

ENGLISH LANGUAGE NEEDS OF ENERGETICS PROFESSIONALS : IMPLICATIONS FOR ENGLISH FOR SPECIFIC PURPOSE CURRICULUM DEVELOPMENT

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Abstract : This study investigates the English language needs of forty-eight (48) companies in Benin, comprising twenty-three (23) renewable energy companies and twenty-five (25) refrigeration and cooling companies. The main objective is to identify the English language competencies required across these two industrial sectors in order to develop an English for Specific Purposes (ESP) syllabus tailored to the professional needs of students enrolled in the Bachelor's Degree in Energetics at the Institut National Supérieur de Technologie Industrielle (INSTI), Lokossa. Participants were selected on their accessibility and willingness to participate, without gender restrictions. The study involved five hundred and fifty-eight (558) respondents, including five hundred and forty-eight (548) employees and ten (10) employers, representing a wide range of professional positions within their respective organisations. A mixed-methods research design was employed, combining questionnaires, semi-structured interviews adapted from Westerfield's (2009) needs analysis checklist, workplace communication analysis, and a review of existing English language syllabi. The findings indicate that English proficiency is essential for interpreting technical manuals, reading electrical and refrigeration diagrams, communicating effectively with international manufacturers, suppliers and business partners, preparing technical reports, installing and maintaining energy and refrigeration systems, and participating in technical training programmes delivered in English. The study therefore highlights the need for a context-specific ESP syllabus grounded in authentic workplace communication and designed to address the linguistic demands of both the renewable energy and refrigeration industries.

Keywords : Energetics, Renewable Energy, Refrigeration and Cooling, English for Specific Purposes (ESP), Needs Analysis.

BESOINS EN ANGLAIS DES PROFESSIONNELS DU SECTEUR ENERGÉTIQUE : IMPLICATIONS POUR L'ÉLABORATION DE PROGRAMMES D'ANGLAIS SUR OBJECTIFS SPÉCIFIQUES

Résumé : Cette étude porte sur l'analyse des besoins en anglais de quarante-huit (48) entreprises béninoises, dont vingt-trois (23) entreprises spécialisées dans les énergies renouvelables et vingt-cinq (25) entreprises intervenant dans les domaines du froid et de la réfrigération. L'objectif est d'identifier les compétences linguistiques en anglais requises dans ces deux secteurs afin de concevoir un programme d'anglais de spécialité répondant aux exigences professionnelles des étudiants inscrits en Licence génie énergétique à l'Institut National Supérieur de Technologie Industrielle (INSTI) de Lokossa. Les participants ont été sélectionnés selon leur accessibilité et leur disponibilité à participer à l'étude, sans distinction de genre. Au total, cinq cent cinquante-huit (558) personnes ont participé à la recherche, dont cinq cent quarante-huit (548) employés et dix (10) employeurs, représentant différents profils professionnels au sein de leurs entreprises respectives. Une méthodologie mixte a été adoptée, combinant des questionnaires, des entretiens semi-directifs adaptés de la grille d'analyse de Westerfield (2009), l'analyse des situations de communication en milieu professionnel ainsi qu'un examen des programmes d'anglais existants. Les résultats révèlent que la maîtrise de l'anglais est devenue indispensable pour interpréter les manuels techniques, comprendre les schémas électriques et frigorifiques, communiquer avec les fabricants, fournisseurs et partenaires internationaux, rédiger des rapports techniques, installer et assurer la maintenance des équipements énergétiques et frigorifiques, ainsi que suivre des formations techniques dispensées en anglais. L'étude met ainsi en évidence la nécessité de développer un programme d'anglais de spécialité fondé sur les besoins réels du terrain et intégrant des tâches de communication authentiques qui reflètent les exigences linguistiques des secteurs des énergies renouvelables et de la réfrigération.

Mots-clés : énergétique, énergies renouvelables, réfrigération et froid, anglais de spécialité, analyse des besoins.

Introduction

The rapid expansion of renewable energy and refrigeration sectors in Benin over the past decade has increased the demand for professionals who possess not only sound technical expertise but also effective English language communication skills. As the country intensifies its efforts to promote sustainable energy solutions and improves energy efficiency, engineers and technicians increasingly interact with international manufacturers, development partners, technical consultants, and multinational companies. Most technical manuals, equipment specifications, maintenance procedures, safety guidelines, and training resources in the energy sector are produced in English, making English proficiency a critical component of professional competence. However, as in many African countries, graduates from technical institutions often experience difficulties entering the labour market because the skills acquired during their studies do not always correspond to employers' expectations (Trudeau & Omu, 2017; Fynn, 2020; Allais, 2022). Among these deficiencies, limited English language proficiency remains a major barrier to employability and career development. A growing body of literature has highlighted the importance of English as a key employability skill in engineering and technology-related professions. Employers increasingly expect graduates to communicate effectively in English, particularly when

reading technical documentation, preparing reports, participating in international training programmes, collaborating with foreign experts, and operating imported equipment (Riemer, 2002; Kassim & Ali, 2010; Zahari et al., 2016; Rup et al., 2016). In many organisations, English proficiency constitutes an important recruitment criterion, while career progression often depends on employees' ability to communicate in international professional environments. Within the renewable energy and refrigeration industries, professionals are frequently required to install, commission, troubleshoot, and maintain sophisticated technologies supplied by international manufacturers, whose documentation and customer support are predominantly available in English.

Previous research has also demonstrated a persistent mismatch between university training and workplace expectations, particularly regarding graduates' communication skills and professional preparedness (Bradley, 2016; Mncayi, 2021). To reduce this gap, needs analysis has become a fundamental stage in the design of English for Specific Purposes (ESP) programmes, enabling curriculum developers to identify the linguistic and communicative competencies required in specific occupational settings (Brown, 1995; West, 1994; Long, 2005; Basturkmen, 2013). By systematically investigating learners' target situations and employers' expectations, needs analysis ensures that language programmes are relevant, authentic, and directly applicable to professional practice (Benesch, 1996; Berwick, 1989; Boshier & Smalkoski, 2002).

Guided by these principles, the present study investigates the English language needs of forty-eight (48) companies in Benin, comprising twenty-three (23) renewable energy companies and twenty-five (25) refrigeration and cooling companies. The objective is to identify the communicative tasks, language skills, and technical vocabulary required in these industries in order to develop an English for Energetics syllabus for the Bachelor's Degree in Energetics at the Institut National Supérieur de Technologie Industrielle (INSTI), Lokossa. This study responds to the growing need for competency-based and industry-oriented curricula that integrate employers' perspectives into programme development (Abou-Khalil et al., 2019; Wang & Burris, 1997). Consistent with the learner-centred philosophy advocated by Robinson (1987) and Nunan (2005), it is based on the premise that language instruction should be shaped by learners' present and future professional needs rather than by predetermined linguistic content. By identifying the English language requirements of the renewable energy and refrigeration industries, this research aims to provide evidence-based recommendations for ESP curriculum development, thereby enhancing graduates' employability, professional communication skills, and capacity to operate effectively in an increasingly globalised energy sector.

1. Review of the Scholarship

Needs analysis has long been recognised as the cornerstone of English for Specific Purposes (ESP) course design. Brown (1995) identifies it as the first stage in curriculum development, preceding the establishment of course objectives, language assessment, materials development, instructional delivery, and programme evaluation. Likewise, Dudley-Evans and St. John (1998) argue that a comprehensive needs analysis enables the development of highly focused courses that address learners' actual academic and professional requirements. Several scholars have reinforced this view, maintaining that needs analysis ensures the alignment of course content with authentic learner needs and workplace expectations (Gatehouse, 2001; Graves, 2000; Richards, 2001; Westerfield, 2010; West, 1994). According to Iwai et al. (1999), needs analysis involves the systematic collection of

information that serves as the foundation for designing programmes capable of addressing the specific needs of a clearly defined group of learners. Hyland (2006) provides a broader perspective by arguing that needs analysis extends beyond identifying learners' linguistic deficiencies. It also examines learners' professional goals, educational backgrounds, motivations, and future workplace responsibilities. Such a comprehensive approach enables ESP practitioners to develop programmes that are not only linguistically appropriate but also professionally relevant. Similarly, Smoak (2003) emphasizes that ESP instruction should be firmly grounded in authentic professional communication, arguing that "ESP is English language teaching based on the real and immediate needs of learners who must successfully perform real-life tasks. It is needs-based and task-oriented" (pp. 22–27). Hutchinson and Waters (1987) further distinguish between target needs: what learners are expected to accomplish in their future professional environments and learning needs, which concern how learners can most effectively acquire the required competencies. Target needs include necessities, lacks, and wants, encompassing the functional, grammatical, lexical, and discourse features learners require to perform successfully in occupational settings.

In the field of Energetics, needs analysis has become increasingly important due to the international nature of the renewable energy and refrigeration industries. The rapid expansion of renewable energy technologies, refrigeration systems, energy efficiency projects, and smart energy solutions has considerably increased the need for engineers and technicians capable of communicating effectively in English. Most technical documentation, equipment manuals, maintenance procedures, safety regulations, international standards, research publications, and manufacturers' specifications are published in English. Consequently, energy professionals are expected to read technical manuals, interpret electrical and refrigeration diagrams, communicate with international suppliers and manufacturers, prepare technical reports, participate in training programmes, and collaborate with multinational engineering teams.

Several studies have demonstrated that English proficiency has become an indispensable professional competency in engineering and technology-related disciplines. Riemer (2002) argues that communication skills are among the most valued attributes sought by engineering employers worldwide. Similarly, Kassim and Ali (2010) found that engineers frequently use English to communicate with colleagues, customers, consultants, and international partners in multicultural workplaces. Spence and Liu (2013) further observed that engineering graduates require English not only for technical communication but also for teamwork, project management, problem-solving, and professional presentations. Within the renewable energy sector, professionals regularly consult English-language standards issued by international organisations, operate imported equipment, and participate in international capacity-building programmes, making English proficiency a prerequisite for professional effectiveness.

Research conducted across various ESP domains including engineering (Spence & Liu, 2013), healthcare (Lu, 2018; Choi, 2021), tourism (Al-Khatib, 2005; Ho, 2020), and information technology consistently demonstrates that industry-specific needs analysis leads to more relevant and effective English language programmes. In the context of Energetics, this implies identifying the communicative situations in which graduates are expected to function, such as interpreting photovoltaic installation manuals, diagnosing refrigeration system failures, understanding electrical safety procedures, communicating with international equipment suppliers, writing maintenance reports, preparing project proposals, and participating in technical meetings conducted in English. Recent scholarship also

advocates participatory and context-sensitive approaches to needs analysis, encouraging the active involvement of employers, employees, graduates, educators, and curriculum developers throughout the programme design process (Abou-Khalil et al., 2019; Cowling, 2007; Jasso-Aguilar, 2005). Nunan (1988a) similarly argues that effective needs analysis should consider learners' existing competencies alongside the language demands of their future occupations. Such an approach ensures that ESP curricula address both immediate learning needs and long-term professional objectives. These theoretical perspectives provide a solid foundation for investigating the English language needs of professionals working in renewable energy and refrigeration companies in Benin. They also support the development of an English for Energetics curriculum that reflects authentic workplace communication, responds to local industrial realities, and prepares graduates to compete effectively in an increasingly globalised energy sector.

The current study aims to :

- ☐ Identify the English language needs of professionals working in the Energetics industries.
- ☐ Examine the extent to which the existing English language curriculum for Energetics students corresponds to the communicative requirements of the renewable energy and refrigeration sectors.
- ☐ Propose an English for Specific Purposes (ESP) syllabus tailored to the language needs identified in renewable energy and refrigeration companies, thereby improving graduates' employability and workplace performance.

Based on the literature reviewed and the objectives of the study, three hypotheses are formulated to guide the investigation.

- ☐ Hypothesis 1: The English language needs of professionals employed in the renewable energy and refrigeration industries differ from the content currently offered in existing English language programmes.
- ☐ Hypothesis 2: There is a weak alignment between the current English curriculum for Energetics students and the communicative demands of the renewable energy and refrigeration sectors.
- ☐ Hypothesis 3: An English for Energetics syllabus developed from the workplace language needs identified in renewable energy and refrigeration companies will better prepare graduates for successful integration into the labour market than the existing English curriculum.

2. Methodology

A mixed-methods research design was adopted, combining quantitative and qualitative approaches to obtain a comprehensive understanding of the English language needs of professionals working in the renewable energy and refrigeration sectors. This methodological approach enabled the triangulation of data from multiple sources, thereby providing a detailed picture of both perceived and actual workplace language requirements. The study population consisted of five hundred and fifty-eight (558) participants, including five hundred and forty-eight (548) employees and ten (10) employers, drawn from twenty-three (23) renewable energy companies and twenty-five (25) refrigeration and cooling companies in Benin. Participants represented a wide range of professional positions, including renewable energy engineers, refrigeration engineers, solar photovoltaic technicians, refrigeration and air-conditioning technicians, electrical engineers,

maintenance supervisors, project managers, installation technicians, sales engineers, customer service officers, and administrative personnel. Respondents were selected through purposive and convenience sampling based on their accessibility, willingness to participate, and professional experience. No gender restrictions were applied. Data were collected using four complementary methods. First, a 12-item questionnaire adapted from Westerfield's (2009) needs analysis framework was administered to all employees. The questionnaire gathered information on participants' professional positions, years of experience, academic qualifications, self-assessed English proficiency, previous English language training, frequency and purposes of English use at work, communication difficulties encountered because of limited English proficiency, and recommendations for developing an English for Specific Purposes (ESP) syllabus suitable for the Energetics programme. Employees were also invited to suggest the language skills, communicative situations, and technical vocabulary that should be incorporated into future English courses.

Second, employers completed a structured questionnaire designed to identify the English language competencies expected of employees in the renewable energy and refrigeration industries. The questionnaire examined recruitment criteria, workplace communication requirements, employees' English proficiency, professional tasks requiring English, and employers' recommendations for improving the English curriculum. Particular attention was given to language skills required for reading technical manuals, interpreting electrical and refrigeration diagrams, communicating with international manufacturers and suppliers, preparing technical reports, conducting maintenance operations, participating in technical meetings, and following international safety standards.

Third, semi-structured interviews were conducted with a purposive sample of employees and employers. The interview guide explored participants' educational and professional backgrounds, the frequency and context of English use in their daily work, typical communicative situations encountered in renewable energy and refrigeration activities, and the challenges associated with limited English proficiency. Interviewees also discussed the advantages of English proficiency for career advancement, participation in international training programmes, technology transfer, and collaboration with foreign experts. Finally, participants were invited to recommend the content, learning activities, and communication tasks that should be included in an English for Energetics syllabus.

Fourth, workplace documents were analysed to identify authentic language use in the two industries. The documents included installation manuals, equipment specifications, maintenance procedures, refrigeration service manuals, photovoltaic system documentation, electrical wiring diagrams, safety regulations, technical reports, manufacturers' catalogues, operation manuals, inspection reports, and maintenance records. This document analysis enabled the identification of the vocabulary, grammatical structures, discourse features, and communicative tasks most frequently encountered in professional practice.

Quantitative data obtained from the questionnaires were analysed using descriptive statistics, including frequencies and percentages, to summarise participants' English proficiency levels, patterns of language use, workplace communication needs, and training priorities. Qualitative data derived from interviews and document analysis were analysed through thematic content analysis to identify recurring themes related to workplace communication, language challenges, professional expectations, and essential English language competencies required in the renewable energy and refrigeration sectors. The integration of quantitative and qualitative findings provided a comprehensive understanding of both general and specific English language needs of energy professionals in Benin.

Combining questionnaires, semi-structured interviews, and authentic workplace document analysis ensured a robust and context-sensitive needs analysis. The findings constitute a solid empirical foundation for designing an English for Energetics syllabus that reflects authentic workplace communication, addresses the linguistic demands of the renewable energy and refrigeration industries, and equips future graduates with the English language competencies required for successful professional practice in both national and international contexts.

3. Results

The study revealed that professionals working in the renewable energy and refrigeration sectors have two principal English language needs: (a) communicating effectively with international manufacturers, suppliers, consultants, and technical partners, and (b) understanding and producing technical documentation, including installation manuals, maintenance guides, equipment specifications, technical reports, safety procedures, and international standards. Nearly all respondents indicated that English, alongside French, has become indispensable in their daily professional activities, reflecting its status as the dominant language of science, engineering, and global energy technologies (Graddol, 2006). Approximately 70% of respondents reported that their need for English had increased considerably since joining their companies, while 83% believed that English would become even more important as the renewable energy and refrigeration industries continue to expand. The increasing importation of solar photovoltaic systems, refrigeration equipment, air-conditioning technologies, batteries, inverters, and smart energy systems has significantly increased the demand for professionals capable of working with English-language documentation and communicating with international technical experts.

Regarding workplace language use, writing emerged as the most frequently used English skill (90.3%), followed by reading (80.6%). Employees regularly prepare maintenance reports, installation reports, technical emails, service records, inspection forms, quotations, and project documentation in English. Reading is equally important because professionals frequently consult installation manuals, operating instructions, equipment catalogues, electrical and refrigeration diagrams, safety procedures, and manufacturers' specifications. These findings corroborate previous studies in engineering and technical professions, which identify written English as the principal medium for technical communication and documentation (Male et al., 2009; Evans, 2010; Spence & Liu, 2013).

Speaking and listening were also identified as essential workplace skills. More than half of the respondents reported using English regularly during telephone conversations, online technical support sessions, virtual meetings, supplier negotiations, equipment commissioning, and international training programmes. Oral communication was particularly important when interacting with foreign manufacturers, explaining technical problems, requesting technical assistance, participating in workshops, and collaborating with multinational engineering teams. These findings support earlier ESP research advocating balanced development of all four language skills rather than focusing exclusively on reading technical texts (Dudley-Evans & St. John, 1998; Cowling, 2007).

The study further revealed significant shortcomings in the English language instruction currently offered to Energetics students. Many respondents indicated that existing English courses place excessive emphasis on general English while giving insufficient attention to technical communication and workplace applications. Employees consistently reported that they had received little preparation for interpreting technical

manuals, communicating with international suppliers, understanding equipment specifications, writing technical reports, or participating in professional meetings conducted in English. Employers similarly expressed dissatisfaction with graduates' ability to communicate effectively in authentic professional situations, particularly when installing imported equipment, troubleshooting technical problems, or consulting international documentation. These findings confirm the mismatch between existing English language programmes and the actual communicative demands of the renewable energy and refrigeration industries. They reinforce long-standing recommendations in the ESP literature advocating systematic needs analysis as the basis for curriculum development (Brown, 1995, 2009; Hutchinson & Waters, 1987; West, 1994). Consequently, the study highlights the necessity of developing a specialised English for Energetics syllabus for students enrolled at the Institut National Supérieur de Technologie Industrielle (INSTI), Lokossa, following the learner-centred and task-based principles advocated by Nunan (1988a) and Graves (2000).

3.1. Technical English for Energy Professionals

This component should focus on developing the specialised vocabulary and communicative competencies required in renewable energy and refrigeration professions. Students should acquire the language necessary to understand and produce technical documents such as installation manuals, maintenance procedures, electrical wiring diagrams, refrigeration schematics, equipment specifications, operating instructions, safety regulations, and technical reports. Following Hutchinson and Waters (1987), emphasis should be placed not only on specialised terminology but also on the ability to communicate complex technical information accurately and effectively. Students should also develop competence in writing maintenance reports, inspection reports, service records, technical emails, project documentation, and incident reports commonly encountered in professional practice.

3.2. Professional Communication Skills

This component should develop both oral and written communication skills required in the energy industry. It should include authentic tasks such as communicating with international manufacturers and suppliers, responding to customer enquiries, participating in technical meetings, conducting telephone and video conferences, presenting renewable energy projects, negotiating equipment purchases, and writing professional correspondence. Students should also practise explaining installation procedures, troubleshooting equipment failures, delivering technical presentations, and collaborating with multidisciplinary teams. These activities reflect the authentic workplace communication tasks emphasised by Gatehouse (2001) and Smoak (2003).

3.3. Practical and Context-Based Learning

The final component should emphasise experiential learning through authentic workplace scenarios drawn from renewable energy and refrigeration companies. Students should engage in simulations involving photovoltaic system installation, refrigeration system maintenance, electrical fault diagnosis, equipment commissioning, preventive maintenance, workplace safety, customer support, and project coordination. Collaborative problem-solving activities, role plays, technical case studies, laboratory simulations, and project-based learning conducted in English would enable learners to develop both technical and communicative competence simultaneously. Such an approach responds to recommendations

for participatory and context-sensitive ESP curriculum development (Abou-Khalil et al., 2019; Jasso-Aguilar, 2005) while preparing graduates to function confidently in multilingual and multicultural professional environments within the rapidly evolving energy sector.

4. Discussion

The findings of this study demonstrate that English has become an indispensable professional tool in the renewable energy and refrigeration industries in Benin. The results confirm that employees require English primarily for two broad purposes : communicating with international stakeholders and understanding highly specialised technical documentation. These findings are consistent with the growing body of ESP research arguing that English is no longer merely an academic subject but a professional competency that directly influences employability and workplace performance (Hutchinson & Waters, 1987; Dudley-Evans & St. John, 1998; Hyland, 2006).

One of the most significant findings concerns the dominant role of written communication. Writing emerged as the most frequently used language skill, followed closely by reading. This result may initially appear surprising because engineering professions are often associated with practical activities rather than documentation. However, it reflects the reality of modern engineering practice, where technicians and engineers continuously produce maintenance reports, inspection records, installation reports, service documentation, technical emails, and project records while simultaneously consulting manuals, equipment specifications, wiring diagrams, and safety regulations. These findings corroborate those of Male et al. (2009), Evans (2010), and Spence and Liu (2013), who argue that written communication has become central to engineering professions due to increased quality assurance procedures, international standards, and digital documentation. The study also highlights the growing importance of oral communication. Although writing and reading were used more frequently, speaking and listening remain essential because professionals regularly communicate with foreign manufacturers, suppliers, technical consultants, and international trainers. Telephone conversations, online meetings, virtual technical assistance, equipment commissioning, and professional presentations require engineers to communicate accurately and confidently in English. This finding supports Kassim and Ali's (2010) conclusion that engineers increasingly operate within multilingual workplaces where English functions as the principal language of professional interaction. Likewise, Riemer (2002) argues that communication competence has become one of the most valued employability skills sought by engineering employers worldwide.

Another important contribution of the study is the identification of a substantial mismatch between the English currently taught in the Bachelor's programme and the actual communicative demands of the workplace. Both employers and employees consistently reported that graduates possess insufficient preparation for authentic professional communication. Existing courses focus largely on General English while neglecting specialised communicative tasks such as interpreting technical manuals, writing maintenance reports, explaining equipment failures, participating in technical meetings, and communicating with international suppliers. These findings strongly support Hypotheses 1 and 2, confirming that the current curriculum does not adequately reflect workplace language needs. Similar mismatches between university English programmes and workplace expectations have been reported in engineering (Spence & Liu, 2013), healthcare (Lu, 2018), tourism (Ho, 2020), and information technology, suggesting that this challenge extends beyond the Beninese context.

The increasing reliance on imported technologies further reinforces the importance of English in the Energetics sector. Most photovoltaic systems, refrigeration equipment, batteries, inverters, control systems, and diagnostic software used in Benin originate from international manufacturers whose documentation is produced almost exclusively in English. Consequently, engineers must interpret manuals, follow installation procedures, consult troubleshooting guides, and understand international safety standards without translation. This observation confirms Graddol's (2006) argument that English has become the dominant language of science, technology, and international commerce. It also illustrates how technological globalisation has transformed English from an optional foreign language into a professional necessity for engineers.

The study further supports the learner-centred philosophy advocated by Robinson (1987), Nunan (1988a), and Graves (2000), according to which ESP programmes should originate from learners' target situations rather than predetermined linguistic content. The communicative tasks identified during workplace observations—including reading electrical diagrams, writing technical reports, participating in technical meetings, troubleshooting equipment, negotiating with suppliers, and delivering project presentations—provide authentic contexts upon which syllabus designers can build meaningful learning activities. This confirms Hutchinson and Waters' (1987) distinction between target needs and learning needs, demonstrating that successful ESP programmes should integrate both the language required in professional practice and the pedagogical strategies that facilitate its acquisition.

Finally, the findings strongly support Hypothesis 3 by demonstrating that an English for Energetics syllabus developed from authentic workplace needs would better prepare graduates for employment than the existing curriculum. The proposed syllabus integrates specialised vocabulary, professional communication, and task-based learning grounded in authentic workplace situations. Such an approach is consistent with recommendations by Smoak (2003), Cowling (2007), Basturkmen (2013), and Abou-Khalil et al. (2019), who advocate context-sensitive ESP programmes developed through close collaboration with industry stakeholders. By aligning language instruction with employers' expectations, the proposed curriculum is expected to enhance graduates' communicative competence, improve their employability, facilitate technology transfer, and strengthen their participation in international engineering projects.

Overall, the present study confirms that effective ESP curriculum design should be driven by systematic needs analysis involving employers, employees, educators, and authentic workplace documentation. For technical institutions such as INSTI-Lokossa, integrating industry-based communicative tasks into English instruction represents a strategic means of producing graduates who possess not only sound technical knowledge but also the English language competencies required to operate successfully in an increasingly globalised renewable energy and refrigeration industry.

-Proposed English for Energetics

Based on the findings of the present needs analysis, it is recommended that the existing General English curriculum be replaced or complemented by a competency-based English for Specific Purposes (ESP) syllabus specifically designed for students enrolled in the Bachelor's Degree in Energetics at INSTI-Lokossa. The proposed syllabus should aim to develop the English language competencies required in the renewable energy and refrigeration industries by integrating authentic workplace communication tasks and industry-specific content. It should include modules on the energy industry and engineering

professions, technical vocabulary related to renewable energy and refrigeration systems, reading and interpreting technical manuals, equipment specifications, electrical and refrigeration diagrams, technical writing, professional communication, workplace safety, international standards, project management, and employability skills. Learning activities should be task-based and project-oriented, allowing students to engage in authentic professional situations such as writing maintenance and inspection reports, preparing technical emails, conducting technical presentations, participating in meetings, communicating with international manufacturers and suppliers, responding to customer enquiries, diagnosing equipment faults, and explaining installation and maintenance procedures. The programme should also incorporate simulations, role plays, laboratory-based communication activities, case studies, collaborative projects, and the use of authentic materials such as manufacturers' manuals, technical catalogues, safety regulations, maintenance records, and engineering documentation. Instruction should emphasize the balanced development of reading, writing, speaking, and listening skills while fostering students' ability to work effectively in multilingual and multicultural professional environments. Assessment should combine continuous evaluation with practical assignments, oral presentations, technical report writing, and authentic workplace performance tasks. Such a learner-centred and industry-oriented syllabus would better prepare Energetics graduates to communicate effectively in English, access international technical resources, collaborate with global partners, and improve their employability in the rapidly expanding renewable energy and refrigeration sectors.

Conclusion

This study investigated the English language needs of professionals working in the renewable energy and refrigeration industries in Benin with the aim of developing an English for Specific Purposes (ESP) syllabus for students enrolled in the Bachelor's Degree in Energetics at the Institut National Supérieur de Technologie Industrielle (INSTI), Lokossa. Using a mixed-methods approach involving questionnaires, semi-structured interviews, workplace document analysis, and curriculum review, the study identified the communicative tasks, language skills, and technical competencies required in authentic professional settings. The findings revealed that English has become an essential professional competency in the energy sector, particularly for interpreting technical documentation, communicating with international manufacturers and suppliers, preparing technical reports, participating in professional meetings, and accessing technical training delivered in English. The study also demonstrated a clear mismatch between the existing English curriculum and the communicative demands of the renewable energy and refrigeration industries. While current courses focus primarily on General English, employers increasingly expect graduates to possess specialised language skills that enable them to function effectively in multilingual and technology-driven workplaces.

These findings confirm the importance of conducting systematic needs analyses before designing ESP programmes and reinforce the view that language instruction should be aligned with authentic workplace communication. Consequently, the study proposes a competency-based, learner-centred, and industry-oriented English for Energetics syllabus that integrates specialised technical vocabulary, professional communication skills, authentic workplace tasks, and project-based learning. Such a curriculum has the potential to strengthen students' communicative competence, facilitate their transition into employment, and improve their capacity to participate effectively in national and

international engineering environments. Beyond its contribution to curriculum development at INSTI-Lokossa, this research provides empirical evidence that may inform ESP programme design in other engineering and technology institutions in Benin and across similar educational contexts. It also highlights the importance of sustained collaboration between higher education institutions and industry to ensure that language education evolves alongside technological innovation and labour market expectations. Future research should evaluate the implementation and effectiveness of the proposed syllabus and explore the English language needs of professionals in other engineering disciplines to further strengthen ESP curriculum development in technical higher education.

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