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English Competencies and Challenges for Data Science and Cyber Security Students at Al Istiqlal University

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Abstract

This present research aims to determine the growing needs and challenges faced by Data Science and Cyber Security students at Al Istiqlal University's Faculty of Information Technology when learning the English language. It also tries to ascertain whether gender and level of competence affected their requirements and difficulties in mastering the English language. 35 cadets who are specializing in Data Science and Cyber Security make up the sample. The researcher gave out 39 questionnaire items divided into eight domains. The results show that cadets in Data Science and Cyber Security did not undergo any guidance regarding

how to utilize English in the discipline while engaging in the analysis of data or cyber security keywords. Additionally, the study demonstrates that cadets majoring in data science and cyber security did not receive any guidance on how to learn to communicate in English, and the teaching activities in the English programs they had taken did not match their notions of the standards for expert English. Moreover, English proficiency requirements for cadets enrolling in Data Science and Cyber Security courses should be taken into consideration. Additionally, no statically meaningful differences in the demands for key competencies and barriers faced by Data Science and Cyber Security cadets are found when gender and competency traits are taken into consideration.

1. Introduction

The dominant language spoken around the world is English. It is used as a primary language in several nations. English is frequently referred to as the "lingua franca," a language of interpersonal interaction that is utilized in practically every element of the societal and scientific worlds (Crystal, 2003; Jodaei et al., 2018; Masood & Alsheikh, 2017; Shehni, 2021). Learning English provides students access to a wealth of knowledge that might not be accessible in alternative languages. Although learning English might be challenging and take a while to perfect, it is obvious that this is necessary because accomplishing this could lead to a variety of opportunities for students once they enter the workforce, especially for ESP (Crystal, 2003; Erfiani et al., 2021; Masood & Al-Sheikh). Students encounter several difficulties in communicating, composing, grammatical structures, terminology, and English articulation, among other aspects. When compared to the other academic institutions in Palestine, Al Istiqlal University is thought of as being a fledgling institution. Data Science and Cyber Security are new majors of the numerous university disciplines whose subjects are primarily delivered in English. The process of identifying what students may already know, what they can do, and what they have yet to gain is known as need analysis. The needs analysis process is, therefore extremely crucial for second or foreign language learners (Erfiani et al., 2021).

Examining the benefits and challenges of learning English for students who are majoring in Data Sciences and Cyber Security is the goal of the current study. Cadets' alleged educational learning difficulties are referred to as challenges. Students majoring in Data Science and Cyber Security at Al Istiqlal University undertake data processing for security objectives that requires mastery of English language competencies.

1.1. Significance

For Al Istiqlal University's English instructors, this investigation is important because it helps them identify the best strategies for supporting Data Science and Cyber Security cadets with their English language demands for key competencies. Stakeholders will also think about ways to facilitate the integration of ESP programs to meet the demands of cadets studying Data

Science and Cyber Security. The English language program will be expanded or modified by instructional designers based on the demands of the Data Science cadets in the department. Moving closer to real-world professional scenarios, students can discover more and improve their communication skills.

1.2. Problematics

The study examines the important inquiries:
- What level of English proficiency is required for cadets in the disciplines of Data Science and Cyber Security?
- What difficulties do English language learners in the fields of Data Science and Cyber security encounter?
- Do gender-based needs for Data Science and Cyber Security cadets vary considerably?
- In terms of difficulty, are there significant differences between the requirements of Data Science and Cyber Security cadets?

2. A review of the literature and connected research

Need analysis is regarded to be fundamental in the English for Specific Purposes (ESP) context because it enables professionals and content creators to better understand the actual students' priorities (Erfiani et al., 2021, Widdowson, 1981; Widanaet al., 2020; Huang, 2022). Needs analysis has generated controversy because linguists in the field of ESP are still divided over the definition of the word "need." Different stakeholders, including parents, staff, professionals, and learners, might well have different ideas about what "needs" entail. Needs analysis is seen as a procedure for accessing information (Mackay & Mountford, 1978; Widdowson, 1981). Educationalists described needs analysis as methods and practices for collecting data to be utilized in the creation of course material (Ria & Malik, 2020). Each ESP course content needs initially perform a needs analysis to supply appropriate inputs and achieve impactful educational results. Needs analysis is described as the practice of recognizing the requirements that necessitate a student or a set of students requiring a language and prioritizing the needs (Huhta et al., 2013). Need analysis relies on differentiating between goal needs—i.e., what the student must accomplish to know and understand "wants," or the students' views of their needs (Hutchinson & Waters, 1987). Researchers argue that intended needs also encompass "necessities," which are things the learner must be aware of to function well in the target environment (Muthmainnah et al., 2020). While "lacks" refers to the need to grasp what the student currently understands to decide which of the basic needs the student "lacks". The emphasis on the need for language learning as a basis of knowledge for creating curricula or creating resources that address specific needs has been observed to be a consistent theme among all of the interpretations (Huhta et al., 2013). Identifying the needs of the students ought to be the initial phase in creating ESP coursework (Erfiani et al., 202; Syakur et al., 2020; Siraranghom, 2020).

Chen and Chang (2016) conducted a study on the realistic requirements of staff members in respect of English application at the workplace as well as cadets' viewpoints on the needs evaluation of English education. According to the poll's results, companies and cadets have

different opinions about what English learners should study, especially in respect of communication and listening competencies. Additionally, the skills that are emphasized in schools do not match the skills that companies require.

Ahmmed et al. (2020) carried out a research article on the marine English competencies that Bangladeshi mariners need for serving onboard ships and getting job prospects in the maritime domain on both a global and local scale. This research sought to assess the standard of English maritime proficiency demanded by Bangladeshi hiring firms. The implemented study employed a mixed-method approach to gather quantitative and qualitative responses from 135 experienced cadets and 24 recruiting institutions. Onboard, 68 maritime tasks were identified and ranked from "least required" to "extremely critical" in terms of skill requirements. The survey participants as being of utmost importance chose 23 of these tasks. Since talking is the primary mode of communication, this analysis revealed that communicating constituted the most crucial of the three skills because speaking is the primary method of communication used in most recruitment.

Siraranghom (2020) looked at the requirements of army cadets (number = 362) enrolled in an English-speaking program. The purpose of the research seeks to understand the requirements of cadets in mastering English so order to create a new English communication program in a particular military environment during which English would be employed for specific military objectives. Information regarding needs was gathered via surveys and quasi-interview sessions. A needs analysis questionnaire with inquiries about the course material, pedagogical strategies, and tasks was handed out to the cadets. Then, 32 cadets were randomly selected and interrogated to examine certain challenges that showed up in the data gathered from the survey. The results demonstrated that the cadets were required to learn from a helpful teacher who did not place them in uncomfortable settings, as well as work with a compassionate teacher.

Erfiani et al., (2021) polled to figure out what students already know about language abilities and functionalities, what they don't recognize about challenges they've faced while hosting guests, and what they anticipate learning about their requirements for enhancing their ability to host guests. The investigation employed a mixed exploratory technique that prioritizes a qualitative analysis before quantifying or validating it. According to the study, verbal communication and listening skills represent the most crucial language capabilities, but general conversation, providing information, offering services, and responding to questions constitute the greatest fundamental language features. They frequently deal with visitors who are hurried in their speech, use improper grammar, and seem confused in their communication. Landlords providing homestays desire a constant flow of communication with visitors from check-in to check-out, thus they have linguistic restrictions in place.

A study by Masood & Al-Sheikh (2017) looked at Palestine's spoken English learners' challenges. The students were given a survey containing closed-ended questions. This study reviews the challenges that the polled students have when acquiring conversational English

using a qualitative research approach. It investigates the extent to which barriers prevent oral English instruction in Palestine, student perspectives toward verbal courses at universities, the goals of speaking skill instruction at universities, and the function of English teachers in helping students improve their oral English ability. 62 recruits, both male and female, were selected as the study's sample by the investigators. Al-Istiqlal University's Faculty of Humanities during the initial semester of the academic year served as the study's confines. The study's findings make it quite clear why cadets feel a strong desire to acquire the English language orally.

The investigation was performed by Menggo et al. (2019) on the educational needs and targeting requirements of learners in an academically speaking course. Participants in the investigation comprised 312 English majors from six Indonesian universities. A survey and an extensive interview were both used to collect data. According to the outcomes, the necessities, lacks, and demands of learners were found to be their primary needs. On the other side, the learning process needs to take into consideration input, procedure, context, and the learner's responsibility. Students were obliged to participate in the independent conversation exercise with a value of (64.49%) because they lacked vocabulary which comprises a value of (32.69%). Additionally, students preferred video as an educational method of input and collaborating and communicating (39.10%) in program development (38.46%). Critical analysis as a tactic (37.50%), cooperative learning (37.82%), and interactive interaction (39.74%) are all preferred in a classroom context. The content development must be able to foster 21st-century skills in line with student preferences. Speaking professionals are advised to modify their content by need assessments.

Thyab (2016) looked into how the native language affected Arab cadets' ability to learn English vocabulary. Native Arab speakers have a variety of difficulties when attempting to master English. They encounter a variety of difficulties when trying to use English articles. Mastering English articles written by students whose native tongue is Arabic represents one of the most prevalent and serious problems Arab English learners encounter, per past studies. In this study, such outcomes are backed up and emphasized. Arab English learners find it challenging to employ English articles because of the distinctions between the two languages' article structures. The notions of concreteness and indefiniteness are conveyed differently in Arabic than they are in English due to differences in article arrangement. Since articles constitute one of the most utilized topics in the English language, this investigation endeavored to handle this significant issue. This project seeks to locate earlier research outcomes on English-language articles. This is done by showing how differences in the article frameworks of Arabic and English lead Arabic English students to commit errors and even misunderstandings in their study of the language.

The 21st-century learning experience is how students can integrate subject-matter knowledge, specialized skills, real understanding, and literacy required for success in the profession and community (Ledward & Hirata, 2011). They go on to say that competencies go beyond 21st-century skills and encompass the ability to think critically, think creatively, communicate effectively, and operate in collaboration. Students will succeed in the global

standing thanks to these talents. The necessary abilities are consistent with the idea of academic achievement today, which emphasizes cognitive processes that entail analytical and innovative strategies for problem-solving and strategic decision.

Albaqshi (2016) examined how effectively the content in ESP classes is organized for the learners' linguistic development and realistic situations. The Alahsa College of Technology in Saudi Arabia was the site of this study. A corpus-based examination of such an ESP reference book was used as the technique, and the units were matched to the cadets' needs assessment of a real-life scenario in an automobile workshop. The researcher observed that, in terms of technological content, the textbooks partially fulfill the program outcomes and the requirements of the recruits, yet there is a need to develop the exercises' communicative and creative abilities so that they serve as a realistic representation of an actual setting.

Yildirim (2015) studied the English communication challenges and how they affected the cadets' transition to life in the United States. 30 Turkish dual diploma recruits were the test subjects, and the materials were delivered to them as part of a joint Turkish university English Language Teaching course. The article collected information utilizing a 60-item poll that the researcher created, and they used multiple linear regression assessment, paired-sample t-tests, independent-sample t-tests, and correlation coefficients to analyze them. The findings showed that this program's recruits have slight English-related challenges; they have more of these issues in their education than in personal interaction, and the most difficult skills are written and spoken communication in educational environments.

Alhuqbani (2008) conducted a study on the requirements for law enforcement personnel in Saudi Arabia who speak English. In light of this, 103 active law enforcement officers filled out a survey. The results showed that English is a crucial component of the security domain. The administration of English modules by several departments and the Higher Academy of Security Sciences provides evidence that the Ministry of the Interior is aware of the importance of English for police personnel and officers. The study's participants understood the value of adapting the language-learning resources they used to their particular job conditions required. All security personnel agrees that the components of their jobs are essential. Although police personnel and their profession are aware of the value of English in their job, many officers claimed that they had never received training on how to use English to further policy goals. The overall findings confirm that English should be given priority for police operations, so this is a negative consequence. Based on this conclusion, the study has offered some broad suggestions for improving the English course content at King Fahd Security College, the Higher Institute of Security Sciences, and particular safety industries.

3. Methodology

3.1. Research Design

The targeted requirements technique for NA put forward by Hutchinson and Waters (1987) served as the foundation for the research investigation. The term "targeted requirements" is wide and includes the needs, weaknesses, and goals of learners. Assessing the learners' needs can help you determine the "requirements of the specific context," or what the student needs to

understand to perform well in the target setting. Then they should research what they need to understand the difficulties associated with the goal and competence level. Hutchinson and Waters (1987) maintain that when requirements and challenges are being identified, it is important to include students' preferences and viewpoints on why they need a language. They may have a comprehensive grasp of the requirements of the targeted circumstance and will have an opinion as to their inadequacies.

3.2. Population

The entire student body of Data Science and Cyber Security cadets makes up the population. The total of cadets accepted into each program is relatively limited. There are generally 35 recruits in the two programs.

3.3. Sample

The selection of the 35 cadets, both male, and female, was deliberate.

3.4. Characteristics of the study sample

The complete research population consisted of 35 students from Data Science and Cyber Security programs at AL Istiqlal University. The cadets are native Arab speakers who major in Data Science and Cyber Security. They range in age from 19 to 22. This sample is unique because all the recruits are required to live in the university's dormitories. After all, the education system has organized their entire week. They have difficulties learning since they spend most of their time in combat training. They schedule their day even by second, so every minute makes a difference. Students may look at what is required from them through many perspectives to practice a language. This is a crucial step in the learner-centered strategy to course development because it gives them the chance to generalize their insights. As a result, academics and curriculum designers favor this method of information dissemination.

3.5. Instrumentation

Based on prior studies and literary works, the researcher's sole investigation method was a survey with a 5-point Likert scale.

3.6. Validity of the questionnaire

A group of language experts received the survey from the researcher. The significant majority of participants agreed that the questionnaire satisfied the research aim and objectives once its content was examined.

3.7. Reliability of the questionnaire

When evaluating the questionnaire's reliability using the Crombach Alpha Formula, it obtained a score of (0.876).

4. Results

4.1. Results related to the first question:

Results are shown in chart 1 below to demonstrate how important English language competence is.

Table 1: The level of English proficiency of undergraduates studying Data Science and Cyber

Security utilizing means, standard deviations, and percentages

No	Statement	N	Mean	STD	Percentage
1	Communication	35	4.10	0.83	80.4%
2	Reading comprehension	35	3.96	1.00	79.2%
3	Listening competencies	35	3.94	0.95	78.82%
4	Composition	35	3.82	1.10	78.7%
	Mean	35	3.95	0.95	79.3%

The results of the cadets' responses to the four abilities have been determined to be valuable by the cadets. The findings show that responses on the four core components of the English language, communicating, listening competencies, reading comprehension, and composing quite strong, with values varying from 70% to 80% (80.4% – 78.7%). It seems that the cadets' understanding of the value of linguistic abilities is evident in their answers. Their top priority is communication, where this competency received an 80.4% rating. These findings concur with Masood & Al-Sheikh (2017).

4.2. The value of communication competence for the cadets' career prospects:

Table (2) displays the outcome related to the importance of listening competencies for cadets.

Table 2: Means, Standard Deviations, and Percentage distribution of Listening in English for Cybersecurity and Data Science.

No	Statement	N	Mean	STD	Percentage
1	I need to acquire the skill of listening in English as it is significant in my employment at a government agency that addresses cyber security threats.	35	4.08	0.87	81.7%
2	I need to listen to comprehend the text and concepts used in the context of data sciences and digital forensics.	35	4.00	1.00	80.00%
3	I must listen to grasp English-language presentations and roundtable discussions on data science and cyber security.	35	3.99	1.02	79.7%
4	I must listen to fully get the lingo, words, and texts at large.	35	3.68	1.24	73.5%
5	I must listen to fully understand the worries and inquiries that others	35	3.96	0.99	79.2%

may have about my work.

The calculated results demonstrate that cadets gave exceptionally significant scores for items 1 and 2 regarding the value of listening competencies for future employment in Data Analysis and Cybersecurity domains, with ratings ranging between 81.7% and 80%. The proportion ranges from (80.0%-79.7percentage) and is high for items 3 and 5. The fourth item, nevertheless, receives a lower level of response. The researcher claims that the sample's response of complete agreement with the importance of listening ability for the potential job of officer Cybersecurity and Data Science has consistently been influenced by the high rates of responder positive reactions to the majority of questionnaire items, which amounts to certain issue more than 81%.

4.3. The significance of effective communication skills for the cadets' Cybersecurity and Data Science professional position

Table 3 displays the cadets' opinions on the importance of communication competencies for future employment in the cyber sphere.

Concerning cybersecurity, chart 3 displays the population's communication competencies' averages, standard deviations, and proportions.

No	Statement	N	Mean	STD	Percentage
1	Every time I wish to employ terminology and idioms related to cybersecurity responsibilities in the future, I will need to improve my verbal and informational communication skills.	35	4.20	0.88	83.05%
2	To communicate with others regarding forensic evidence, media appearances, symposiums, or booklets, I must communicate in English.	35	4.04	0.93	80.2%
3	Speaking English is necessary for me to communicate with foreigners who will be collaborating with my foundation in the foreseeable future.	35	3.91	1.15	78.8%
4	To improve my chances of excelling in my future career, I need to be competent to communicate in English well.	35	3.95	1.08	79.5%

The results for chart 3 indicate that the sample's opinions regarding verbal skills for the professional life in cybersecurity are very high on Items 1 and 2, where their percentages range

from (83% to 80.2%), while they are less on items 3 and 4 where their percentages are 79.5% and 78.8% respectively.

According to the researcher, these outcomes are a consequence of participants' ability to effectively collaborate or even interact directly in the workforce and thus to talk about subjects linked to law enforcement scenes, as seen by the extremely high response rates—some things received 83%—for some items. However, there is less emphasis placed on the item (3.) Because students studying Data Science and Cyber Security believe, they can share their knowledge with non-native English speakers even if their English is not great. This outcome is in line with Erfiani et al., (2021), Ahmmed et al., (2020), and Menggo et al., (2019).

4.4. The relevance of text comprehension to the cadets' career in Cybersecurity and Data Security

Table (4) shows the result.

Table 4: Measures, S D, and Area Percent in English Reading concerning Cybersecurity and Data Science.

NO	Statement	N	Mean	Standard Deviation	Percentage
1	I have to grasp reading texts to learn the vocabulary and expressions used in my discipline.	35	4.10	1.05	82.2%
2	I ought to study to grasp the terms used for forensic, institutional, and civil science that is related to cyber and data security.	35	3.93	0.96	78.4
3	I must read in English to grasp cases that are relevant to my line of work.	35	3.86	1.02	77.4%
	Total	35	3.96	1.00	79.2%

The importance of reading abilities for the long term in Cybersecurity and Data Science is particularly considerable on both items 1 and 2 with a percentage of (82.2 % -78.4 %). Moreover, the rate is high on item (3), at (77.4%). Response for the overall score is 79%, which is a very high percentage.

The study finds that understanding security-related texts, words, and jargon associated with Data Science and Cyber Security requires searching reading comprehension. Because it is believed that recruits studying Data Science and Cyber Security are not required to read in English to grasp cases that are relevant to their line of work. The third element is less favorable for this item. Alhuqbani (2008) supports this outcome.

4.5. The value of writing abilities for the cadets' future careers in Cybersecurity and Data Analysis

Findings are shown in the chart (5).

Chart five highlights means, standard deviations, and ratios of the English Composition domain regarding Data Science and Cyber Security

No	Statement	N	Mean	STD	Percentage
1	Writing terminology related to my profession in data science and cyber security is necessary.	35	4.28	0.81	86.4%
2	I will need composition competencies for the long term when I write a report, an essay, or a booklet about my success.	35	3.72	0.92	81.5%
3	I have to compose a thorough justification or declaration in English regarding a situation, a violent problem, or an internet crime.	35	3.7	0.97	73.6%
4	I require English writing abilities to create reports and articles about subjects relating to my major and get them published on a global scale.	35	3.58	1.15	73.8%
	total	35	3.82	0.92	78.9%

The scores in table five regarding writing abilities are quite high; the percentages for items 1 and 2 are (86.4%-81.5 percent). Additionally, the proportion is considerable at (73.8%) for item number 4. Because Data Science and Cyber Security cadets believe, they can produce a report on various themes without understanding the craft of writing. This outcome is in line with what Albaqshi (2016) and Yildirim (2015) found.

4.6. Sentence construction proficiency is essential for potential data protection

The table below displays the results of the cadets' opinions on the significance of grammatical structures.

The mean values, standard deviations, and percentages of issues regarding English sentence structure for the disciplines of Data Science and Cyber Security are shown in chart 6.

No	Statement	Number	Mean	Standard Deviation	Percentage
1	I have to master grammatical rules to compose properly for the job.	35	3.86	1.08	77.4
2	To completely comprehend what I hear, I need to master sentence construction rules.	35	3.84	1.11	76.7

3	To appropriately discuss an accident, I require sentence construction.	35	3.74	1.20	74.8%
4	For my chosen profession, I require grammatical rules to appropriately construct security-related terms and phrases.	35	3.68	1.22	73.3%
	Total	35	3.78	1.17	77.6%

The findings indicate that the sample's response to the study's statements about the value of grammar proficiency for prospective security jobs is quite high on items 1 and 2, with percentages of (77.4%-76.7 percentage). In addition, it is high on item (4), with a proportion of 73.3%. The number of respondents, at 77.6%, is exceptionally high for the overall score.

The researcher provides a rationale of the overall score's reaction to the sampling study's consensus on the significance of grammar proficiency for potential future employment in the professional cyber security field. This is evident from the high levels of response for the majority of the questionnaire survey, which exceeded 77% in some areas.

4.7. The importance of knowing English to function well at work, advance, and have a successful corporate professional career in the future

The cadets are questioned on how English aids them in their instructional assignments, their intended careers, and the advantages of English to them. The response is reported in Table (7).

Table 7: English area percentages, means, and standard deviations for efficiency, advancement, and prospective professional lives at the workplace

No	Statement	Number	Mean	Standard Deviation	Percentage
1	Your proficiency in English will ensure your success in the English-language professional development program.	35	4.02	1.02	80.9%
2	My proficiency in English allows me to carry out my duties more successfully.	35	3.98	0.96	79.3%
3	English language practice helps me become more knowledgeable and skilled in the discipline of study and work.	35	3.88	1.07	77.8%

4	Pursuing my education in an English-speaking country.	35	3.86	1.10	76.8%
5	Boosting my probability of being awarded a fellowship to pursue my postgraduate study or take part in English-language development programs abroad.	35	3.74	1.27	75.2%
6	You can use English to clarify the location of the trace evidence to a person who does not speak Arabic.	35	3.72	1.22	74.1%
7	The English language makes it easier to navigate websites with themes relating to my area of expertise and various areas.	35	3.69	1.18	73.8%
8	Knowledge of the languages advancing me to a superior professional level.	35	3.51	1.35	70.5%
	Total	35	3.80	1.13	75.05%

The first item's percentage for the question addressing how proficiency in the language ensures success in English-language professional development workshops is 80.9%, which is very high. Furthermore, item (2) has a high percentage (79.3%). With a score of 75.05%, the total result is not too bad. Students majoring in Data Science and Cyber Security think that studying English will help them pass any external training programs they decide to enroll in after they enlist in the military. This result is in line with Menggo et al. (2019).

4.8. Responses linked to the second query

The study's question regarding the difficulties faced by Data Science and Cyber Security cadets in the English language is covered in this section. Table 8 displays the outcome.

Table 8: Means, Standard Deviation, and Percentages of Area in English in Complexities Confronting Data Science and Cyber Security Cadets.

No	Statement	Number	Mean	Standard Deviation	Percentage
1	I have a hard time keeping up with English duties in a real environment.	35	3.96	1.09	79.3%
2	I'm unable to follow a symposium debate in English communication.	35	3.80	1.02	75.9%

3	I have trouble interacting in English with international visitors who speak different dialects.	35	3.76	1.07	75.5%
4	My ability to express myself is lacking.	35	3.7	1.24	73.9%
5	I have trouble accurately interpreting word meanings in context.	35	3.66	1.06	73.01%
6	Everything that is spoken in English is difficult for me to comprehend.	35	3.63	1.14	72.8%
7	Due to the multiplicity of cultures, I have problems speaking English.	35	3.61	1.20	72.7%
	Total	35	3.74	1.12	75%

Data Science and Cybersecurity cadets in the English language face significant difficulties with this issue, as shown in Table 8. For instance, in point (1), *I have a hard time keeping up with English duties in a real environment.* It had a high ranking of (79.3%). The responses of cadets are also high on both items (2, 3), *I'm unable to follow a symposium debate in English communication* and *I have trouble interacting in English with international visitors who speak different dialects*. Their respective percentages are (75.9 and 75.5). The overall score is fairly high that reaching 75%.

4.9. Results of question three

Are there significant differences in Data Science and Cyber Security cadets' needs and English language in the aspects of difficulties due to gender?

Table 9: Findings of independent-sample (T) for students' preferences and English language in the factors of challenges caused by gender variable

Domain	Gender	N	Mean	Std. Deviation	Std. Error Mean	F	Sig.
The importance of basic skills in English	Male	19	3.91	0.53	0. 09	2.13	0.15
	Female	16	3.90	0.61	0.10		
Importance of listening skills	Male	19	3.97	0.58	0.11	1.21	0.25
	Female	16	3.95	0.64	0.10		
Importance of speaking skill	Male	19	4.01	0.65	0.11	0.46	0.48
	Female	16	4.04	0.49	0.08		
Importance of reading skills	Male	19	3.90	0.68	0.11	1.36	0.26
	Female	16	4.04	0.74	0.13		
Importance of writing skills	Male	19	3.90	0.54	0.09	0.05	0.81
	Female	16	3.97	0.50	0.11		
Grammar skills are very	Male	19	3.89	0.81	0.13		

						0.62	0.45
important to learn in the English Language.	Female	16	3.67	0.89	0.16		
Importance of the English language in the performance and promotion	Male	19	3.85	0.60	0.09	0.68	0.43
	Female	16	3.75	0.60	0.11		
English language in the aspects of difficulties	Male	19	3.77	0.72	0.13	0.03	0.88
	Female	16	3.70	0.73	0.12		

The aforementioned table unequivocally demonstrates that there are no gender-related disparities in the expectations and barriers faced by English Data Science and Cyber Security cadets at the level of significance (a=0.05). The null hypothesis is accepted since the level of significance (T) value exceeded 0, (0.05).

Given how important and necessary it is for both sexes to be able to function and operate throughout their lives and be able to contribute continually, there is an agreement between both sexes in the study. This shows that both female and male students in the Department of Data Science and Cyber Security have the same opinions and feelings about the same English language in terms of problems and the requirement to learn it for a range of objectives.

4.10. Findings of the fourth investigation

In terms of difficulty, are there significant differences between the requirements of Data Science and Cyber Security cadets?

Table 10: Findings from a one-way ANOVA comparing the requirements for Cyber Security and Data Science cadets with the challenges posed by English competency

Domain	Levels	Sum Of Squares	Degrees	Average Squares	F Value	Sig. Level
The significance of fundamental English skills	Between Groups	2.730	2	.911	3.114	.033
	Within Groups	19.565	33	.293		
	Total	22.296	35			
The significance of listening skills	Between Groups	1.506	2	.502	1.395	.253
	Within Groups	24.153	33	.361		
	Total	25.650	35			
The significance of communication skills	Between Groups	3.080	2	1.027	3.494	.021
	Within Groups	19.691	33	.293		

	Total	22.769	35			
The value of reading comprehension	Between Groups	.067	2	.021	.044	.989
	Within Groups	34.634	33	.518		
	Total	34.701	35			
The significance of composing abilities	Between Groups	1.354	2	.450	1.747	.168
	Within Groups	17.075	33	.260		
	Total	18.429	35			
The value of English language instruction Sentence construction abilities	Between Groups	.572	2	.191	.255	.858
	Within Groups	49.383	33	.748		
	Total	49.954	35			
The value of English language proficiency for competence and advancement	Between Groups	2.061	2	.687	2.00	.121
	Within Groups	22.989	33	.343		
	Total	25.050	35			
The challenges of the English language	Between Groups	1.501	2	.502	.958	.410
	Within Groups	34.551	33	.523		
	Total	36.050	35			

The results of table 10 show that there are no statistically significant differences in English proficiency. In terms of English proficiency, Data Science and Cyber Security cadets struggle greatly, with the first and third domains being the exceptions. The researcher understands the value of having proficiency in English abilities (first domain) and communicative competence (third domain) for the training of Data Science and Cyber Security cadets due to the high demand for these skills in the field of investigations and communications with teammates who work within the same line of duty in the workplace.

5. Discussion

The results demonstrate that scores on the four fundamental competencies of English language use—communicating, listening skills, comprehension skills, and composing—are quite robust, with scores ranging from 70% to 80% (80.4% - 78.7%). The cadets' awareness of the importance of language skills appears to be clear from their responses. Their major priority is communication, where this proficiency was rated at 80.4%. These results support those of

Masood and Al-Sheikh (2017).

The importance of mastering essential English language abilities, according to the study, is what caused the overall score to rise. The majority of the questionnaire replies are quite positive, topping 80% in one area that highlighted what the cadets expected from using the English language for potential utilization in the workforce they hope to perform in the future. The researcher credits such findings to the significance of the English language for three issues stated previously, and the study's sample unanimously affirms that having these skills makes it easier for Data Science and Cyber Security cadets to meet their obstacles and requirements. However, the level of reaction in writing is lower than other levels of reaction since Data Science and Cyber Security cadets always experience greater speaking challenges than writing challenges. This outcome is consistent with Erfiani et al., (2021), Ahmmed et al., (2020), and Menggo et al., (2019).

According to how important listening comprehension is, the score ranges from 73.5% to 81.7%. According to the researcher, the sample's response shows complete agreement about the importance of listening skills for an officer's possible career in Data Science and Cybersecurity. The large percentages of respondents that demonstrate affirmation to the bulk of survey questions, which equals a figure of over 81%, have consistently had an influence. These results, according to the researcher, are the outcome of the need for students to learn and comprehend English through active listening and its significance to their profession as officers. However, the proportion is lower for question four since students majoring in Data Science and Cyber Security assert that their university-based specialized courses have already equipped them with the terminology and lexicon they require. This outcome is consistent with Menggo et al., (2019).

Results for the sample's opinions on communicative skills for professional life in cybersecurity are very high, ranging from (83% to 78.8 %%). According to the researcher, these results are an outcome of participants' ability to successfully collaborate or even engage directly in the workforce. As a result, talking about topics related to law enforcement scenes is evidenced by the extremely high response rates. However, the item that talks about the importance of using the language to converse with native speakers received less attention because students studying Data Science and Cyber Security believe they can communicate with non-native speakers even if their English is not excellent. This result is consistent with studies by Erfiani et al. (2021), Ahmmed et al. (2020), and Menggo et al., (2019).

Understanding what one reads is essential for long-term success in Data Science and Cybersecurity. This is reflected in the high score of reading comprehension, as the response for the final score is 79%. The study finds that reading comprehension is essential for comprehending documents, words, and jargon used in Data Science and Cyber Security. However, it is asserted that candidates pursuing degrees in Data Science and Cyber Security can comprehend scenarios relevant to their line of work without having to read in English. Alhuqbani (2008) endorses this judgment.

The writing section receives relatively high ratings, totaling 86.4%. However, the concern regarding students' need for English writing skills to produce reports and articles about

topics related to their major and get them published on a global scale received the lowest responses (73.8%). It performed worse on the third criterion because Data Science and Cyber Security cadets think they can make reports on different topics without knowing how to write well. This result concurs with what Albaqshi (2016) and Yildirim discovered (2015).

The results show that the sample's reaction concerning the importance of grammar competence for potential security jobs is quite high, amounting to 73.3%. The researcher notes that the overall result supports the consensus of the poll's sample study on the importance of grammar proficiency for likely future employment in the professional cybersecurity field. The researcher believes that these findings demonstrate how crucial sentence structure is to writing professionally. The fourth criterion, however, earns a lower grade because the Data Science and Cyber Security cadets believe they are not native English speakers. The outcome is consistent with (Teoh et al., 2016).

When asked about how English helps students with their academic assignments, their intended occupations, and the benefits of English to them, they revealed that learning English would help them succeed in any external training courses they choose to register for after joining the military. The outcome is consistent with Menggo et al (2019).

Data Science and Cybersecurity cadets in the English language encountered significant challenges with keeping up with English-language responsibilities in a realistic environment, following a symposium debate in English communication, and struggling to interact in English with foreign visitors who speak different dialects. The results indicate that Data Science and Cyber Security cadets do not consider acquiring languages like English through common speech in the community of speakers. The result is supported by the findings of the studies conducted by Masood & Al-Sheikh (2017), Syakur et al., (2020), Yildirim (2015), and Siraranghom (2020).

Considering how crucial and fundamental it is for both sexes to be able to function and operate throughout their lives and be able to contribute continuously, there is an agreement between both genders in the study. This demonstrates that male and female undergraduates in the Department of Data Science and Cyber Security share the same concerns and attitudes regarding the same English language issues and the necessity to acquire it for a variety of goals.

The importance of having fluency in English and communication competency for the coaching of Data Science and Cyber Security cadets is of great value. This is due to the increased need for these competencies in the area of investigations and communications with peers who operate within the same line of responsibility in the organization. This observation is consistent with the conclusions drawn from research by Albaqshi (2016) and Ledward & Hirata (2011).

6. Conclusion

The results show that the four English language skills, cognitive, and communicative are highly required by cadets. This is because they acknowledge the widespread usage of English as the universal language of all specializations and educational disciplines. Al Istiqlal University decision-makers should include linguistic competence, focusing on conversion, listening, and communicating competencies because they are considered for being the most

essential for cadets. These skills meet the demands of cadets learning English. The most often acknowledged statement of the dimension is "Conversation" with a mean of 4.10. Following that is the phrase "Comprehension competency with a mean of 3.96. This is the consensus among most Al Istiqlal University students majoring in Data Science and Cyber Security. The Writing Competencies point, with a mean of 3.82, is the least popular. For the vast majority of Data Science and Cyber Security cadets, English language proficiency is a modest hurdle. The findings also indicate that the needs and difficulties faced by the Data Science and Cyber Security cadets concerning the aforementioned variables are not statistically different. Additionally, the results of the research show that, except in the initial and third domains, there are no statistically significant variations in the priorities and difficulties in English proficiency between Data Science and Cyber Security cadets at the level of significance (a=0.05).

Generally, the results show that cadets in Data Science and Cyber Security did not acquire any instruction about learning to communicate in English, and the learning resources of the English programs they had accomplished failed to satisfy cadets' perceptions of the requirements for professional English. By ranking academic abilities including interpreting data from scientific sources and their applicability in their line of work as security personnel, the participants showed that they understood the graduation criteria that lay ahead of them. The study's conclusions imply that English proficiency demands for cadets enrolled in Data Science and Cyber Security courses should be taken into account. They thought their proficiency in English was often only moderate.

6.1. Recommendations

- The following suggestions could well be drawn from the analyses and assertions:
- The requirement for the Data Science and Cyber Security cadets to communicate in English owing to its significance in developing their self-confidence.
- Having confidence and forming their persona, whether at work or while working as a cyber-scene investigator.
- The requirement that the Palestinian National Government implements a curriculum and English-language programs for al Istiqlal University's Data Science and Cyber Security cadets' development and regeneration.
- The requirement must conduct extensive research to understand the value of the English language for the Data Science and Cyber Security cadets and how it affects their line of work.
- The Data Science and Cyber Security cadets should receive extensive instruction in communication and listening competency to support the growth of their language.
- Providing knowledgeable individuals outside the academy to assist students in data analysis and digital forensics with communicative activities.

It is proposed that additional studies could be conducted to focus on the crucial requirements to build creative writing skills, particularly in learning to cope with data analysis,

to boost these contributions to the ongoing growth of literature in the field of foreign language acquisition across many specializations. Moreover, to meet the diverse English language requirements of the skilled domains, more study of cadets' preferences is required.

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