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ESP Needs Analysis for Computer and Network Engineering Students at a Vocational High School in Bandar Lampung

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Abstract

This study investigated the English for Specific Purposes (ESP) needs of Computer and Network Engineering (TKJ) students at a vocational high school in Bandar Lampung, Indonesia. Guided by Hutchinson and Waters' needs analysis framework, it examined students' necessities, wants, lacks, and the alignment between current English materials and vocational demands. A mixed-methods case study involved 36 eleventh-grade students, one English teacher, and one TKJ teacher. Data were collected through a questionnaire, semi-structured interviews, and document analysis, then analyzed using descriptive statistics, thematic analysis, and document interpretation. The findings showed that students needed English mainly for technical instructions, tutorial videos, technical vocabulary, documentation, and workplace communication. They preferred hands-on, collaborative, task-based, and technology-related learning activities. Their main gaps were low confidence in professional English use, difficulty explaining technical concepts, limited technical vocabulary, and dependence on translation tools. Document analysis indicated that current materials remained general and lacked sufficient TKJ-related vocabulary, authentic technical texts, and workplace tasks. The novelty lies in triangulating student needs, teacher perspectives, and school documents within one TKJ context, showing that the mismatch is a curriculum-material issue. The study recommends ESP-oriented material adaptation through collaboration between English and vocational subject teachers.

1. Introduction

Vocational high schools play an important role in preparing students with practical skills for future employment. Unlike general senior high schools,

vocational schools are expected to equip learners with field-specific competencies that can support them either in entering the workforce or continuing their education in a related field. In the context of Industry 4.0, this responsibility has become even more important. Vocational students are expected not only to master technical skills, but also to access, understand, and use information in international and digital environments. In Indonesia, vocational education standards also highlight the importance of foreign language competence to support students' performance in their specific fields of expertise (Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia No. 34 Tahun 2018, 2018).

For this reason, English in vocational education should not be treated merely as a general school subject. It needs to be connected to students' areas of specialization and future occupational needs. This is especially relevant for Computer and Network Engineering students, commonly known as TKJ students in Indonesian vocational schools. These students often encounter English in software interfaces, hardware manuals, error messages, installation guides, online tutorials, technical documentation, and workplace communication. Therefore, English learning should help them perform technical and professional tasks, not only learn general grammar or everyday expressions.

Previous studies consistently indicate that English instruction in Indonesian vocational schools is still dominated by General English materials even when students belong to specialized programs. Evidence from culinary, engineering, and other vocational contexts shows that textbooks and classroom tasks often do not represent students' occupational language demands (Ayutami et al., 2018; Jaya et al., 2023; Prayoga et al., 2021). These studies collectively point to a systemic problem: vocational students are expected to operate in field-specific academic and workplace settings, yet their English learning materials often remain generic.

In engineering and technology-related fields, this issue is particularly urgent. Musrina et al. (2024) found that ESP needs analysis studies in engineering contexts have focused more on higher education, leaving vocational high school students relatively underrepresented. Although several studies have examined ESP needs in Computer and Network Engineering, learners' needs are inherently context-specific because they are shaped by curriculum demands, available learning resources, teacher practices, school-industry links, and local workplace expectations (Hutchinson & Waters, 1987; Poedjiastutie & Oliver, 2017). Therefore, a school-based needs analysis remains necessary to generate empirical evidence for locally relevant material development.

Needs analysis is a fundamental stage in ESP course and material development. Hutchinson and Waters (1987) classify learners' needs into necessities, wants, and lacks. Necessities refer to what learners must know or be able to do in the target situation. Wants refer to learners' preferences and expectations in the learning process. Lacks refer to the gap between learners' current proficiency and the competence required in the target situation. Through

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needs analysis, teachers and material developers can evaluate whether existing materials are relevant to students' academic and occupational demands. This process is important because ESP instruction should be grounded in learners' real communicative purposes and the demands of their future professional contexts (Dudley-Evans & John, 1998; West, 1994).

For Computer and Network Engineering students, English is not only a curriculum subject but also a practical tool for accessing technical knowledge. Software interfaces, network devices, manuals, error messages, installation guides, online tutorials, and technical documentation frequently use English as the default language. Students who have difficulty understanding technical English may struggle to follow tutorials, solve technical problems, read documentation, and communicate in professional situations. Previous studies on TKJ students have similarly emphasized technical vocabulary, technical reading, and English instructions as central needs (Helingo & Molou, 2024; Mahbub & Fauzi, 2018; Tri Nurhasanah & Eri Kurniawan, 2023).

Based on this background, this study aims to identify the English language needs of Computer and Network Engineering students at a vocational high school in Bandar Lampung and to examine the extent to which existing English materials align with those needs. The novelty of this study lies in the simultaneous integration of student questionnaires, teacher interviews, and document analysis within a single TKJ school context. This design allows the study to compare students perceived needs, teachers' instructional explanations, and the actual materials used in class, thereby offering a more comprehensive and context-sensitive account of ESP material mismatch than studies relying on only one data source. Specifically, this study addresses the following questions:

1. What are the English language necessities of Computer and Network Engineering students?
2. What are the students' preferred English learning materials and classroom activities?
3. What are the students' current English proficiency gaps?
4. To what extent do the existing English materials align with students' ESP needs?

2. Method

This study employed a mixed-methods case study design. The design was selected because ESP needs analysis requires both measurable patterns and contextual explanations of students' language needs. Questionnaire data were used to map students' necessities, wants, lacks, and perceptions of current materials, while interview and document data were used to explain, verify, and contextualize the questionnaire patterns. The study did not aim to make statistical generalizations; instead, it sought to provide a detailed, context-sensitive account of ESP needs in one Computer and Network Engineering program. This approach

is consistent with mixed-methods research, in which quantitative and qualitative evidence are combined to strengthen the interpretation of a research problem (Creswell & Creswell, 2022).

The study was guided by Hutchinson and Waters' (1987) framework of ESP needs analysis, which classifies learners' needs into necessities, wants, and lacks. In this study, necessities referred to the English skills and knowledge required by Computer and Network Engineering students in their academic and future occupational contexts. Wants referred to students' preferred learning materials and classroom activities. Lacks referred to the gap between students' current English ability and the English competence needed in their vocational field. In addition, this study examined the alignment between the existing English materials and students identified ESP needs.

The study was conducted at a vocational high school in Bandar Lampung, Indonesia, particularly in the Computer and Network Engineering program. The participants consisted of 36 eleventh-grade students majoring in Computer and Network Engineering, one English teacher, and one Computer and Network Engineering teacher. The students were involved because they were the target learners of the English materials being evaluated. The English teacher was involved because she had direct experience in teaching English to the students, while the Computer and Network Engineering teacher was involved because he understood the students' technical learning activities and vocational language demands.

The participants were selected through purposive sampling. Purposive sampling allows researchers to select participants who can provide relevant and information-rich data related to the research focus (Etikan, 2016; Palinkas et al., 2015). This sampling technique was considered appropriate because the study required participants who were directly involved in the English teaching and learning process in the Computer and Network Engineering context. The school and participants were kept anonymous. The English teacher was coded as ET1, and the Computer and Network Engineering teacher was coded as TKJT1.

Three instruments were used to collect the data: a student questionnaire, semi-structured interview guides, and a document analysis checklist. The questionnaire was administered to 36 eleventh-grade Computer and Network Engineering students. It consisted of closed-ended items using a five-point Likert scale and open-ended questions. The closed-ended items were designed to gather information about students' English necessities, preferred learning materials, preferred classroom activities, perceived proficiency gaps, and perceptions of current English materials.

The open-ended questions allowed students to provide additional explanations about their learning needs, difficulties, and suggestions. The questionnaire items were developed based on Hutchinson and Waters' ESP needs analysis framework and aligned with the research questions. To ensure content validity, the questionnaire was reviewed by one expert validator with a background

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in ESP and English language education. The validator assessed the clarity, relevance, and alignment of the items with the theoretical framework and research questions before administration. Revisions were made based on the validator's feedback to improve item precision and appropriateness. Because the questionnaire was used for descriptive needs analysis rather than as a standardized psychometric scale, the study emphasized content validity, item clarity, and triangulation across data sources rather than inferential reliability testing.

Semi-structured interviews were conducted with one English teacher and one Computer and Network Engineering teacher. The interview with the English teacher focused on students' English proficiency, classroom practices, existing English materials, teaching challenges, and the relevance of English instruction to the students' vocational field. The interview with the Computer and Network Engineering teacher focused on the role of English in technical learning, students' difficulties in understanding technical English, the use of English in computer and networking activities, and the English skills needed for students' future careers. The interviews were used to provide contextual explanations for the questionnaire findings.

Document analysis was conducted to examine the English lesson plan and worksheet currently used in the Computer and Network Engineering class. Document analysis is a systematic procedure for reviewing and interpreting written materials to obtain meaning, develops understanding, and identify relevant themes (Bowen, 2009). The documents analyzed in this study were the English lesson plan and worksheet used for eleventh-grade students in the Computer and Network Engineering and Software Engineering programs.

The document analysis focused on whether the materials included technical vocabulary, authentic technical reading texts, visual or digital resources, Computer and Network Engineering-related topics, and workplace communication tasks. This analysis was conducted to determine the extent to which the existing materials reflected students' ESP needs.

The data were analyzed quantitatively and qualitatively. The closed-ended questionnaire responses were tabulated and analyzed using frequency, percentage, and mean scores. The mean scores were used to identify the general tendency of students' responses. The interpretation of the mean scores was classified into three categories: High ($M \geq 3.50$), Moderate ($2.50 \leq M < 3.50$), and Low ($M < 2.50$). These categories were used to interpret students perceived necessities, wants, lacks, and perceptions of the existing materials.

The open-ended questionnaire responses were analyzed descriptively by grouping similar responses into recurring categories. The frequency of each category was then counted to support the interpretation of the closed-ended questionnaire results. This analysis helped identify students' additional comments regarding the topics, activities, difficulties, and improvements they expected in

English learning.

The interview data were transcribed, read repeatedly, and coded based on recurring themes related to necessities, wants, lacks, and material relevance. Thematic analysis was used to identify patterns in the teachers' responses. Thematic analysis was used because it enables researchers to identify, analyze, and report patterns within qualitative data (Braun & Clarke, 2006). The themes from the interviews were then compared with the questionnaire results to explain and strengthen the quantitative findings.

The lesson plan and worksheet were analyzed using a document analysis checklist. The checklist focused on the presence or absence of ESP-related elements, including technical vocabulary, authentic technical texts, workplace communication tasks, visual or digital resources, and topics related to Computer and Network Engineering. The results of the document analysis were interpreted descriptively and compared with the students' questionnaire responses and teacher interview findings.

The integration of quantitative and qualitative data was conducted during the interpretation stage through a triangulation matrix. First, the questionnaire results were used to identify dominant patterns in students' necessities, wants, lacks, and perceptions of existing materials. Second, the interview data were analyzed thematically to explain, confirm, or problematize those patterns. For example, when questionnaire results indicated students' difficulty in speaking about technical concepts, the teacher interviews were examined to identify possible classroom and vocational explanations for this gap. Third, the document analysis results were compared with both questionnaire and interview findings to determine whether the current materials addressed or failed to address the identified needs. Points of convergence and divergence across the three sources were then interpreted to produce a more trustworthy account of students' ESP needs.

Triangulation across the questionnaire, interviews, and document analysis was used to strengthen the credibility of the findings. Triangulation is useful for enhancing qualitative trustworthiness by comparing evidence from multiple data sources (Nowell et al., 2017). Ethical considerations were maintained throughout the study. Before data collection, participants were informed about the study's purpose, the voluntary nature of their participation, and their right to withdraw. Consent was obtained from students and teachers before the questionnaire and interviews were conducted. The school's name and participants' identities were anonymized, and participant codes (ET1 and TKJT1) were used in reporting the findings.

3. Result

This study drew on three sources of data: a student questionnaire involving 36 participants, semi-structured interviews with one English teacher (ET1) and

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one Computer and Network Engineering teacher (TKJT1), and document analysis of the English lesson plan and worksheet currently used in the TKJ class. The findings are presented based on four dimensions of the ESP needs analysis framework: students' necessities, wants, lacks, and the alignment between existing materials and the students' identified needs.

Students' Necessities

Table 1 presents students' responses to the necessity dimension of the questionnaire. This dimension reflects the English skills students perceived as important for their future IT-related careers

Table 1. *Student Perceptions of Target Needs - Necessities (N = 36)*

No.	Statement	SS	S	N	TS	STS	M	Cat.
1	Reading technical manuals and documentation	6	15	9	5	1	**3.56**	**High**
2	Understanding software interfaces and error messages	7	17	8	4	0	**3.75**	**High**
3	Writing technical reports about network/computer issues	2	11	21	2	0	**3.36**	**Moderate**
4	Writing professional emails to clients/colleagues	1	6	24	4	1	**3.06**	**Moderate**
5	Communicating with clients about technical problems	5	11	19	1	0	**3.56**	**High**
6	Presenting technical solutions or project results	3	8	23	1	1	**3.31**	**Moderate**
7	Understanding technical instructions in English	5	19	12	0	0	**3.81**	**High**
8	Watching English tutorial videos about technology	13	10	12	1	0	**3.97**	**High**
9	Technical vocabulary: computer hardware (CPU, RAM, etc.)	9	16	10	1	0	**3.92**	**High**
10	Technical vocabulary: networking (router, IP address, etc.)	7	19	10	0	0	**3.92**	**High**

Note. SS = Strongly Agree; S = Agree; N = Neutral; TS = Disagree; STS = Strongly Disagree; M = Mean. Category: High = M ≥ 3.50; Moderate = 2.50 ≤ M < 3.50.

As shown in Table 1, students' highest-rated necessities were related to accessing and understanding technical information. Watching English tutorial videos (M = 3.97), mastering hardware and networking vocabulary (M = 3.92), understanding technical instructions (M = 3.81), and understanding software interfaces or error messages (M = 3.75) were all categorized as High. These results suggest that English is needed not only for reading school texts but also for following audiovisual tutorials, operating software, interpreting technical messages, and engaging with online documentation. In contrast, technical reports,

professional emails, and presentations were rated Moderate, suggesting that formal productive skills may receive less immediate attention in the students' current learning context.

The interview findings supported the questionnaire results. ET1 identified reading and speaking as two essential skills for TKJ students, while TKJT1 emphasized the importance of technical vocabulary and reading. TKJT1 also noted that approximately 70% of TKJ learning materials use English by default. In addition, TKJT1 highlighted the need for speaking and listening skills in workplace communication, particularly for students who may participate in job placement programs through the school's BKK (Bursa Kerja Khusus).

Students' Wants

Tables 2 and 3 present students' preferences for English learning materials and classroom activities.

Table 2. Student Preferences: Learning Materials (N = 36)

No.	Statement	SS	S	N	TS	STS	M	Cat.
1	Learning through real technical manuals and documentation	5	10	19	2	0	**3.50**	**High**
2	Videos about computer and networking topics	3	18	13	2	0	**3.61**	**High**
3	Authentic IT industry materials (real emails, reports)	2	9	23	2	0	**3.31**	**Moderate**
4	Real workplace scenarios (troubleshooting, client communication)	5	17	12	2	0	**3.69**	**High**

Note. M = Mean. High = M ≥ 3.50; Moderate = 2.50 ≤ M < 3.50.

Table 3. Student Preferences: Learning Activities (N = 36)

No.	Statement	SS	S	N	TS	STS	M	Cat.
1	Hands-on practice and activities	16	12	7	1	0	**4.19**	**High**
2	Group or pair work during English class	10	16	9	0	1	**3.94**	**High**
3	Role-playing professional situations	6	14	12	4	0	**3.61**	**High**
4	More opportunities to practice speaking	10	14	9	2	1	**3.83**	**High**

Note. M = Mean. High = M ≥ 3.50.

In terms of learning materials, students showed a clear preference for materials connected to authentic and practical TKJ contexts. Real workplace scenarios, videos about computer and networking topics, and technical manuals were rated High, while authentic IT industry documents such as emails and reports were rated Moderate. This pattern indicates that students expected English materials to move beyond general topics and become more directly connected to troubleshooting, client communication, and technical procedures.

The open-ended responses confirmed this pattern. Students most frequently requested topics related to computer hardware, database management, cloud

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computing, and networking. These responses show that students wanted English materials that reflected the technical content they encounter in their vocational field.

Students' preferences for classroom activities showed an even clearer tendency toward practice-based learning. Hands-on practice received the highest mean score, followed by group or pair work, speaking practice, and role-playing professional situations. These results indicate that students preferred practical, collaborative, and communicative learning activities rather than text-based instruction alone.

The interview data were consistent with these findings. ET1 explained that TKJ students were accustomed to a learning model that emphasized practice more than theory. TKJT1 also suggested that English learning would be more meaningful if it included visual materials such as videos, images, and audio related to TKJ tools and activities. Students' open-ended responses similarly highlighted the need for more speaking practice and technology-related video tutorials.

Students' Lacks

Table 4 presents students' responses regarding their current English proficiency gaps.

Table 4. Student Perceptions of Current English Proficiency Gaps (N = 36)

No.	Statement	SS	S	N	TS	STS	M	Cat.
1	Difficulty understanding technical English vocabulary	8	8	14	5	1	**3.47**	**Moderate**
2	Difficulty reading technical manuals and documentation	3	12	15	4	2	**3.28**	**Moderate**
3	Difficulty speaking English about technical concepts	7	14	12	3	0	**3.69**	**High**
4	Difficulty writing technical reports or emails	4	12	12	7	1	**3.31**	**Moderate**
5	Lack of confidence in professional English use	9	17	7	3	0	**3.89**	**High**

Note. M = Mean. High = M ≥ 3.50; Moderate = 2.50 ≤ M < 3.50.

As shown in Table 4, the most prominent gaps were affective and communicative in nature. Lack of confidence in professional English use (M = 3.89) and difficulty speaking about technical concepts (M = 3.69) were both categorized as High. Moderate-level gaps in vocabulary comprehension, technical writing, and reading documentation further suggest that students need integrated support across language skills. The open-ended responses added that students struggled with motivation, technical vocabulary, speaking practice, grammar, and confidence. These findings show that students' difficulties are both linguistic and affective.

"Jadi mereka harus menerjemahkan dulu ke internet." (TKJT1)

TKJT1 further explained that students often used Google Translate, Google Lens, and ChatGPT to help them understand English technical content. ET1 added that speaking was difficult for students because they had to manage vocabulary, pronunciation, and grammar at the same time. This challenge was more noticeable among students who had limited opportunities to practice communicative English in class.

Alignment of Existing Materials with Students' Needs

Table 5. Student Evaluations of Current English Materials (N = 36)

No.	Statement	SS	S	N	TS	STS	M	Cat.
1	Current textbook is relevant to my TKJ field	2	8	21	5	0	**3.19**	**Moderate**
2	Current materials include enough technical vocabulary	1	11	19	5	0	**3.22**	**Moderate**
3	Topics in English class are connected to computer/networking	2	8	22	3	1	**3.19**	**Moderate**
4	Current materials prepare me for my IT career	3	14	19	0	0	**3.56**	**High**

Note. M = Mean. High = M ≥ 3.50; Moderate = 2.50 ≤ M < 3.50.

Students' perceptions of the current English materials were generally moderate. The weakest areas were topic relevance to computer and networking content (M = 3.19) and technical vocabulary coverage (M = 3.22), suggesting that students found the materials too general for their vocational context. Although the item on career preparation received a high mean score (M = 3.56), most students selected Neutral, indicating cautious rather than strong satisfaction with the current materials.

The document analysis helped explain these perceptions. The English lesson plan and worksheet, titled *Perangkat Mengajar Bahasa Inggris Kelas XI TKJ & RPL, 2025/2026*, consisted of three main units: asking and giving opinions about technology, analytical exposition, and narrative texts. Although these materials were pedagogically organized, they did not sufficiently represent the specific English needs of TKJ students.

4. **Discussion**

The findings are discussed based on Hutchinson and Waters' ESP needs analysis framework, which includes necessities, wants, and lacks. The discussion also addresses the alignment between current materials and students' vocational needs, as well as the implications of the findings for ESP curriculum adaptation.

The first major finding is that Computer and Network Engineering students need English mainly for technical and practical purposes. Students rated watching English tutorial videos, understanding technical instructions, mastering computer

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hardware and networking vocabulary, and reading technical documentation as their most important necessities. This finding reflects the nature of the TKJ field, where students frequently encounter English through software interfaces, digital tutorials, manuals, error messages, and technical documentation. In this context, English is not only a school subject. It functions as a tool for accessing technical knowledge.

This finding supports Hutchinson and Waters' (1987) view that ESP should be based on learners' target situation needs. For TKJ students, the target situation requires them to understand and use English in relation to computer systems, networks, troubleshooting procedures, and technical communication. Therefore, English instruction should not rely only on general topics. It should help students develop the vocabulary, reading, listening, and speaking skills required in their vocational field. Similar findings were reported by Mahbub and Fauzi (2018), Nurhasanah and Kurniawan (2023), and Helingo and Molou (2024), who identified technical vocabulary, technical reading, and English instructions as central needs among Computer and Network Engineering students.

The second finding concerns students' learning preferences. Students preferred hands-on activities, group or pair work, speaking practice, role-playing professional situations, technology-related videos, and real workplace scenarios. These preferences are consistent with the characteristics of vocational education, which emphasizes practical learning and skill application. Since TKJ students are already familiar with practice-based learning in their vocational subjects, English instruction should also give them opportunities to use language actively and contextually.

This finding suggests that task-based and multimedia-supported ESP materials may be suitable for TKJ students. Task-based learning is relevant to vocational ESP because it connects language learning with real occupational tasks and communicative purposes (Sari & Wirza, 2021; Widodo, 2016). English lessons, for example, can include tasks such as explaining how to install software, identifying computer hardware, describing network problems, reading troubleshooting guides, following tutorial videos, or role-playing communication between a technician and a client. These activities can help students see the relevance of English to their vocational learning and future workplace situations. Previous studies also show that vocational students tend to respond positively to contextual, practical, and career-oriented English materials (Fadlia et al., 2022; Hidayat, 2024; Yeni Rahmawati et al., 2025).

The third finding shows that students' major lacks were low confidence in professional English use, difficulty speaking about technical concepts, limited technical vocabulary, and dependence on translation tools. These gaps indicate that students have not yet developed enough confidence and competence to use English independently in technical contexts. Translation tools can support learning, but excessive dependence on them may prevent students from developing direct

comprehension of technical English. This is important because students will need to understand English instructions, manuals, and workplace communication more independently in the future.

Students' lack of confidence also has pedagogical implications. Confidence cannot be developed only through grammar instruction or textbook exercises. It requires repeated opportunities to use English in meaningful and relevant contexts. Gürler (2015) found a positive relationship between self-confidence and speaking skill, which shows that affective factors play an important role in students' oral performance. In vocational ESP contexts, students may feel anxious or reluctant to speak when they lack the technical vocabulary and communicative practice needed for workplace-related situations (Ayuningtyas et al., 2022). Therefore, English teachers should provide low-pressure speaking activities, guided vocabulary practice, role-play, collaborative problem-solving tasks, and technical presentations that gradually build students' confidence.

The fourth finding concerns the mismatch between students' needs and the existing English materials. The document analysis showed that the current lesson plan and worksheet were generally well organized, but the content was still general. The materials lacked technical vocabulary, authentic technical reading texts, and workplace communication tasks. This finding helps explain why some students perceived English lessons as only moderately relevant to their vocational field.

This mismatch is consistent with previous studies showing that English materials in Indonesian vocational schools are often not fully aligned with students' specific occupational needs. Findings from culinary, general vocational, and Computer and Network Engineering contexts similarly indicate the need for more field-specific English materials (Ayutami et al., 2018; Helingo & Molou, 2024; Jaya et al., 2023; Nurhasanah & Kurniawan, 2023). The present study extends these findings by showing, through document analysis, that the mismatch is visible not only in students' perceptions but also in the actual lesson plan and worksheet used in one TKJ classroom.

The results imply that English materials for TKJ students should be adapted rather than completely replaced. The existing lesson structure can still be used as a foundation, but the content needs to be enriched with ESP-oriented materials. For instance, a unit on giving opinions can be adapted into giving opinions about computer specifications, internet connection problems, or cybersecurity issues.

A unit on analytical exposition can discuss the advantages and disadvantages of cloud storage, online security, or network maintenance. A unit on narrative texts can also be contextualized through stories about troubleshooting experiences, internship experiences, or technology-related incidents. This approach is consistent with ESP material development principles, which emphasize material adaptation based on learners' target needs and contextual demands (Dudley-Evans & John, 1998; Hutchinson & Waters, 1987).

The findings also highlight the importance of collaboration between English

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teachers and vocational subject teachers. English teachers bring knowledge of language pedagogy, while TKJ teachers understand technical content and workplace relevance. Collaboration between them can help ensure that English materials are both linguistically appropriate and technically meaningful. Previous research also emphasizes that ESP curriculum development should involve relevant stakeholders so that the resulting materials are aligned with learners' academic and professional needs (Poedjiastutie & Oliver, 2017; Sari & Wirza, 2021). Therefore, schools should provide regular opportunities for joint planning, material development, and evaluation of ESP-based English instruction.

Overall, the study shows that Computer and Network Engineering students require English materials that are specific, practical, authentic, and connected to their vocational field. Their needs include technical vocabulary, listening to tutorial videos, reading documentation, speaking about technical problems, and communicating in workplace situations. However, the current materials still do not fully address these needs. For this reason, ESP-oriented material adaptation is needed to bridge the gap between English instruction and the occupational demands of TKJ students.

Beyond the Indonesian vocational context, this study contributes to ESP curriculum theory by demonstrating how multiple sources of evidence can reveal different layers of learner needs. Student questionnaires identified perceived needs and gaps, teacher interviews explained how those needs appeared in classroom and vocational learning, and document analysis showed whether the materials supported or neglected those needs. This triangulated evidence suggests that ESP material mismatch should be understood not only as a matter of student preference but also as a curriculum-design problem. Such an interpretation is relevant to other EFL vocational contexts where standardized General English curricula are applied to learners with specialized occupational language demands.

This study has several limitations that should be acknowledged. First, the sample was limited to one class of 36 students at a single vocational high school, which restricts the generalizability of the findings to other TKJ contexts, regions, or curriculum frameworks. Second, the study did not include classroom observation, which could have provided additional insight into how instruction actually unfolded and whether students' reported needs aligned with observable classroom behavior. Third, the perspectives of industry stakeholders and TKJ graduates were not included; their input could have further validated the target situation needs. Fourth, the questionnaire was validated through expert review but was not tested as a standardized scale with broader reliability analysis. Future research should address these limitations by involving larger and more diverse samples, incorporating classroom observation, including industry partners and alumni, and conducting more extensive instrument testing.

5. Conclusion

This study found that Computer and Network Engineering students need English for practical and technical purposes, particularly for understanding software interfaces, technical instructions, manuals, tutorial videos, technical vocabulary, and workplace communication. English is commonly used in software interfaces, manuals, tutorials, error messages, and other technical resources. Therefore, English instruction for these students should be closely connected to their vocational field.

The study also identified several gaps in students' current English ability. Many students reported low confidence in using professional English, difficulty speaking about technical concepts, limited technical vocabulary, and a strong dependence on translation tools. These findings indicate that general English instruction alone is not enough to prepare TKJ students for the language demands of their vocational field. They need more opportunities to use English actively in technical and workplace-related situations.

The document analysis further showed that the existing English materials were well organized pedagogically, but their content remained too general. The materials did not sufficiently include technical vocabulary, authentic technical reading texts, or workplace communication tasks related to Computer and Network Engineering. This points to a mismatch between the current English materials and students' ESP needs.

Based on these findings, this study recommends the development of ESP-oriented English materials for Computer and Network Engineering students. Such materials should integrate technical vocabulary, authentic manuals and documentation, tutorial-based listening activities, workplace communication tasks, and collaborative problem-solving activities. Collaboration between English teachers and vocational subject teachers is also essential to ensure that the materials are both linguistically appropriate and technically relevant.

This study was limited to one class of 36 students at a single vocational high school in Bandar Lampung and did not include classroom observation, industry stakeholders, or TKJ graduates. Therefore, the findings should not be generalized to all Computer and Network Engineering students in Indonesia. In addition, although the questionnaire was reviewed for content validity, future studies may conduct broader pilot testing and reliability analysis with larger samples.

Nevertheless, the study contributes to ESP needs analysis scholarship by demonstrating how the convergence of student questionnaires, teacher interviews, and document analysis can reveal a structural mismatch between General English curricula and the specific occupational language demands of vocational learners. Future studies should involve more schools, larger samples, classroom observation, and industry partners, and may also focus on developing and testing ESP-based English materials for Computer and Network Engineering students based on the needs identified in this study.

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