskam et al., 2019) and project-based blended learning (Pinphet & Wasanasomsithi, 2022). However, these initiatives were largely dependent on the controlled university environment and were not evaluated for their scalability or transferability in industry. Future research should thus include not only pedagogical innovations but also institutional enablers-such as assessment reforms, faculty training, and industry partnerships- conditioning their success (Sangwan et al., 2022; Prince et al., 2024). Thus, the review here does support the assertion that TOP will indeed improve the communicative readiness of EFL undergraduates in engineering; however, it also reveals some inadequacies in current practices. There is considerable evidence to support the claim that invariably most of the studies pertaining to assessment were short and classroom bound, frequently lacking methodological rigour and follow-up. Moreover, persisting structural challenges on curriculum misalignments, inadequate needs assessments, and failure to prioritize communication as a fundamental engineering competency have restricted the transformation potential of TOP. Without addressing these overarching systemic challenges, the promise of TOP as a bridge from the academy into the workplace would remain partially fulfilled.

5.1 What Challenges Influence the Implementation of Technical Oral Presentations (TOP) within Engineering English for Specific Purposes (ESP) Courses?

The application of TOP in ESP classrooms has multiple impediments, so that implementing it effectively becomes quite difficult—structural impediments, linguistic impediments, and even psychological impediments, so to speak. A common theme that runs through the literature is that the successful operation of TOP is conditioned heavily upon the design of the course. Research evidence has shown that, by and large, without considering needs analysis in a coherent way, ESP modules pay very little attention to the communicative realities of the engineering workplace (Alsamadani, 2017; Kim, 2013; Thepseenu, 2020; Nateghian, 2024). Although scholars believe that module designs responding to students' real workplace needs would contribute to outcomes (Azmi et al., 2018; Thongprasit & Piriyaawong, 2023), it has been shown in studies that a number of programs still offer generic and decontextualized oral tasks which have little in common with real engineering communication (Gee et al., 2015; Mohamed & Asmawi, 2018). This inconsistency between what the literature professes and what actually happens in practice is viewed as a huge stumbling block toward proper implementation. The second of these barriers is the variability in English proficiency among EFL undergraduates. Students with poor English capabilities have tremendous difficulty not only in preserving linguistic accuracy but also in reading through very complex technical concepts, thereby damaging the very content and delivery itself (Irudayasamy et al., 2020; Alharbi, 2021). Although it is expected that the ESP framework would help scaffold these learners effectively, from time to time they find themselves deprived of adequate resources, or more frequently depending on inappropriate ready-made models (Bekteshi & Xhaferi, 2020). Therefore, poorly designed TOP tasks would have the opposite effect where they would aggravate intimidation and disinterest among the so-called weaker students instead of actually empowering them. Psychological barriers represent yet another major obstacle. Among others, speaking apprehension, fear of being evaluated adversely, and low self-confidence have been widely acknowledged to obstruct students' oral performances (Afzal, 2019; Kashinathan & Aziz, 2021; Soomro et al., 2019). Scholars argue that TOP, when appropriately sequenced and scaffolded through pedagogical interventions, can lower the affective filter and create a safe environment (Shahar & Abdul Raof, 2021; Al-khreshah, 2024). The discrepancy of intervening application remains, in contrast with many other instances where the students still view presentation tasks as high-stakes assessment rather than opportunities for development (Aziz et al., 2022; Rajitha & Alamelu, 2020). Whether present classroom practices really assist in reducing the psychological barrier for active participation, however, continues to remain as a gnawing dilemma. All these challenges, taken together, imply that mere inclusion of TOP in ESP modules is not enough. Unless the curricula link explicitly to workplace discourse practices, needs-driven designs and affective pedagogies will prevent the TOP's transformational potential from being met. More important than that, these results indicate that the barriers are pedagogical and are also institutional against the background of the overall systemic low esteem of communication within engineering education (Hadgraft & Kolmos, 2020; Beckner, 2024).

Table 3. Challenges in Implementing TOP in ESP Courses

Category	Specific Challenges	Supporting Literature
Curricular	Lack of structured TOP modules; reliance on generic ESP content; minimal authentic workplace simulations.	Gee et al. (2015); Mohamed & Asmawi (2018); Alsamadani (2017); Kim (2013); Thepseenu (2020); Nateghian (2024)
Linguistic	Weak English proficiency hinders technical accuracy, clarity, and confidence in presentations.	Irudayasamy et al. (2020); Alharbi (2021); Bekteshi & Xhaferi (2020)
Psychological	High speaking anxiety, fear of mistakes, low self-esteem; perception of TOP as high-stakes evaluation.	Soomro et al. (2019); Kashinathan & Aziz (2021); Afzal (2019); Rajitha & Alamelu (2020); Aziz et al. (2022)
Institutional	Communication undervalued in engineering curricula; insufficient training/resources for ESP instructors.	Hadgraft & Kolmos (2020); Beckner (2024); Azmi et al. (2018); Baukal et al. (2022)

6. Conclusion

Given these insights from the selected literature related to technical oral presentation (TOP) skills, the findings showed that TOP should be implemented and integrated as part of the English for Specific Purposes (ESP) curriculum for EFL engineering undergraduates. TOP is a critical teaching strategy as it teaches the undergraduates to use language effectively in technical presentations and equips them with skills needed to enhance their workplace communicative skills. The review also highlighted the importance of conducting needs analysis to develop better ESP contents that meet and address their language proficiency, hence making them better communicators. The advantages of TOP, as a whole, along with engineering-related training programs, can lead to improved professional competencies and readiness among engineering graduates to meet the demands of their future careers.

Acknowledgments

We sincerely thank our colleagues at the Center for Modern Languages, the Center for Mathematical Sciences, and the Faculty of Industrial Management at UMPsA for their invaluable insights on the early drafts of this manuscript. Their critical feedback and perspectives significantly contributed to the refinement of our systematic literature review and the overall development of this study. We are grateful for their constructive comments and support. We are grateful for the financial assistance from the University Malaysia Pahang Al-Sultan Abdullah internal research grant funding.

Authors' contributions

Mr. Younus conducted a systematic search of relevant literature across major databases and repositories related to technical oral

presentation studies. Dr. Abdullah Adnan Mohamed and Dr. Fatimah Ali were responsible for cross-checking and verifying the sources, as well as reviewing the drafts of the manuscript. Professor Dr. Abdul Rashid Ab Hamid oversaw the overall methodology and was responsible for the interpretation of the study's findings.

Funding

This study is supported by the Universiti Malaysia Pahang Al- Sultan Abdullah RDU Grant No 223409.

Competing interests

The authors declare no conflicts of interest, financial or personal, related to the work presented in this manuscript.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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