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The Role of the English Language in Facilitating Technical Knowledge Transfer and Modernizing Curricula in Higher Technical and Vocational Education

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الملخص بالعربي:

أصبحت اللغة الإنجليزية اللغة الرئيسة للتواصل العلمي والابتكار التكنولوجي والتعاون المهني على المستوى الدولي، مما جعل إتقانها ضرورة أساسية في مؤسسات التعليم التقني والمهني العالي للوصول إلى المعرفة التقنية، ودعم تطوير المناهج الدراسية، وإعداد الخريجين بما يتوافق مع متطلبات سوق العمل العالمي. هدفت هذه الدراسة إلى استقصاء دور إتقان اللغة الإنجليزية في تسهيل نقل المعرفة التقنية وتحديث المناهج الدراسية في مؤسسات التعليم التقني والمهني العالي في ليبيا. واعتمدت الدراسة المنهج الوصفي الكمي، حيث جُمعت البيانات باستخدام استبانة أعدها الباحث وطُبقت على عينة مكونة من (23) عضو هيئة تدريس ومدرس من مؤسسات التعليم التقني والمهني العالي. وتناولت الاستبانة آراء المشاركين حول دور اللغة الإنجليزية في نقل المعرفة التقنية، وتطوير المناهج الدراسية، والتحديات التي تواجه دمج اللغة الإنجليزية في التعليم التقني. وتم تحليل البيانات باستخدام الأساليب الإحصائية الوصفية، بما في ذلك المتوسطات الحسابية والانحرافات المعيارية. وأظهرت النتائج وجود مستوى مرتفع جدًا من الاتفاق حول أهمية اللغة الإنجليزية في تسهيل الوصول إلى المعرفة، ودعم تحديث المناهج. كما كشفت النتائج عن عدد من التحديات الرئيسة، أبرزها نقص مواد تعليم الإنجليزية التقنية، والحاجة إلى مزيد من التدريب اللغوي لأعضاء هيئة التدريس والمدرسين في التخصصات التقنية. وأوضحت نتائج الدراسة إلى أن تعزيز تعليم اللغة الإنجليزية، ولا سيما من خلال برامج الإنجليزية للأغراض الخاصة والدعم المؤسسي، يسهم في تحسين نقل المعرفة التقنية، وتطوير المناهج الدراسية، وزيادة جاهزية الخريجين للعمل في بيئات مهنية قائمة على التكنولوجيا. وتوصي الدراسة بدمج اللغة الإنجليزية بصورة أكثر فاعلية في سياسات ومناهج التعليم التقني والمهني بما يعزز جودة التعليم ويواكب التطورات التكنولوجية العالمية.

الكلمات المفتاحية :اللغة الإنجليزية، نقل المعرفة التقنية، تحديث المناهج الدراسية، التعليم التقني العالي، التعليم التقني والمهني، ليبيا.

Abstract:

This study examined academic staff members' and instructors' perceptions of the role of English in technical knowledge transfer and curriculum modernization in Libyan higher technical and vocational education. A quantitative descriptive design was employed, using a structured questionnaire administered to 23 purposively selected participants. The questionnaire addressed technical knowledge transfer, curriculum modernization, and challenges affecting English integration. Data were analyzed using means and standard deviations. Participants reported very high perceived importance of English for technical knowledge transfer (M = 4.40, SD = 0.64) and curriculum modernization (M = 4.43, SD = 0.63). They also identified substantial challenges (M = 4.45, SD = 0.61), particularly insufficient English for Specific Purposes (ESP) programs, limited technical English materials, and inadequate English-language training for technical instructors. By examining these three dimensions together, the study provides context-specific evidence from Libyan technical and vocational education. However, the small, purposively selected sample limits the transferability of the findings, which reflect participants' perceptions and cannot be generalized statistically to all institutions or disciplines in Libya. The study recommends developing discipline-specific ESP programs, improving technical English materials, strengthening instructor training, and establishing institutional policies to support English integration into technical curricula.

Keywords: English Language Proficiency; English for Specific Purposes (ESP); Technical Knowledge Transfer; Curriculum Modernization; Higher Technical Education; Technical and Vocational Education; Libya.

1 Introduction

The rapid expansion of globalization, digital transformation, and technological innovation has fundamentally reshaped the demands placed upon higher technical and vocational education institutions.

Today, graduates are expected not only to possess advanced technical competencies but also to demonstrate the ability to access, interpret, and apply knowledge generated across international scientific and industrial communities. As the overwhelming majority of scientific publications, engineering standards, technical manuals, software documentation, and research databases are produced in English, proficiency in the English language has become an essential component of technical education.

English has evolved beyond its traditional role as a foreign language to become the international language of science, engineering, technology, aviation, medicine, information technology, and global commerce. Universities, technical institutes, multinational corporations, and international organizations increasingly use English as the primary medium for communication, research dissemination, and professional collaboration. Consequently, students enrolled in higher technical and vocational education require adequate English language proficiency to engage effectively with contemporary technical resources and participate successfully in knowledge-based economies.

Technical knowledge transfer refers to the systematic process through which scientific discoveries, technological innovations, engineering practices, and professional expertise are transmitted from researchers and industries to educational institutions, instructors, and learners. Effective knowledge transfer enables educational institutions to maintain curricula that reflect current industrial developments, emerging technologies, and evolving workforce requirements. Since much of this knowledge is disseminated in English, language proficiency directly influences the efficiency with which institutions acquire, adapt, and implement technological advancements.

Curriculum modernization has similarly become a strategic priority for higher technical and vocational education worldwide. The rapid emergence of artificial intelligence, automation, renewable energy systems, robotics, cloud computing, cybersecurity, additive manufacturing, and data analytics requires continuous revision of educational programs to ensure their relevance to industry needs. Modern curricula emphasize competency-based learning, digital literacy, problem-solving, critical thinking, innovation, and lifelong learning. English plays a central role in supporting these reforms by providing access to international educational resources, technical standards, online professional development platforms, and collaborative research opportunities.

Within this context, English for Specific Purposes (ESP) has gained increasing importance in technical education. Unlike general English instruction, ESP focuses on developing language skills directly related to learners' academic disciplines and professional careers. ESP equips students with the vocabulary, communication strategies, and technical discourse required to understand engineering specifications, laboratory manuals, research articles, industrial regulations, software interfaces, and workplace communication. By integrating language learning with technical content, ESP contributes to both academic achievement and professional readiness.

Despite the growing recognition of English as a strategic educational resource, many higher technical and vocational institutions, particularly in developing countries, continue to experience challenges in integrating English effectively into technical curricula. Limited English proficiency among students and instructors, insufficient teaching resources, outdated curricula, inadequate professional development opportunities, and weak institutional partnerships with industry often restrict access to contemporary technical knowledge. These challenges may reduce graduates' competitiveness in local and international labor markets while slowing curriculum reform initiatives.

Recognizing these developments, educational policymakers increasingly acknowledge that strengthening English language education is not merely a linguistic objective but a strategic investment in national technological capacity, workforce development, innovation, and economic competitiveness. Consequently, understanding the role of English in facilitating technical knowledge transfer and curriculum modernization has become increasingly important for educational institutions seeking to improve the quality and relevance of higher technical and vocational education.

1.1 Statement of the Problem

The rapid development of science and technology has created increasing demands on higher technical and vocational education institutions to provide graduates with updated knowledge and skills that correspond with contemporary industrial and professional requirements. As UNESCO (2021) and the World Bank (2019) emphasize, technical and vocational education institutions are expected to prepare graduates who possess competencies aligned with the evolving needs of modern industries and

technology-driven economies. However, many technical education systems continue to face difficulties in maintaining curricula that reflect international technological developments due to limited access to recent scientific resources, technical documentation, and global academic communication channels. One of the major factors influencing this situation is the limited integration of English language education within technical and vocational programs. Although English represents the dominant language of scientific publications, engineering standards, technological manuals, software applications, and international professional communication, many students and instructors in technical institutions encounter difficulties in using English effectively for academic and occupational purposes (Crystal, 2003; Graddol, 2006). This limitation restricts their ability to access emerging technical knowledge, participate in international learning communities, and benefit from global technological advancements (Tardy, 2004; Warschauer, 2000). Furthermore, the separation between English language instruction and technical education often reduces the effectiveness of language learning. In many institutions, English courses are delivered as general language subjects without sufficient consideration of students' technical fields, professional requirements, or workplace communication needs. As a result, graduates may possess basic language knowledge but lack the specialized linguistic competencies required to understand technical materials, communicate within professional environments, and continue lifelong learning in rapidly changing technological fields (Hutchinson & Waters, 1987; Dudley-Evans & St John, 1998).

In addition, curriculum modernization requires continuous access to international models, industrial standards, digital resources, and research findings. Without adequate English proficiency among educators and learners, institutions may experience difficulties in adopting innovative teaching approaches, updating technical content, and establishing effective cooperation with international educational and industrial organizations (Rojewski, 2009). In the context of higher technical and vocational education, particularly in developing countries, there remains a need to investigate how English language proficiency contributes to technical knowledge transfer and curriculum modernization. Understanding this relationship may assist educational policymakers, curriculum designers, and technical institutions in developing strategies that strengthen English education and improve the quality and relevance of technical programs. Therefore, this study addresses the role of the English language as a strategic tool for facilitating access to technical knowledge, supporting curriculum development, and enhancing the capacity of higher technical and vocational education institutions to respond to global technological changes.

1.2 Significance of the Study

The significance of this study derives from the increasing importance of English as a fundamental resource for scientific communication, technological advancement, and professional development. As higher technical and vocational education institutions seek to prepare graduates capable of working within increasingly globalized and technology-driven environments, understanding the contribution of English language proficiency becomes essential.

The study is expected to contribute theoretically by expanding understanding of the relationship between language skills, knowledge transfer, and educational modernization. It highlights English not only as a communication tool but also as an essential mechanism through which technical knowledge is accessed, interpreted, adapted, and transferred within educational contexts.

From a practical perspective, the study may benefit curriculum developers and educational administrators by emphasizing the need to integrate English language instruction with technical disciplines. The findings may support the development of English for Specific Purposes (ESP) programs designed according to the linguistic and professional requirements of students in engineering, information technology, applied sciences, and other technical fields.

For instructors, the study may provide insights into the importance of developing both technical and language competencies. Technical teachers who possess stronger English skills may have greater opportunities to access international resources, participate in professional development activities, and introduce updated knowledge into their classrooms.

For students, improving English proficiency may increase their ability to understand technical manuals, use specialized software, follow online educational resources, and communicate effectively in professional environments. Consequently, English education may contribute to improving employability and preparing graduates for participation in local and international labor markets.

At the institutional level, this study may encourage higher technical and vocational education institutions to develop policies that promote curriculum internationalization, strengthen academic partnerships, and enhance technological competitiveness through effective use of English as a medium for knowledge exchange.

1.3 Research Questions

This study seeks to answer the following research questions:

1. What role does the English language play in facilitating technical knowledge transfer within higher technical and vocational education?
2. How does English support curriculum modernization and alignment with international technological developments?

1.4 Aims of the Study

The study aims to:

1. Explore the importance of English as an international medium for scientific and technological communication.
2. Analyze the relationship between English language education and curriculum modernization processes.
3. Provide recommendations for improving English language policies, curriculum design, and institutional practices in technical education.

1.5 Theoretical Framework

The relationship between English language proficiency, technical knowledge transfer, and curriculum modernization in higher technical and vocational education can be explained through several interconnected theoretical perspectives. This study is primarily grounded in two complementary frameworks: English as a Global Language Theory, and Knowledge Transfer Theory. Together, these perspectives explain how English functions not merely as a communication system but as a strategic educational resource that connects local technical institutions with global scientific and technological developments.

The first theoretical foundation of this study is related to the global status of English as the dominant language of international communication. Crystal (2003) explained that the worldwide expansion of English has been strongly associated with historical, economic, scientific, and technological developments. According to Crystal, English gained its international position because it became the preferred medium for communication among researchers, professionals, organizations, and institutions across linguistic and geographical boundaries. In contemporary scientific and technological contexts, English has become the main language through which knowledge is produced, published, exchanged, and applied. The importance of English in science and technology is particularly evident in higher technical and vocational education. As Swales (1990) emphasized, professional and academic communities depend on specialized forms of communication that enable members to participate effectively in their fields. Since many international research journals, technical standards, engineering manuals, software documentation, and digital learning platforms are produced in English, proficiency in the language provides learners and educators with direct access to global knowledge networks. Therefore, English competence should be considered an essential component of technical capability rather than an additional linguistic skill.

The second theoretical perspective underpinning this study is Knowledge Transfer Theory, which explains how scientific and technological knowledge moves between individuals, institutions, and professional communities. Knowledge transfer involves the processes through which discoveries, innovations, practices, and expertise are communicated, adapted, and implemented. In educational settings, knowledge transfer occurs when institutions transform external scientific and technological information into curricula, teaching materials, and learning experiences. Nonaka and Takeuchi (1995) highlighted that knowledge creation and transfer depend on effective communication processes between individuals and organizations. From this perspective, language represents a fundamental mechanism because knowledge cannot be transferred effectively without the ability to understand, interpret, and communicate information. In higher technical education, English serves as one of the main channels

through which international knowledge reaches educators and students. Technical publications, online courses, patents, industrial standards, and professional training materials are frequently available in English; therefore, limited English proficiency may restrict institutions' ability to acquire and apply technological developments. The connection between English and curriculum modernization can also be understood through globalization and educational transformation perspectives. Graddol (2006) argued that English has become closely connected with international education, employment, and technological development. As educational systems attempt to modernize their curricula according to global trends, access to international resources becomes increasingly important. Since many curriculum frameworks, professional standards, and technological innovations are communicated in English, language proficiency influences institutions' ability to update their educational programs.

In higher technical and vocational education, curriculum modernization requires continuous adaptation to emerging technologies, including artificial intelligence, automation, robotics, cybersecurity, renewable energy, and digital manufacturing. According to UNESCO (2016), technical and vocational education systems must continuously respond to technological changes and labor market demands through flexible curricula and competency-based approaches. English supports this process by enabling educators and curriculum developers to access international models, research findings, digital resources, and professional networks. However, integrating English into technical education remains challenging, particularly in developing educational contexts. Warschauer (2000) pointed out that unequal access to language and digital literacy can create barriers to participation in global knowledge environments. Many institutions face challenges related to students' limited English proficiency, insufficient ESP programs, lack of teacher preparation, outdated materials, and weak institutional policies supporting English integration. Therefore, this theoretical framework views English as a bridge connecting technical education systems with international scientific and technological communities. Through English proficiency and ESP-based approaches, higher technical institutions can improve knowledge transfer, modernize curricula, enhance graduate competencies, and strengthen their participation in global technological development.

1.6 Review of Related Studies

Previous research has examined the relationship between English, international communication, specialized knowledge, and vocational education. Crystal (2003) described the global role of English in scientific and professional communication, while Graddol (2006) discussed its growing importance in international education and employment. Similarly, Swales (1990) explained that participation in professional discourse communities requires familiarity with specialized genres and communication practices. These foundational works provide a theoretical basis for understanding why English may be important in technical education. However, they do not directly establish how academic staff in Libyan higher technical and vocational education perceive its role in knowledge transfer and curriculum modernization.

More recent empirical research has investigated English for Specific Purposes (ESP) in vocational and technical contexts. Avcı and Engin-Demir (2021) examined vocational English needs among students in the Accommodation and Travel Service department of a vocational and technical high school in Turkey. Their mixed-methods study involved 25 students, two vocational subject teachers, two English teachers, and three supervisors. The findings identified speaking and listening as important areas for development and highlighted concerns involving teaching materials, curriculum suitability, teacher qualifications, and relationships between schools and industry. This research demonstrates that effective vocational English provision involves more than general language instruction. However, its focus was on students' language needs in a specific vocational department, rather than academic staff perceptions of English as a means of technical knowledge transfer and curriculum modernization.

Arias-Contreras and Moore (2022) investigated English-language requirements among agricultural technicians in Chile. Using document analysis and interviews with five technicians and five teachers, they identified English-language tasks relevant to agricultural work and found that existing language provision did not adequately address the specific needs of vocational learners. The authors emphasized the importance of discipline-specific language instruction, appropriate learning materials, and professional development for ESP teachers. Their study is particularly relevant because it connects English-language requirements with vocational work. Nevertheless, it concentrated on agricultural training and workplace language needs, whereas the present study considers broader perceptions of

English in technical knowledge transfer and curriculum modernization within Libyan higher technical and vocational education.

Santika et al. (2022) conducted a case study of ESP needs in a vocational high school multimedia program in Indonesia. The participants included one English-language teacher and 18 students. The findings identified difficulties with grammar, vocabulary, and speaking, alongside the need for listening, reading, and writing skills in workplace settings. The researchers recommended materials incorporating technical vocabulary, authentic texts, copywriting, photography, and videography. Their findings highlight the importance of aligning English instruction with vocational specializations. Unlike that study, the present research does not focus on designing an ESP course for one occupational field. Instead, it examines how academic staff perceive English's contribution to accessing technical knowledge and supporting curriculum development, alongside the institutional challenges affecting its integration.

Nurhasanah and Kurniawan (2023) examined ESP needs in computer and network engineering at a vocational high school in Indonesia. Their study used questionnaires, textbook analysis, and interviews. The findings indicated a need for English instruction aligned with students' specializations and identified limitations involving ESP content, textbooks, facilities, and teachers' capacity to teach specialized English. This research provides direct evidence of the challenges associated with integrating English into technical education. However, its emphasis was on ESP provision in a specific vocational program. The present study adopts a broader institutional perspective by examining perceived benefits related to technical knowledge transfer and curriculum modernization together with barriers to English integration.

Taken together, these empirical studies indicate recurring concerns in vocational English education, including mismatches between general English instruction and occupational requirements, insufficient specialized materials, and the need for appropriate teacher preparation. They also demonstrate that English-language needs vary across professional fields. However, the studies reviewed above primarily investigate learners' language needs, the development of specialized teaching materials, or English instruction within particular vocational programs. They provide less direct evidence about how academic staff in Libyan higher technical and vocational education perceive English's role in accessing technical information, drawing on international professional standards, and updating technical curricula.

The present study addresses this context-specific gap by examining three related dimensions: English and technical knowledge transfer, English and curriculum modernization, and challenges affecting English integration. Its distinctive contribution is the combined examination of these dimensions through a descriptive questionnaire administered to 23 purposively selected academic staff members and instructors in Libyan higher technical and vocational education institutions. Rather than measuring students' English proficiency or testing whether English instruction causes improvements in technical outcomes, the study documents participants' perceptions of the potential value of English and the institutional barriers they identify. Given the small, purposively selected sample, the findings offer context-specific evidence and should not be generalized statistically to all Libyan institutions or technical disciplines.

2 Research Methodology

2.1 Research Design

This study employed a quantitative descriptive research design to examine academic staff members' and instructors' perceptions of the role of English in technical knowledge transfer and curriculum modernization in Libyan higher technical and vocational education. A questionnaire survey was used to collect quantitative data without manipulating variables or establishing causal relationships. The study focused on three dimensions: English and technical knowledge transfer, English and curriculum modernization, and challenges affecting the integration of English into technical education.

2.2 Participants

The study involved 23 academic staff members and instructors from higher technical and vocational education institutions in Libya. Participants were selected because their professional experience was relevant to technical teaching, curriculum implementation, the use of educational resources, and English-language needs in technical education.

2.3 Sampling Method

Purposive sampling was employed to select participants with relevant professional experience. Participants were required to be academic staff members or instructors in higher technical or vocational education, have experience teaching technical or vocational courses, have experience with curriculum implementation or educational resources, and agree voluntarily to participate.

The final sample comprised 23 participants. Because purposive sampling is a non-probability technique and the sample was small, the participants cannot be considered statistically representative of the wider population of academic staff and instructors in Libya. The findings are therefore interpreted as descriptions of the participating individuals' perceptions rather than conclusions that can be generalized statistically to all Libyan technical and vocational education institutions.

2.4 Research Instrument

The primary data-collection instrument was a structured questionnaire developed by the researcher in accordance with the study's objectives and relevant literature on English for Specific Purposes (ESP), technical English needs, vocational education, and curriculum development. Research on ESP in vocational and technical contexts has emphasized the importance of aligning English instruction with occupational requirements, specialized vocabulary, technical materials, and workplace communication (Arias-Contreras & Moore, 2022; Nurhasanah & Kurniawan, 2023; Santika et al., 2022).

The questionnaire contained 15 items in total. The three analytical dimensions were English and technical knowledge transfer, English and curriculum modernization, and challenges affecting English integration. Five items were reported for each dimension, accounting for 15 dimension-specific items. Responses to the questionnaire statements were recorded on a five-point Likert-type scale: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. Higher scores indicated stronger agreement with the statements. For interpreting mean scores, the study used the following operational categories: 1.00–1.80 = very low, 1.81–2.60 = low, 2.61–3.40 = moderate, 3.41–4.20 = high, and 4.21–5.00 = very high. These ranges were used as the study's interpretation criteria rather than presented as a standardized scale established by a particular published source. The questionnaire was researcher-developed. The literature informed the study's conceptual focus; however, the instrument was not reported as having undergone formal expert review or pilot testing. Consequently, these procedures cannot be cited as evidence of its validity.

2.5 Validity and Instrument Development

The questionnaire items were developed to reflect the study's three dimensions and were informed by literature concerning ESP needs in vocational and technical education. For example, Arias-Contreras and Moore (2022) examined English-language requirements in vocational agricultural education, while Santika et al. (2022) investigated English needs in a vocational multimedia program. Nurhasanah and Kurniawan (2023) examined ESP needs in computer and network engineering education. These studies provide relevant conceptual background for examining specialized language needs and challenges in technical education.

No formal expert review or pilot testing was conducted for the present questionnaire. Accordingly, the study does not claim that content validity was established through expert assessment or that the instrument was refined through pilot testing. This is a methodological limitation that should be acknowledged. Future research should subject the questionnaire to expert review and pilot testing before broader application.

2.6 Data Analysis

The questionnaire data were analyzed using descriptive statistics, including means and standard deviations. Means were used to summarize participants' agreement with individual statements and the three analytical dimensions, while standard deviations described the variability of responses. Items were ranked by their mean scores to identify the issues receiving the highest levels of agreement.

3 Results

The results were organized according to the main dimensions of the study, including the role of English in technical knowledge transfer, the contribution of English to curriculum modernization, and the challenges affecting the integration of English into technical education. Descriptive statistical methods,

including frequencies, percentages, means, and standard deviations, were used to analyze participants' responses.

Table (1) presents participants' responses regarding the role of English in facilitating technical knowledge transfer.

Table 1

Participants' Perceptions of English and Technical Knowledge Transfer

Rank	Statement	Mean	SD	Level
1	English facilitates access to digital learning resources.	4.52	0.51	Very High
2	English enables access to international technical publications.	4.48	0.59	Very High
3	English helps students understand technical manuals and documentation.	4.43	0.66	Very High
4	English contributes to continuous professional development.	4.35	0.71	High
5	English supports communication with international technical communities.	4.22	0.74	High
	Overall Mean	**4.40**	**0.64**	**Very High**

The results indicate that participants strongly recognize the importance of English in facilitating technical knowledge transfer. The overall mean score (M = 4.40, SD = 0.64) represents a very high level of agreement. The highest-rated item was related to access to digital learning resources (M = 4.52), suggesting that participants perceive English as an essential tool for accessing online technical information and professional learning opportunities.

Table (2) presents participants' views regarding the contribution of English to curriculum development and modernization.

Table 2

Participants' Perceptions of English and Curriculum Modernization

Rank	Statement	Mean	SD	Level
1	English provides access to international professional standards.	4.57	0.50	Very High
2	English helps curriculum developers access international educational models.	4.48	0.59	Very High
3	English supports updating technical course content.	4.43	0.66	Very High
4	English assists institutions in adopting emerging technologies.	4.35	0.71	High
5	English contributes to improving the quality of technical education programs.	4.30	0.70	High
	Overall Mean	**4.43**	**0.63**	**Very High**

The results demonstrate that participants consider English an important factor in curriculum modernization. The overall mean (M = 4.43, SD = 0.63) indicates a very high perception level. The results suggest that English enables curriculum developers and instructors to access international standards, technological updates, and educational models necessary for improving technical programs.

Table (3) presents the challenges identified by participants regarding the effective integration of English within higher technical and vocational education.

Table 3
Challenges Affecting English Integration in Technical Education

Rank	Challenge	Mean	SD	Level
1	ESP programs are insufficient in technical institutions.	4.61	0.49	Very High
2	Technical English learning materials are limited.	4.52	0.59	Very High
3	Technical instructors need more English training.	4.48	0.59	Very High
4	Students have limited English proficiency.	4.39	0.65	Very High
5	Institutional support for English integration is insufficient.	4.26	0.75	High
	Overall Mean	**4.45**	**0.61**	**Very High**

The results reveal that participants identify several challenges affecting effective English integration in technical education. The highest-ranked challenge was the limited availability of ESP programs (M = 4.61), indicating that participants believe technical institutions require specialized English courses designed according to learners' professional fields.

3.1 Overall Results

Table (4) summarizes the overall findings of the questionnaire dimensions.

Table 4
Overall Mean Scores of Study Dimensions

Rank	Dimension	Mean	SD	Level
1	Challenges of English Integration	4.45	0.61	Very High
2	English and Curriculum Modernization	4.43	0.63	Very High
3	English and Technical Knowledge Transfer	4.40	0.64	Very High

The overall results indicate that participants perceive English as a highly important factor in higher technical and vocational education. The results demonstrate that English contributes significantly to accessing technical knowledge, supporting curriculum modernization, and connecting educational institutions with international technological developments. However, the findings also reveal considerable challenges, particularly related to English Language implementation, availability of specialized materials, and instructors' preparation.

4 Discussion

4.1 English and Technical Knowledge Transfer

The results indicate that participants perceived English as highly relevant to technical knowledge transfer, with an overall mean of 4.40 (*SD* = 0.64). Access to digital learning resources and international technical publications received the highest ratings. These findings suggest that participants consider English important for accessing technical information and professional learning materials that may not be readily available in other languages.

This interpretation is consistent with Crystal's (2003) discussion of English as a global language and Swales's (1990) account of the specialized communication practices used in academic and professional communities. These works provide a theoretical explanation for the perceived importance of English in technical settings. However, the present study measured participants' perceptions rather than their actual ability to access, understand, or apply English-language resources.

The relatively high rating for technical manuals and documentation also indicates that participants recognize the relevance of English-language materials to technical learning. In practical terms, this perception supports considering language needs when developing technical courses and selecting educational resources. Nevertheless, the present descriptive data cannot determine whether participants' English proficiency directly improves knowledge transfer or professional performance.

4.2 English and Curriculum Modernization

The curriculum-modernization dimension produced an overall mean of 4.43 (*SD* = 0.63). Participants rated access to international professional standards particularly highly, followed by access to international educational models and the updating of technical course content. These results suggest that respondents view English as a useful resource for obtaining information that may inform curriculum review and development.

The findings are consistent with the broader argument that technical and vocational education must respond to technological change and evolving workplace requirements. UNESCO (2021), for example, emphasizes the need for TVET systems to remain responsive to changes in technology, skills, and employment. In this study, participants' responses indicate that English-language access to international information is perceived as relevant to those efforts.

However, the questionnaire did not directly measure curriculum changes, the adoption of international standards, or the quality of revised programs. The findings therefore show that participants perceived English as relevant to curriculum modernization; they do not demonstrate that English use resulted in actual curriculum improvements.

4.3 Challenges Affecting English Integration

Challenges affecting English integration received the highest overall mean among the three dimensions (*M* = 4.45, *SD* = 0.61). The insufficient availability of ESP programs was the highest-rated challenge, followed by limited technical English materials and the need for additional English training for technical instructors. These responses suggest that participants perceive specialized instruction and institutional resources as important conditions for integrating English into technical education.

This finding is consistent with the central principle of ESP: language instruction should be designed around learners' specific academic or occupational needs. Hutchinson and Waters (1987) and Dudley-Evans and St John (1998) provide foundational discussions of needs-based language teaching. More recent studies in vocational contexts have also identified the importance of discipline-specific language requirements and appropriate learning materials (Arias-Contreras & Moore, 2022; Nurhasanah & Kurniawan, 2023; Santika et al., 2022).

The high rating for instructor training further suggests that participants see English integration as an institutional and professional-development issue, rather than solely a student-level concern. Technical instructors may need appropriate language support to work with English-language resources and communicate specialized content, although the present study did not directly assess instructors' language proficiency or training needs through performance measures.

The results therefore point to several areas that institutions could consider: developing discipline-specific ESP programs, producing or adapting technical English materials, providing relevant training for instructors, and strengthening institutional support. These are practical implications drawn from participants' reported perceptions, not interventions whose effectiveness was tested in this study.

4.4 Overall Interpretation and Contribution

Across all three dimensions, the mean scores ranged from 4.40 to 4.45, indicating very high agreement under the study's interpretation criteria. The findings show that participants perceived English as relevant to accessing technical information and supporting curriculum development, while also identifying substantial barriers to its integration.

The study's contribution lies in examining these three dimensions together within the context of Libyan higher technical and vocational education. Whereas research on ESP often focuses on language needs in particular vocational disciplines, this study combines perceived benefits related to technical knowledge transfer and curriculum modernization with the challenges respondents associate with English integration.

The results must nevertheless be interpreted in light of the study's limitations. The sample consisted of 23 purposively selected participants, and the findings were based on self-reported questionnaire responses. Furthermore, the questionnaire was not subjected to formal expert review or pilot testing. The findings are therefore context-specific and cannot be generalized statistically to all Libyan technical and vocational education institutions. Future studies could include larger samples from multiple institutions and disciplines, evaluate the questionnaire's validity and reliability, and combine

staff perceptions with evidence from curriculum documents, technical materials, and assessments of English-language skills.

Overall, the findings suggest that participants regard English as an important resource for technical education, while perceiving the availability of ESP programs, technical English materials, instructor training, and institutional support as areas requiring attention. These perceptions provide a basis for further investigation and for considering context-sensitive approaches to English integration in technical and vocational curricula.

5 Conclusion

This study examined academic staff members' and instructors' perceptions of the role of English in technical knowledge transfer and curriculum modernization in Libyan higher technical and vocational education. The findings indicated high levels of agreement across the three dimensions investigated: technical knowledge transfer (M = 4.40, SD = 0.64), curriculum modernization (M = 4.43, SD = 0.63), and challenges affecting English integration (M = 4.45, SD = 0.61). Participants' responses suggest that they regard English as important for accessing technical information and supporting curriculum development. They also perceive insufficient English for Specific Purposes (ESP) provision, limited technical English materials, and inadequate language training for technical instructors as important challenges.

These findings should be interpreted in light of the study's limitations. The sample consisted of 23 purposively selected participants, which limits the transferability of the results to other institutions and contexts. In addition, the data were based on self-reported questionnaire responses and therefore reflect participants' perceptions rather than direct measurements of knowledge-transfer outcomes, actual curriculum changes, or graduate employability. The findings do not establish that English integration directly produces improvements in these areas.

Future research could involve larger and more diverse samples from multiple Libyan technical and vocational education institutions. Further studies could also combine questionnaires with interviews, curriculum and teaching-material analysis, and direct assessments of technical English proficiency or access to technical information. Longitudinal or intervention-based research could investigate whether introducing discipline-specific ESP courses and technical English resources is associated with measurable changes in teaching practices, curriculum development, or students' technical-language performance. Such research would provide a stronger evidence base for decisions about English-language provision in Libyan technical and vocational education.

6 Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Integrate English language skills with technical curricula by connecting language instruction with technical subjects, practical training, and professional communication needs.
2. Provide continuous professional development programs for technical instructors to improve their ability to access English-based technical resources and incorporate international knowledge into their teaching practices.
3. Develop and update technical English learning materials including textbooks, digital resources, manuals, and online learning materials that reflect current technological developments.
4. Encourage the use of English-based scientific and technological resources such as international journals, digital platforms, professional standards, and online training courses to enhance knowledge transfer.
5. Establish institutional policies supporting English integration within higher technical and vocational education programs to strengthen curriculum modernization and international cooperation.
6. Conduct regular needs analyses to identify students' and instructors' English language requirements and ensure that English programs remain relevant to technological and labor market changes.
7. Promote collaboration between English language instructors and technical specialists to design effective ESP courses that combine language skills with professional knowledge.

8. Support research on English language integration in technical education, particularly within the Libyan context, to evaluate effective strategies for improving language proficiency and educational outcomes.

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