Original Research Article

Communication Needs of Post-Graduate Engineers in Saudi Arabia: An Exploration of English Language Proficiency Requirements

ABSTRACT

English language has become the established language for academic communication, the international language for science and technology and the most reputable journals in engineering publish mainly in English language. This study investigates the English language speaking and writing functions needed by postgraduate engineers in Saudi Arabia upon joining the labor market. To this end, the researcher selected fifty experienced engineers from different engineering companies in Jeddah. The researcher prepared a few questions related to the communications needs in English language that post graduate students usually find important while dealing with other multi-nationality engineers. He also built a questionnaire for the same purpose. The findings of the study revealed that there is agreement that speaking and writing functions in English language are unavoidable and an engineer unable to communicate orally and in writing in English language is considered illiterate. This study found an urgent need for a syllabus as a remedial procedure to train fresh graduate engineers on enhancing their competence in speaking and writing in English language.

Key words: Postgraduate engineers, communication needs, translanguaging, King Abdulaziz University.

1. INTRODUCTION

The rapid growth of the engineering field in Saudi Arabia necessitates a highly skilled workforce equipped with the necessary technical expertise and communication skills. English has become the lingua franca of the globalized world, particularly in the field of engineering. As a result, post-graduate engineers in Saudi Arabia must possess a high level of English language proficiency to effectively communicate with colleagues, clients, and stakeholders from diverse backgrounds. This proficiency is essential for success in various aspects of the engineering profession, including presenting technical information, participating in meetings, collaborating with multidisciplinary teams, negotiating persuading, providing technical support, delivering presentations training, and engaging in professional networking.

Beyond spoken English proficiency, post-graduate engineers require strong writing skills for effective communication in the workplace. These writing functions include drafting technical reports and documentation, research papers and journal articles, proposals and grant applications, technical specifications and manuals, emails and correspondence, presentations and slide decks, technical blogs and articles, project documentation, and professional networking profiles.

Post-graduate engineering students may face challenges when communicating with native English-speaking engineers. These challenges can lead to misunderstandings, inefficiency, reduced productivity,

strained relationships, limited career opportunities, professional development challenges, and reduced confidence and self-esteem. To overcome these challenges, post-graduate engineers can employ various strategies, including improving English language skills, seeking language support, using plain and clear language, and using visual aids [1, 2, 3].

This study highlights the crucial role of English language proficiency for post-graduate engineers in the Saudi labor market. By identifying the specific communication needs and providing strategies to overcome challenges, we can ensure that engineers are equipped with the necessary skills to thrive in the globalized engineering landscape and contribute to the continued growth and development of the field in Saudi Arabia. Through analyzing data from various sources, including interviews with experienced and amateur engineers, questionnaires, and research papers, this study identifies the crucial English language speaking and writing functions post-graduate engineers need to master for effective communication in the workplace. Additionally, it examines the challenges they face when communicating with native English-speaking colleagues and proposes strategies to overcome these obstacles. This study also attempts based on the gathered results to develop tailored programs and eventually design curricula that address the specific needs of post-graduate engineers in Saudi Arabia.

1.1 Theories of Intercultural Communication

Whenever communication is mentioned, language which is defined as a system used by a certain speech community in spoken and written discourse appears as a very important ingredient. For successful communication, many theories were proposed to justify and explain this unavoidable necessity in human life. One of the theories of intercultural communication was introduced by Hofstede (1970) who searched about values of people in fifty different countries all over the world. The respondents to his questionnaire were people working in IBM. The results of the questionnaire were used to find four value dimensions of cultural differences. These are power distance, uncertainty avoidance, individualism vs collectivism, and masculinity vs femininity. Then long- term vs short-term orientation was added as a fifth dimension. Another theory proposed by Stella Ting Toomey (1985-1988) is Face Negotiation Theory which is characterized by related expressions like face saving and face losing, emotional significance, the way we want to express ourselves to others and our expectations how we want others to treat us [4].

1.2 Importance of English Language for Engineers

The integration of English language proficiency in engineering workplaces is a critical factor for effective communication and career advancement in a global context. Engineers must navigate a landscape where English serves as a lingua franca, necessitating both spoken and written competencies for diverse professional activities. English is perceived as crucial for recruitment and promotion within engineering fields, with its importance varying by company type; receptive skills are emphasized over productive skills [5]. In addition, engineering graduates' adaptability to English is essential, with communication skills in English being a determinant of obsolescence or success. [6]

English as a Business Lingua Franca (BELF) plays a complex role in workplace communication, with engineers often underestimating its rhetorical and communicative nature during their education [7]. Graduate engineering students require English communication skills for academic tasks such as writing theses, reading literature, and presenting at conferences, indicating the need for balanced multi-skills in English [8]. However, there is a significant gap between the English communication skills taught in academic settings and those required in the corporate sector, affecting employability [9].

Communication skills, including proficiency in English, are recognized as vital for engineers to maintain relevance in the global market, with multilingual skills enhancing the profile of the global engineer [10]. For instance, [11] reports that English language proficiency is pivotal for Indian engineering students for both academic excellence and career progression, with expectations to work in environments where English is the medium of communication. In fact, engineering students' awareness of the importance of English proficiency is crucial, especially for those seeking employment in multinational companies [12]. English

language has a significant impact on the careers of engineering students globally, with widespread application in the field of engineering [13]. Therefore, specialized English for Specific Purposes courses are necessary to prepare engineering students for the professional communication demands of international engineering environments [14].

To sum up, English language proficiency is not only a key factor for engineers in securing employment and advancing their careers but also a fundamental component of their daily professional activities. The ability to communicate effectively in English is essential for collaboration in multinational companies, academic pursuits, and participation in the global engineering community. The research underscores the need for engineering education programs to incorporate comprehensive English language training that aligns with the communicative demands of the engineering workplace.

1.3 Communication Challenges Among Engineers

Engineers in non-English speaking workplaces often encounter communication challenges, particularly when English is the lingua franca of their professional environment. These challenges can impact their professional, social, and emotional well-being. Addressing these issues is crucial for the effective functioning of multicultural and multilingual engineering teams. Engineers in non-native English workplaces face challenges such as sounding less like native speakers, being perceived as less competent leaders due to accents, difficulties in learning English (vocabulary, grammar, pronunciation, translation), lack of time and motivation, struggles with reading and writing tasks, fluency and proficiency issues due to academic language demands, intercultural communication barriers, lack of confidence in fluency affecting message delivery, problems in giving presentations, and difficulties with non-technical vocabulary and complex language in technical materials.

Bilingual engineers frequently engage in translanguaging, which involves mixing languages to construct meaning and meet communication needs in English-speaking workplaces. However, they face difficulties in sounding like native English speakers, which can lead to professional, social, and emotional disadvantages [2]. Non-native English-speaking engineers struggle with various aspects of writing in English, including grammar, tone, specialized terminology, paragraph logic, quantifiers, measurement systems, the writing process, and style. These challenges extend beyond simple grammar fixes and affect their ability to communicate effectively with other subject-area specialists [15].

Non-native English-speaking engineers often struggle to convey ideas and present work in English, which can lead to professional, social, and emotional disadvantages in English-speaking workplace. They face a "linguistic glass ceiling" due to unintelligible accents and communication skills that are perceived as inadequate for leadership roles [15]. Engineering students recognize the importance of English for professional communication but often lack sufficient vocabulary, grammar, pronunciation, and translation skills, which hinders their learning process [16]. Engineering students with English as a second language (L2) may have academic language ability but struggle with the communication demands of workplace contexts. The use of English as a lingua franca in multinational companies presents practical challenges in both oral and written communication, which are intertwined with intercultural issues [17]. Moreover, engineering students are often reluctant to communicate in English due to concerns over grammatical accuracy, which affects their fluency and confidence in workplace situations. Despite technical competence, engineers and engineering students often face difficulties in oral communication, especially during presentations in the workplace [18]. Furthermore, non-native English speakers encounter problems with the language of engineering examination papers, including difficulties with non-technical words and complex sentence structures [19].

The ability to communicate effectively in English is a critical skill for engineers in the global workplace, especially in regions where English is not the first language. Challenges in communication can have significant impacts on career progression and workplace efficiency. Managers, including those in Arab countries, may avoid addressing communication issues with non-native English-speaking employees due to concerns about appearing politically incorrect, which can leave employees unaware of their communication shortcomings and hinder their professional development [15]. Henceforth, there has been a recognized need for tailored English as a Second Language (ESL) training programs for engineers and quantity surveyors in, for example, the UAE to improve their workplace communication skills, especially considering the global role of English as a lingua franca. [20] reports that error analysis of written reports

submitted to UK-based professional certification centers reveals common mistakes by engineers and quantity surveyors, highlighting specific areas where ESL training can be beneficial.

In fact, miscommunication among engineers mostly has disastrous effects on the efficiency and accuracy of achieving projects. The ambiguity and the lack of coordination among engineers lead to missed steps, problems and conflicts that usually end with delays and budget overruns [21]. The construction industry needs effective communication management between the different stakeholders. The unavoidable result of poor communication is project failure [22]. In a study that examines causes and effects of poor communication, it turns out that lack of communication was on top of the reasons and time overrun was the main effect [23].

In summary, engineers in non-native English-speaking environments face a range of communication challenges that can hinder their career progression and workplace effectiveness. These challenges include difficulties in expressing ideas clearly, facing a perceived lack of leadership communication skills, struggling with specific language skills such as vocabulary and grammar, and dealing with the nuances of engineering terminology and presentation skills. Addressing these issues requires a multifaceted approach that includes linguistic training, cultural sensitivity, and educational reforms to better prepare engineers for the global workplace. Arab engineers face significant challenges in communicating in English within their workplaces, including the risk of hitting a "linguistic glass ceiling" and a lack of direct feedback on their communication skills. Customized ESL training programs that take into consideration various robust strategies could be instrumental in enhancing their communication skills and career prospects. To guarantee the effectiveness of these strategies, it is highly significant that they involve multiple educational, social and practical perspectives.

1.4 Strategies to Solve Deficiencies

Effective communication is crucial for engineers in the workplace, encompassing both oral and written skills. Despite the technical proficiency of many engineers, deficiencies in communication can hinder their professional success. Researchers have explored various strategies to address these deficiencies, focusing on both educational interventions and practical techniques. Below are some of these strategies:

a) **Integration of Communication Skills in Engineering Education**:

- Incorporating speaking and writing into engineering curricula can significantly improve communication skills among engineers [24].
- Short training workshops based on experiential learning methods have been effective in enhancing communication skills [25].

b) Practical Communication Strategies:

- Engineers often use strategies such as message abandonment, code switching, self-repetition, and fillers to overcome communication deficiencies during oral presentations [26].
- Techniques like deep breathing, giving space for thinking, and code-switching help manage speaking anxiety [27].

c) Audience and Purpose Analysis:

- Analyzing the communication purpose and audience is essential for effective communication. This includes selecting the right communication channel and organizing content for clarity and impact

[3].

d) Use of Visual Aids and Simplified Language:

- Effective use of visual aids and simplifying language can enhance the clarity and persuasiveness of presentations [3].

- Engineers are encouraged to use visuals effectively, keep sentences short, and use everyday words to make their communication more accessible [3].

e) Listening and Interactive Communication:

- Listening is a critical but often overlooked skill in engineering communication. Interactive communication, including listening to feedback and understanding audience needs, is vital (see [1, 3].

f) Addressing Communication Anxiety:

- Addressing factors such as hesitation, poor confidence, and fear of criticism can help reduce communication anxiety among engineering students [27].

g) Creating a Translanguaging Space

- Translanguaging space in the workplace can empower bilingual engineers by valuing their multilingual skills and allowing for more effective communication. Modifying engineering education programs to recognize and enhance the multilingual competence of bilingual engineers, focusing on the development of their English professional communication abilities in speaking and writing, is recommended [2].

h) Providing Targeted Support

- It is essential to provide focused support and tailored resources to address the broader scope of writing issues faced by non-native English-speaking engineers, including specialized training in tone, terminology, logic, and style that can ultimately lead to better communication outcomes [28].

To overcome communication deficiencies in the engineering workplace, a multifaceted approach is necessary. Integrating communication skills into engineering education, employing practical strategies during presentations, analyzing audience and purpose, using visual aids and simplified language, and addressing communication anxiety are all effective strategies. By adopting these methods, engineers can enhance their communication competence, leading to better professional outcomes. Furthermore, it is essential to create supportive environments that recognize the value of multilingualism and provide comprehensive language training. This includes fostering translanguaging spaces and enhancing educational programs to develop professional English communication skills. Additionally, addressing the complex writing issues faced by non-native English-speaking engineers through specialized training can significantly improve their ability to convey ideas and collaborate effectively in their professional fields.

2. METHODOLOGY

2.1 Population and sample

The population of the study is all engineers in Jeddah who have at least five-years- experience regardless of their field of study (mechanical, civil, electrical, nuclear, …). Their age is between 25 and 60 to guarantee that they can speak English well for interviewing purposes. They can be of different nationalities as companies have no nationality limitations especially the private sector. Companies that have English language speaking Engineers are preferable. The sample of the study is ten randomly chosen engineers among those whose English is nearly perfect and whose companies have English speaking Engineers, and the means of communication is English language.

2.2 Research Design

The data collection tool for this study is the interview so that the researchers get authentic information about the speaking and writing functions needed by engineers in the field of work. The researchers also conducted focus groups with engineers and did brainstorming about the speaking and writing functions. The two main

questions in the interview are about the speaking and writing functions that engineers need in the field of work with the intention to use the resulted data for designing a curriculum that copes with these needs and equipping the undergraduate engineers with these needs. For this purpose, a suggested unit incorporating samples of the speaking and writing activities that are intended to expose postgraduate Saudi engineers to virtual situations they may face in the field of work was designed as a part of a comprehensive syllabus. The interview also covers two questions about the consequences of failing to communicate successfully with English speaking engineers and the steps to follow in order to achieve competence in successful communication in English language. The other data collection tool is a questionnaire of 31 items about the writing and speaking functions needed in the labor market in addition to the communication challenges and the communication strategies. Both tools are validated and piloted on some participants outside the sample. The questionnaire was sent to random participants through social network sites and google forms.

3. RESULTS

The results chapter below depicts the common answers of the interviewees on the four interview questions. The questions reflect the writing and speaking functions that postgraduate KAU engineers need upon joining the labor market. The interview also inquired about the consequences of the lack of successful communication and the losses that may result because of this dilemma. Then the interviewees were asked about their suggestions with regard to ways and strategies to help KAU students become ready to communicate successfully. The chapter also contains the respondents' answers to a questionnaire with regard to the same questions in the interview with more details and sub skills.

3.1 Results related to the interview

Table (1) the interviewees answers to the four main questions of the interview.

	Interview Questions	Common answers
1	● What are the English language speaking functions KAU post graduate engineers need in the field of work?	As post-graduate engineers in the field of work, English language speaking functions play a crucial role in effective communication and professional interactions. Here are the common answers of the interviewees with regard to the important English language speaking functions that post-graduate engineers may need: 1. Presenting Technical Information: Post-graduate engineers often need to present technical information to colleagues, clients, or stakeholders. This includes explaining complex concepts, describing research findings, and presenting project proposals. Clear and concise communication is essential to convey ideas effectively. 2. Participating in Meetings: Engineers frequently participate in team meetings, project discussions, and brainstorming sessions. They need to express their opinions, contribute ideas, ask questions, and provide updates on their work. Active listening skills and the ability to articulate thoughts and ideas in English are important in these scenarios. 3. Collaborating with Multidisciplinary Teams: Engineering projects often involve working with professionals from diverse backgrounds. Effective collaboration requires the ability to communicate ideas, discuss technical issues, and coordinate efforts with team members who may have different levels of English proficiency.

		4. Negotiating and Persuading: Engineers may engage in negotiations with clients, suppliers, or contractors. They need to articulate their requirements, defend technical decisions, and persuade others to adopt their proposed solutions. Proficient English -speaking skills are crucial for successful negotiations. 5. Providing Technical Support: Engineers are often required to provide technical support to colleagues, clients, or end-users. This involves explaining complex technical concepts in a clear and understandable manner, troubleshooting problems, and offering guidance. Effective communication skills are essential to assist others effectively. 6. Delivering Presentations and Training: Post-graduate engineers might be responsible for delivering presentations or conducting training sessions for colleagues or clients. They need to communicate technical information in a structured and engaging manner, ensuring that the audience understands the content. 7. Engaging in Professional Networking: Networking is important for career growth and professional development. Post-graduate engineers should be able to engage in conversations, discuss their work, and build relationships with professionals in their field. English language speaking skills are crucial for effective networking.
2	● What are the English language writing functions post graduate engineers need in the field of work?	In addition to English language speaking functions, post-graduate engineers also require strong writing skills for effective communication in the field of work. Here are the common answers of the interviewees with regard to the important English language writing functions that post-graduate engineers may need: 1. Technical Reports and Documentation: Engineers often need to write technical reports to document their research findings, project progress, or analysis of data. These reports should be clear, concise, and well-organized, presenting information in a logical and coherent manner. 2. Research Papers and Journal Articles: Post-graduate engineers may be involved in conducting research and publishing their work in scientific journals or conferences. Writing research papers requires the ability to articulate research objectives, methods, results, and conclusions accurately and effectively. 3. Proposals and Grant Applications: Engineers may need to write project proposals or grant applications to secure funding for their research or projects. These documents should clearly outline the objectives, methodology, expected outcomes, and the significance of the proposed work. 4. Technical Specifications and Manuals: Engineers often need to write technical specifications for products, systems, or components. They may also be involved in creating user manuals or installation guides. These documents should provide precise and comprehensive instructions or descriptions.

		5. Emails and Correspondence: Email communication is a vital aspect of professional life. Post-graduate engineers need to write clear and professional emails to colleagues, clients, and stakeholders. Effective email writing includes conveying information, asking questions, providing updates, and requesting or providing feedback. 6. Presentations and Slide Decks: Engineers frequently create presentations to share project updates, research findings, or technical information. Writing engaging slide decks involves structuring content, using appropriate visual aids, and conveying information concisely. 7. Technical Blogs and Articles: Some engineers may choose to share their knowledge and insights through technical blogs or articles. This form of writing allows engineers to communicate with a broader audience and showcase their expertise in a particular field. 8. Project Documentation: Engineers often need to document project plans, specifications, requirements, and design details. Clear and well-written project documentation is crucial for effective collaboration, knowledge transfer, and future reference. 9. Professional Networking: Engaging in professional networking often involves writing professional profiles, LinkedIn summaries, and connecting with peers and industry professionals. Writing a compelling and well-crafted professional profile can help engineers make a positive impression and build meaningful connections.
3	● What happens when post graduate engineering students fail to communicate successfully with their native English language speakers' fellow engineers?	When post-graduate engineering students fail to communicate successfully with their native English-speaking fellow engineers, several challenges and consequences may arise. The common answers of the interviewees were: 1. Misunderstandings: Poor communication can lead to misunderstandings and misinterpretations of technical information, requirements, or instructions. This can result in errors, rework, delays, and compromised project outcomes. 2. Inefficiency and Delays: Ineffective communication can hinder collaboration and slow down work progress. Miscommunications, unclear instructions, or difficulty in expressing ideas can lead to inefficiency, project delays, and missed deadlines. 3. Reduced Productivity: When communication barriers exist, engineers may struggle to exchange ideas, seek clarifications, or provide feedback effectively. As a result, productivity may suffer, impacting individual performance and overall team productivity. 4. Strained Relationships: Communication difficulties can strain relationships between post-graduate students and their native English-speaking colleagues. Lack of effective communication can lead to frustration, misunderstandings, and a breakdown in team dynamics, potentially impacting work morale and collaboration.

		5. Limited Career Opportunities: Effective communication skills are highly valued in the professional world. When post-graduate engineering students struggle to communicate successfully with native English speakers, it may limit their career opportunities, especially in multinational companies or industries where English proficiency is a requirement. 6. Professional Development Challenges: Clear communication is crucial for professional development, as it enables engineers to share knowledge, learn from others, and stay updated with industry advancements. Inadequate communication skills may impede their ability to actively participate in conferences, workshops, and networking events. 7. Reduced Confidence and Self-esteem: Constant difficulties in communication can erode the confidence and self-esteem of post-graduate engineering students. It may make them hesitant to contribute ideas, participate in discussions, or engage in professional interactions, which can hinder their personal and professional growth.
4	● How can post graduate engineers communicate successfully with their native English language speakers' fellow engineers?	To communicate successfully with native English-speaking fellow engineers, post-graduate engineers can employ the following strategies: 1. Improve English Language Skills: Enhance English language proficiency through dedicated practice. This includes working on speaking, listening, reading, and writing skills. Engage in language courses, practice with language partners, and utilize online resources to improve vocabulary, grammar, and pronunciation. 2. Seek Language Support: Seek language support services provided by academic institutions or professional organizations. These services may offer language coaching, workshops, or language exchange programs to help improve communication skills in an engineering context. 3. Use Plain and Clear Language: Avoid technical jargon or complex terminology when communicating with native English speakers who may not be familiar with it. Use plain language and explain concepts in a clear and concise manner. Break down complex ideas into simpler terms to ensure understanding. 4. Active Listening: Pay close attention to native English speakers during conversations or meetings. Practice active listening by focusing on the speaker's message, asking for clarifications when needed, and demonstrating understanding through appropriate responses. 5. Ask Questions and Seek Clarifications: Do not hesitate to ask questions or seek clarifications when something is unclear. Native English speakers will appreciate the effort to understand and ensure effective communication. Asking for explanations or examples can help bridge any gaps in understanding.

		6. Practice Cultural Awareness: Understand and respect cultural differences that may influence communication styles and norms. Be aware of cultural nuances, non-verbal communication cues, and the appropriate use of formal or informal language in professional settings. 7. Use Visual Aids and Demonstrations: Utilize visual aids, diagrams, or demonstrations to support verbal communication. Visual aids can aid understanding and provide clarity, particularly when discussing complex technical concepts or designs. 8. Build Relationships: Actively engage in building relationships with native English-speaking fellow engineers. Participate in team-building activities, social events, and networking opportunities to foster better communication and understanding. Building rapport can create a supportive environment for effective communication. 9. Practice Regular Communication: Regularly engage in conversations, discussions, and collaborations with native English speakers. The more practice you have, the more comfortable and confident you will become in communicating with them. 10. Seek Feedback: Request feedback from native English speakers regarding your communication skills. They can provide valuable insights and suggestions for improvement. Actively apply the feedback received to enhance your communication abilities.

Table (1) above shows the interviewees answers to the four questions of the interview. The first two questions reflect the speaking and writing functions KAU post graduate engineers need upon joining the labor market. The two other questions are about the challenges that face KAU postgraduate engineers with regard to communication and interaction and the ways and strategies they use in order to improve their communication skills. Nearly all the interviewees reached unanimous agreement on a list of speaking functions including presentation skills, interacting with other team members, participating in meetings, and socializing with non -Arabic speakers and a list of writing functions including writing technical reports, preparing proposals, and conducting research, writing power point slides for presentations, preparing orders and specifications. Among the consequences of failure to communicate successfully are big financial losses because of misunderstanding, delays in contracts and agreements, limited career opportunities and development challenges. The last interview question covers some suggestions to improve communication skills.

3.2 Results related to the questionnaire

Chart (1) the speaking functions that KAU post graduate engineers need upon joining the labor market

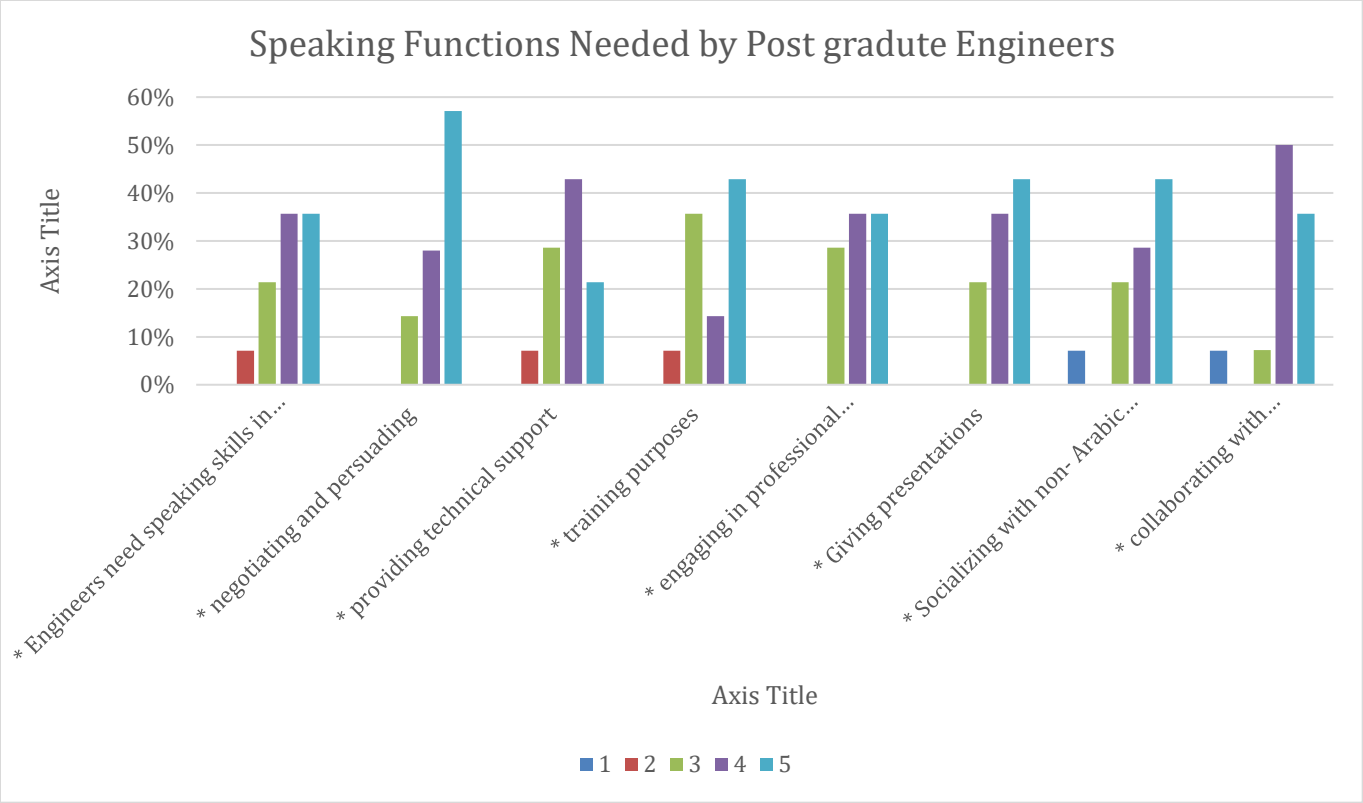

Chart (1) above illustrates the respondents' answers with regard to the English language speaking skills needed by Saudi KAU postgraduate engineers upon joining the labor market. It can be seen clearly that the majority of respondents chose 4 and 5 in all the items which reflects their enthusiasm to the importance of oral communication in English language in the field of work. It is also obvious that a high number of respondents were confused to be with or against the importance of the speaking functions. This is reflected by choosing number 3 which is neutral (20%, 30%, 38%, 30%) for items 1, 3, 4 and 5 respectively. Option 2 almost disappears in the chart as respondents consider 1 and 2 to be the same reflecting the least enthusiasm. All in all, there is unanimous agreement that oral communication in English language is very important for KAU postgraduate engineers.

Chart (2) the writing functions that post graduate engineers need upon joining the labor market

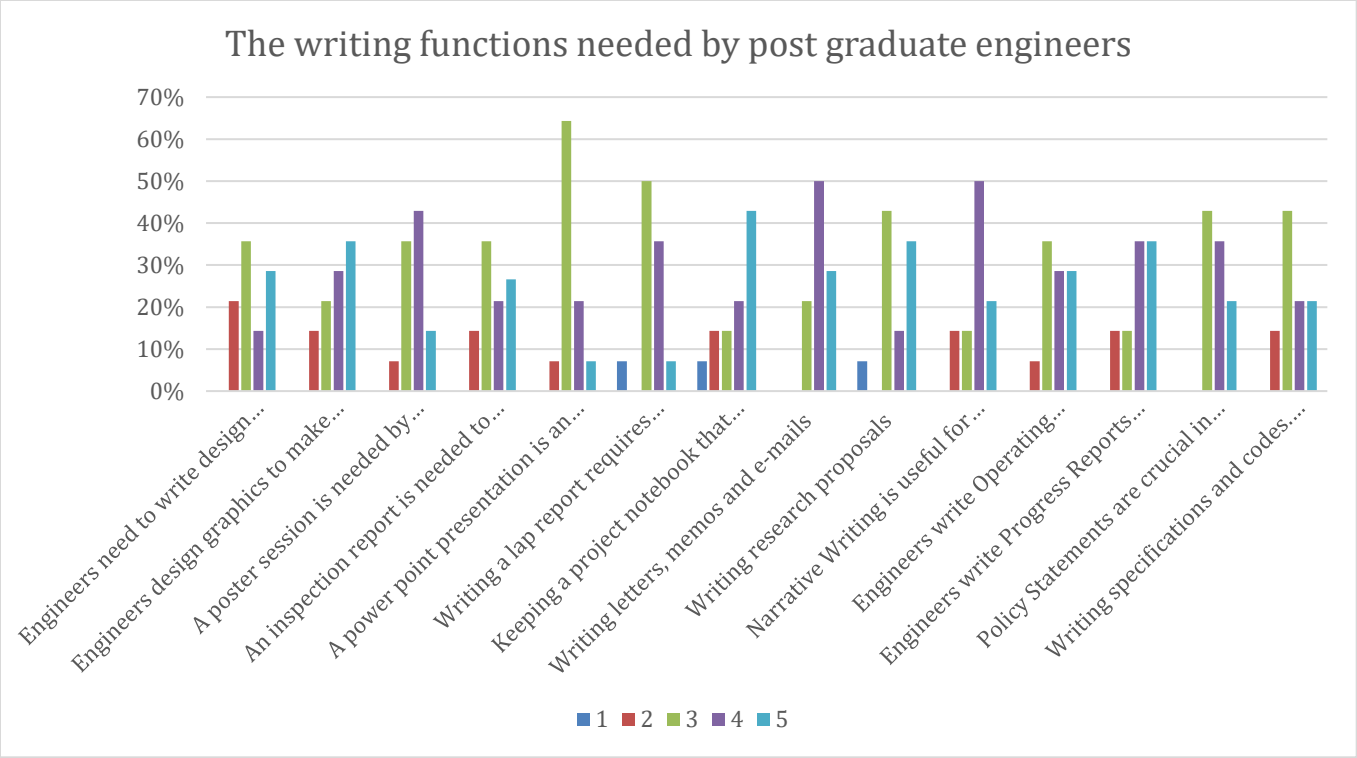

Chart 2 above illustrates the respondents' answers with regard to the English language writing functions needed by KAU engineering post graduate students. Although the majority of respondents agree unanimously on the importance of English language writing functions for postgraduate engineers, a relatively considerable part of the sample chose number 3 which reflects confusion and lack of certainty. It is also apparent that very few respondents have doubts that writing functions are essential for postgraduate KAU engineers. All in all, the uncertainty about the importance of writing functions overwhelmed the respondents' answers. This is very clear in the embarrassed choice of numbers 4&5 which reflect the enthusiasm for writing skills as unavoidable skills for postgraduate engineers.

Chart (3) the communication challenges that face post graduate engineers upon joining the labor market

Chart 3 above shows the respondents' answers with regard to the communication challenges that face KAU postgraduate engineers upon joining the labor market. Except for item 3, the majority of respondents agreed that incompetence in English language affects KAU postgraduate engineers' communication skills in terms of their misunderstanding of messages conveyed to them, inability to

communicate effectively and lack of confidence in their communication skills. Item 3 related to the poor communication skills' effect on KAU postgraduate engineers' job opportunities assumed nearly equal responses among agree, don't know, and disagree (35%, 35% and 30%) respectively.

Chart (4) communication strategies post graduate engineers can follow to communicate successfully

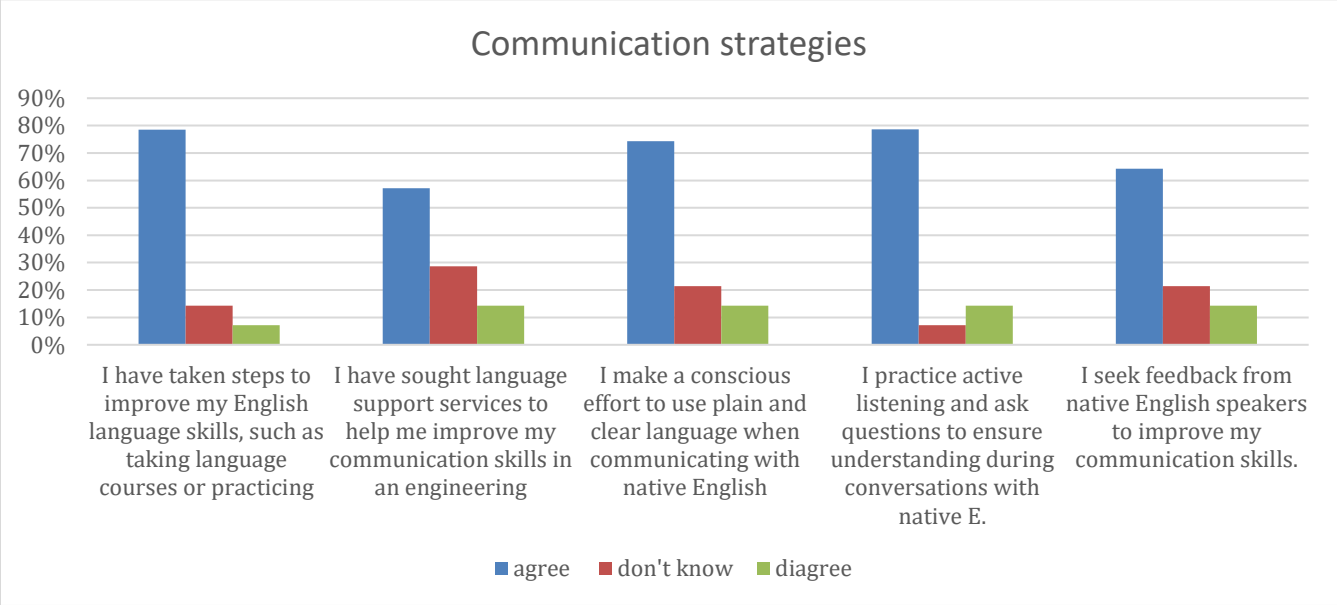

Chart 4 above shows the respondents' answers with regard to the communication strategies KAU postgraduate engineers use in order to improve their communicative competence. It is apparent from the chart that almost 80% of the respondents agreed that taking language courses, language support services, using plain and clear language, active listening and getting feedback are beneficial to improve communication skills. It is also clear that respondents tend to be surer about their answers as confusion and disagreement is getting less than in the charts above.

To sum up, the respondents' answers to the interview and the questionnaire were encouraging and reflect enthusiasm towards English language listening and speaking skills. The challenges also reflect real intention that these skills are needed and unavoidable for KAU postgraduate engineers. Finally, the efforts made to overcome these challenges are serious and encouraging. The unanimous agreement on the items of the questionnaire motivates the researchers to encourage other researchers to conduct more research.

4. Discussion

This research investigates the English language speaking and writing functions KAU engineering students need upon joining the labor market. To this end, the researchers interviewed ten experienced engineers from companies including English language native speakers among their staff where there is a real need to communicate orally and in writing. The interview questions included four main questions about the speaking functions, the writing functions, the challenges that face successful communication and the strategies that engineers use in order to communicate successfully. In addition, they designed a questionnaire containing thirty- one items about the same interview questions for further information.

The results of the interview and the questionnaire echoed the logic and the expectations of the researchers. The interviewees and the survey respondents showed apparent thirst for the competence and the real need

for successful communication in English language. As a response to the first question depicting the English language speaking functions, it was very clear that engineers in the field find speaking in English very important to communicate with native speakers. In fact, the failure to communicate successfully through presentations, negotiating, persuasion, contracting and even socializing proved to be the reason behind losing contracts and misunderstanding in the items of tenders, orders or any other transactions. Lack of communication gives the foreign engineers a feeling that they are not welcomed in the company and consequently, an atmosphere of enmity spreads throughout the place.

The same applies to the writing functions needed by postgraduate KAU engineers upon joining the field of work. The interviewees' answers and respondents' choices showed clearly that experienced engineers agreed unanimously that competence in the writing functions in English is unavoidable for successful communication especially with non- Arabic speakers. Writing progress reports, preparing power point presentations, writing research proposals and memos during meetings and many others are all important tasks an engineer should be able to do. These documents are to be kept in electronic or paper archives as evidence for agreements and contracts to be referred to in case of any misunderstanding. In fact, the writing competence surpasses the mere ability to write to understanding and reading behind the words and between the lines. Certain words are laden with meaning to the extent that it might be justified in different ways. Any mistake or misunderstanding may cost a company millions if not written properly. Moreover, articles, prepositions and certain quantifiers can be very skillfully and sometimes deceitfully used to achieve illegal goals or to escape certain obligations ([20], [6], [2], [1], [9]).

The survey also shows certain challenges that face KAU post graduate engineers due to lack of competence in oral and written communication. Among these challenges are limited opportunities as currently it is a must that a candidate for any job specially an engineer needs to assume certain level of English language competence that enables him/her to communicate successfully. The inability to communicate either for work purposes or for socializing is a very bad feeling for engineers; they feel they don't belong to the group, and they keep silent during meetings with no little hope of interacting and exchanging talks and opinions. Unfortunately, they may have precious ideas that will be prisoned in their heads because they fail to communicate them with others. Another important challenge is that few engineers are deprived the opportunity to get promoted or to have an opportunity for post graduate studies because of their poor level in English language ([27], [16], [17])

The final question in the interview and the questionnaire is related to ways and strategies KAU postgraduate engineers follow in order to improve their level in English language. The respondents agreed that attending courses and seminars, active listening, seeking feedback from native speakers are suggested ways to improve one's communication competence. Another strategy is using simple language to achieve the minimum level of communication which is better that no communication at all. Companies themselves can do much with this regard through arranging training workshops for fresh engineers to enable them to join the engineering speech community ([12], [29])

The lack of enthusiasm or the confusion while responding to some items in the questionnaire refer to either not understanding the speaking and writing functions or a fossilized belief that engineers can communicate in Arabic and the native speakers of English must learn Arabic as they are motivated to stay and keep their jobs. This belief is not valid because most of the engineering terminology is in English language and still an engineer is deaf and dumb unless he/she can communicate in English language successfully.

5. Conclusion and recommendations

This research studies the speaking and writing functions KAU engineering students need upon joining the labor market. It also investigates the challenges that face KAU engineering students' communication, and the strategies engineering students follow in order to improve their English language competence. The findings of the study revealed unanimous agreement that certain speaking and writing functions are badly needed upon joining the labor market. A successful engineer must be equipped with these English language functions/ skills in order to thrive and succeed. Without these, an engineer will get lost and expose the company he works for and the teams he collaborates with to various chances of failure and blackmailing because of not communicating successfully. Jeddah in particular and KSA in general is a cosmopolitan

country where almost plenty of nationalities are available. The most global and widespread language they use for communication especially engineers is English language. As a matter of fact, anyone working in the Gulf states unable to communicate in English language is considered illiterate. The researchers conducted this research in an attempt to determine the speaking and writing functions needed by KAU post graduate engineers and to design a syllabus to teach these functions to undergraduate engineers approaching graduation. The study was limited by the number of interviewees as experienced engineers are busy and probably not that competent in English language. It is also limited by the number of respondents; only twenty people answered the questionnaire. The sample of the study was intended and doesn't represent the great number of the engineers in KSA which impacts the generalizability of the results. This refers to the inability to reach all parts of the Kingdom; in addition to the rare number of engineers who are competent enough to deal with the data collection tools in perfect English. The researchers recommend that more research should be conducted about the four English language skills with regard to their importance for KAU post graduate engineers upon joining the field of work. They also recommend that engineering students should be interested in enhancing their level in English language so that they won't face the challenges of a possible failure in communication in the future.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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Appendix (1)

Dear gentlemen,

I would be grateful to you if you answer the following questions in an attempt to prepare our students in the faculty of engineering to the Saudi labor market.

Interview questions

1. What are the English language speaking functions post graduate engineers need in the field of work?
2. What are the English language writing functions post graduate engineers need in the field of work?
3. What happens when post graduate engineering students fail to communicate successfully with their native English language speakers' fellow engineers?
4. How can post graduate engineers communicate successfully with their native English language speakers' fellow engineers?

Appendix (2)

The questionnaire

Dear gentle engineers, this questionnaire is about the speaking and writing functions needed by KAU post graduate engineers upon joining the labor market. The suggested needs in the list below are rated from 1 to 5 where 1 is the least needed and 5 is the most needed. The questionnaire also contains communication challenges and communication strategies that may help the researchers design a program for equipping undergraduate KAU engineering students with the necessary skills. Please rate the way you see the speaking and writing functions utilized in the field of work from 1 to 5 and the communication challenges and strategies using the Likert scale. Your cooperation is highly appreciated as it will contribute to building

a syllabus to equip undergraduate students of engineering at KAU with the necessary speaking and writing needs.

	Speaking functions needed by KAU post graduate engineers	Scale from 1 to 5				
		1	2	3	4	5
1	Engineers need speaking skills in English for: participating in meetings					
2	collaborating with multidisciplinary teams					
3	negotiating and persuading					
4	providing technical support					
5	training purposes					
6	engaging in professional networking					
7	Giving presentations					
8	Socializing with non- Arabic speaking engineers					
	Writing functions needed by KAU post graduate engineers **Engineers need the following writing functions:**					
1	Engineers need to write design reviews to communicate their progress and concerns about design					
2	Engineers design graphics to make it easier for readers to understand their ideas					
3	A poster session is needed by engineers to display and discuss their work on a project or the results of their research.					
4	An inspection report is needed to assess what repairs need to be completed for a bridge or pavement.					
5	A power point presentation is an important writing function for engineers					
6	Writing a lap report requires engineers to reflect on experiences					
7	Keeping a project notebook that contains notes for all your work.					
8	Writing letters, memos and e-mails					
9	Writing research proposals					
10	Narrative Writing is useful for explaining concepts or depicting situations that might otherwise be difficult to understand					
11	Engineers write Operating Procedures to ensure that the artifacts they create are properly utilized and maintained.					
12	Engineers write Progress Reports to communicate the status of their work or when they reach a milestone.					

13	Policy Statements are crucial in every day operating procedures, and they also play a large role in emergency situations					
14	Writing specifications and codes. Specifications "specify" the work that will be completed in order to comply with specific Codes					
	Communication Challenges	**Agree**	**Agree strongly**	**I don't know**	**Disagree**	**Disagree strongly**
1	I have experienced misunderstandings with native English-speaking engineers due to my English language skills.					
2	My English language skills have hindered my ability to collaborate effectively with native English-speaking engineers.					
3	My English language skills have limited my career opportunities in the engineering field.					
4	I have felt less confident due to my English language skills.					
	Communication Strategies					
1	I have taken steps to improve my English language skills, such as taking language courses or practicing with language partners.					
2	I have sought language support services to help me improve my communication skills in an engineering context.					
3	I make a conscious effort to use plain and clear language when communicating with native English speakers.					
4	I practice active listening and ask questions to ensure understanding during conversations with native English speakers.					
5	I seek feedback from native English speakers to improve my communication skills.					