ENGLISH FOR PHYSICS EDUCATION STUDENTS: A NEEDS ANALYSIS AT AN INDONESIAN ISLAMIC UNIVERSITY

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Abstract

This study examined the English for STEM needs of Physics Education students at Universitas Islam Negeri Alauddin Makassar, Indonesia, in terms of necessities, lacks and wants. A descriptive cross-sectional survey was conducted with 20 students from the 2023 cohort, who completed a 41-item, five-point Likert questionnaire based on the needs analysis framework of Hutchinson and Waters. The data were analysed using frequencies, percentages and mean scores. Most students agreed that they need English to read academic texts (16 students, 80%) and to master physics vocabulary (15, 75%), and 15 (75%) agreed that they need to write reports or formal documents, although a similar item on writing was supported by only 10 (50%). Self-assessed proficiency was moderate (item means 3.00–3.40): about half of the students judged their reading and listening adequate, and fewer were confident in speaking, writing and pronunciation. The most frequently reported difficulties were technical vocabulary (15, 75%) and speaking fluently in academic settings (13, 65%). Students preferred hands-on activities (16, 80%), real examples (15, 75%) and digital media (15, 75%). Neutral responses were common: eight or more of the 20 students chose the neutral option on 12 of the 41 items, so several needs were expressed only tentatively. As the findings rest on one cohort's self-reports, they are preliminary; they suggest that an English for STEM course for these students should begin with physics reading and vocabulary, add structured practice in academic speaking and writing, and use practical, example-based tasks.

Keywords: English for Specific Purposes, English for STEM, Needs Analysis, Physics Education, Teacher Education

INTRODUCTION

In today's globalized world, English plays a central role in academic communication, scientific development and professional advancement. Most scientific publications, international journals, educational resources and research findings are presented in English, making the language an essential tool for students in science-related disciplines. For students majoring in Physics Education, English is not only a subject to be completed, but a key

resource for accessing knowledge, understanding scientific concepts and engaging with the global academic community.

At the university level, English is commonly offered as a compulsory course intended to equip students with basic language skills. However, general English instruction does not always address the specific academic and professional needs of students from particular fields of study. As a result, students may develop general language competence while still facing difficulties in using English effectively in academic reading, scientific writing, classroom communication and professional teaching contexts. Needs analyses in other disciplines, such as psychology (Ananta et al., 2025), marketing (Hulwa et al., 2025), health sciences (Mohamed et al., 2024) and engineering (Nurhasanah & Kurniawan, 2023; Sbastian & Yuniarto, 2025), have repeatedly found that students' needs differ from what general English courses provide.

In the context of Physics Education, students are expected to read scientific texts, understand physics terminology, prepare academic assignments and communicate complex concepts clearly. The language of physics combines technical vocabulary, dense noun phrases, symbols, formulas and graphs (Halliday & Martin, 1993; Lemke, 1990), and prospective physics teachers must also be able to explain these concepts to others. English learning in this field should therefore be relevant, practical and closely aligned with students' academic demands and future roles as physics educators. To achieve this, a needs analysis is required as an initial step in designing appropriate English learning materials and syllabi (Hutchinson & Waters, 1987).

Several needs analyses of Physics Education students have been conducted in Indonesia, but their conclusions differ. Indrasari (2016) examined second-semester students and their ESP lecturers at IAIN Raden Intan Lampung. At UIN Alauddin Makassar, Rahman and Rukmana (2022) surveyed third-semester students, a lecturer and graduates and concluded that the students needed speaking, reading and writing skills, whereas Dahlan et al. (2026) found that reading and technical vocabulary were rated far above speaking and writing. Azahra et al. (2025) likewise found that reading was the most needed skill and that limited scientific vocabulary was the main barrier in physics laboratory work. These studies leave unclear how much priority productive skills should receive relative to reading and vocabulary, and most of them report what students need without also examining their perceived lacks, learning preferences and learning environment within one framework.

At UIN Alauddin Makassar, English is taught to Physics Education students as a compulsory subject in the first semester, for 16 meetings of 100 minutes each. The course

uses general English textbooks that are not designed around the language demands of physics, so it may not match students' needs. The main issue addressed in this study is the potential gap between students' existing English abilities and the language skills required in the field of Physics Education. Using the categories of necessities, lacks and wants proposed by Hutchinson and Waters (1987), this study addressed the following research questions:

RQ1. What English language necessities do Physics Education students perceive for their academic studies and future profession?

RQ2. How do the students assess their current English abilities, and what lacks do they report?

RQ3. What do the students want from English learning in terms of learning strategies, course content and learning environment?

LITERATURE REVIEW

Needs Analysis in English for Specific Purposes

English for Specific Purposes (ESP) is an approach to language teaching in which decisions about content and method are based on the learner's reason for learning (Hutchinson & Waters, 1987). Hutchinson and Waters (1987) distinguish target needs, what learners need to do in the target situation, from learning needs, what learners need to do in order to learn. Target needs comprise necessities, the demands of the target situation; lacks, the gap between these demands and what learners already know; and wants, what learners themselves feel they need. Dudley-Evans and St John (1998) add present situation analysis and the learning environment to this framework, and Richards (2001) stresses that needs analysis should also consider the context in which a course will be taught. Basturkmen (2010) emphasizes that needs analysis should inform every stage of ESP course development, and she distinguishes objective needs, identified from the target situation, from subjective needs, as perceived by learners. A questionnaire of students' perceptions captures mainly subjective needs; Long (2005) therefore recommends using several sources and methods, such as interviews with teachers and analysis of target tasks, to obtain a fuller picture.

English for STEM and the Language of Physics

Hyland (2006) shows that students in higher education need English for the specific academic genres and practices of their disciplines. In physics, meaning is made jointly by language, mathematical symbols and visual representations, and scientific texts rely on technical terms and nominalization (Halliday & Martin, 1993; Lemke, 1990). Reading

physics textbooks and articles, writing laboratory reports and explaining concepts orally therefore require more than general English. For prospective physics teachers, the target situation also includes the classroom, where concepts must be explained clearly to school students. Content-based approaches that use science themes have been found to motivate science students and to develop their academic language (Arslan & Saka, 2010).

Previous Needs Analyses of Physics and STEM Students

Studies of Physics Education students in Indonesia consistently identify reading and vocabulary as central needs. Azahra et al. (2025) surveyed and interviewed 50 Physics Education students and found that reading was rated as the most needed skill (M = 4.1) and that limited command of scientific vocabulary hindered the understanding of laboratory texts and instructions. Dahlan et al. (2026) surveyed 45 Physics Education students at UIN Alauddin Makassar and found that reading (82%) and technical vocabulary (78%) were rated as most important, that speaking and writing were rated as moderately important, and that more than 75% of the students preferred multimedia materials. In contrast, Rahman and Rukmana (2022), who also included a lecturer and graduates, concluded that speaking, reading and writing were all needed. Studies in engineering fields report similar patterns of technical vocabulary needs and low confidence in speaking (Amarta et al., 2026; Nurhasanah & Kurniawan, 2023; Putri et al., 2026; Sbastian & Yuniarto, 2025). Mao and Zhou (2024) further show that students and teachers may agree on some needs and disagree on others, which suggests that students' views should eventually be compared with those of lecturers.

METHOD

Research Design

This study employed a descriptive cross-sectional survey design. According to Creswell (2012), a survey is appropriate when the aim is to describe the trends, attitudes or opinions of a group through numerical data. The survey design was selected because it is commonly used in needs analysis research in ESP and allowed students to respond independently based on their personal experiences in learning English (Dörnyei, 2007). Because the study describes one cohort at one point in time, its findings are not generalized beyond this group.

Participants

The population of this study consisted of students enrolled in the Physics Education Study Program, Faculty of Science and Technology, UIN Alauddin Makassar. The sample was taken from the 2023 cohort, who had taken English as a compulsory subject in their first

semester. All number students in the cohort were invited to participate (total sampling; Sugiyono, 2019), and 20 completed the questionnaire, a response rate of xx%. Report the gender distribution and age range.

Research Instrument

The instrument was a questionnaire administered through Google Forms and adapted from name the source of the items on the basis of the needs analysis framework proposed by Hutchinson and Waters (1987). It consisted of 41 closed-ended statements in eight sections: academic use and needs (items 1–4), learning background and motivation (items 5–8), self-assessed proficiency (items 9–14), perceived weaknesses (items 15–19), learning strategies and preferences (items 20–26), professional communication needs (items 27–31), expectations of the ESP course (items 32–36) and the learning environment (items 37–41). Items 1–4 and 27–31 address necessities, items 9–19 address lacks, and items 20–26 and 32–36 address wants; items 5–8 and 37–41 describe the learning situation. Responses were given on a five-point Likert scale from strongly disagree (1) to strongly agree (5) (Fraenkel et al., 2012). The items were presented in English / Indonesian. The items were reviewed, e.g., by an ESP lecturer, and whether they were piloted.

Data Collection and Analysis

The questionnaire link was shared with the students in during and after their compulsory English course. Before responding, the students were informed of the purpose of the study and that participation was voluntary and anonymous. The responses were recorded automatically by Google Forms. The data were analysed using descriptive statistics: the frequency and percentage of responses in each category, the number and percentage of students who agreed (agree and strongly agree combined) and the mean score for each item, calculated from the individual responses. Because every item was worded positively and no items were reverse-coded, agreement may be inflated by acquiescence bias (Dörnyei & Taguchi, 2010); neutral responses were therefore reported and interpreted as uncertainty rather than as agreement.

FINDINGS AND DISCUSSION

Findings

The findings are organized according to the three research questions: necessities (Tables 1 and 2), lacks (Tables 3 and 4), and wants and the learning situation (Tables 5 to 8).

All 20 students answered every item. Item means ranged from 3.00 to 4.10, and eight or more students (40% or more) chose the neutral option on 12 of the 41 items.

Necessities (RQ1)

Table 1 presents students' academic use of English and their academic needs.

Table 1. Academic use and needs

No.	Statement	SD	D	N	A	SA	Agree	Mean
1	I often use English in my academic studies or learning activities.	0	2	12	5	1	6 (30%)	3.25
2	I need English to read and understand academic or professional texts.	0	0	4	12	4	16 (80%)	4.00
3	I need English to write reports, papers, or formal correspondence.	0	3	7	9	1	10 (50%)	3.40
4	I need English that includes technical or field-specific vocabulary related to physics.	0	0	5	14	1	15 (75%)	3.80

Note. Values are numbers of students (N = 20). SD = strongly disagree (1); D = disagree (2); N = neutral (3); A = agree (4); SA = strongly agree (5). Agree = A + SA, with the percentage of the 20 students in parentheses. Means were calculated from the individual responses on the five-point scale.

Most students (12 of 20, 60%) were neutral about how often they use English in their studies, and only six (30%) agreed that they use it often, which indicates that English is present in their academic activities but has not yet become a regular practice. In contrast, 16 students (80%) agreed that they need English to read and understand academic or professional texts, the highest mean in this section (M = 4.00), and 15 (75%) that they need English that includes technical vocabulary related to physics. Half of the students (10, 50%) recognized the need for English to write reports, papers or formal correspondence, while three (15%) disagreed.

Table 2 presents students' needs for professional communication.

Table 2. Professional communication needs

No.	Statement	SD	D	N	A	SA	Agree	Mean
27	I need to learn how to communicate professionally in my field using English.	0	0	6	13	1	14 (70%)	3.75
28	I need to be able to write reports or formal documents in English.	0	0	5	14	1	15 (75%)	3.80
29	I need to use polite and formal English in professional situations.	0	0	7	11	2	13 (65%)	3.75
30	I need to master technical terminology related to my field.	0	0	7	12	1	13 (65%)	3.70
31	I need to understand how professionals in my field communicate using English.	0	0	7	11	2	13 (65%)	3.75

Note. Values are numbers of students (N = 20). SD = strongly disagree (1); D = disagree (2); N = neutral (3); A = agree (4); SA = strongly agree (5). Agree = A + SA, with the percentage of the 20 students in parentheses. Means were calculated from the individual responses on the five-point scale.

No student disagreed with any professional communication item. Fifteen students (75%) agreed that they need to be able to write reports or formal documents in English, 14 (70%) that they need to learn to communicate professionally in their field, and 13 (65%) each that they need to use polite and formal English, to master technical terminology and to understand how professionals in their field communicate in English. Between five and seven students (25–35%) were neutral on these items. Two pairs of similar items gave different results. The need to write reports was supported by 15 students (75%) in item 28 but by only 10 (50%) in item 3, which also mentions papers and correspondence and drew three disagreements (15%). The need for technical vocabulary was supported by 15 students (75%) in item 4 and 13 (65%) in item 30. The wording of the items may explain part of this difference, so the need for writing in particular should be treated with caution.

Lacks (RQ2)

Table 3 presents students' self-assessment of their English abilities.

Table 3. Self-assessed English proficiency

No.	Statement	SD	D	N	A	SA	Agree	Mean
9	My speaking ability is good enough for daily conversations.	1	2	9	8	0	8 (40%)	3.20
10	I can understand lectures, presentations, or conversations in English.	1	2	7	9	1	10 (50%)	3.35
11	I am able to read and understand academic or professional texts in English.	2	2	6	10	0	10 (50%)	3.20
12	I am able to write reports, essays, or formal emails in English.	3	2	7	8	0	8 (40%)	3.00
13	I have sufficient vocabulary related to my field of study.	0	3	6	11	0	11 (55%)	3.40
14	My English pronunciation is clear and easy to understand.	0	5	6	9	0	9 (45%)	3.20

Note. Values are numbers of students (N = 20). SD = strongly disagree (1); D = disagree (2); N = neutral (3); A = agree (4); SA = strongly agree (5). Agree = A + SA, with the percentage of the 20 students in parentheses. Means were calculated from the individual responses on the five-point scale.

Students' self-assessment of their proficiency was moderate, with item means between 3.00 and 3.40, the lowest of all sections. About half considered their reading of academic texts (10 students, 50%) and their listening comprehension (10, 50%) adequate, and 11 (55%) felt that they had sufficient vocabulary in their field. Fewer students were confident in their speaking for daily conversation (8, 40%), their writing of reports, essays or formal emails (8, 40%) and their pronunciation (9, 45%). Writing and pronunciation also had the most disagreement (five students, 25%, each), followed by reading (four, 20%). Receptive skills were rated slightly more positively than productive skills, but the difference amounts to only one or two students and should not be overinterpreted.

Table 4 presents the weaknesses that students reported.

Table 4. Perceived weaknesses

No.	Statement	SD	D	N	A	SA	Agree	Mean
15	I have difficulty speaking English fluently in academic or professional settings.	0	2	5	11	2	13 (65%)	3.65
16	I find it difficult to understand native English speakers.	0	3	6	7	4	11 (55%)	3.60
17	I feel that my academic writing skills in English are still limited.	0	4	8	6	2	8 (40%)	3.30
18	I have difficulty understanding technical or field-specific vocabulary in English.	0	1	4	13	2	15 (75%)	3.80
19	There is a significant gap between my current English ability and what is required in my field.	0	2	10	7	1	8 (40%)	3.35

Note. Values are numbers of students (N = 20). SD = strongly disagree (1); D = disagree (2); N = neutral (3); A = agree (4); SA = strongly agree (5). Agree = A + SA, with the percentage of the 20 students in parentheses. Means were calculated from the individual responses on the five-point scale.

The most frequently reported weakness was difficulty with technical or field-specific vocabulary (15 students, 75%), followed by difficulty speaking fluently in academic or professional settings (13, 65%) and understanding native English speakers (11, 55%). Eight students (40%) felt that their academic writing skills were still limited, and eight (40%) perceived a significant gap between their current ability and the requirements of their field, while half of the students (10) were neutral on this item. Item 18 appears to conflict with item 13, in which 11 students (55%) reported sufficient vocabulary in their field. A possible explanation is that students distinguish between the general vocabulary of their subject, which they feel they know, and the technical terms of physics texts in English, which they find difficult; the questionnaire does not allow this to be confirmed.

Wants and Learning Situation (RQ3)

Table 5 presents students' learning strategies and preferences.

Table 5. Learning strategies and preferences

No.	Statement	SD	D	N	A	SA	Agree	Mean
20	I learn English better through discussions and group work.	1	0	8	9	2	11 (55%)	3.55
21	I prefer to learn English through hands-on activities and simulations.	0	0	4	10	6	16 (80%)	4.10
22	I often use videos, applications, or the internet to learn English.	0	0	5	11	4	15 (75%)	3.95
23	I regularly review English lessons outside of the classroom.	0	0	9	10	1	11 (55%)	3.60
24	I expect my lecturer to use interactive teaching methods.	0	0	6	12	2	14 (70%)	3.80
25	I understand the material better when real examples are provided.	0	1	4	10	5	15 (75%)	3.95

No.	Statement	SD	D	N	A	SA	Agree	Mean
26	I enjoy learning activities that involve hands-on practice.	0	0	5	9	6	15 (75%)	4.05

Note. Values are numbers of students (N = 20). SD = strongly disagree (1); D = disagree (2); N = neutral (3); A = agree (4); SA = strongly agree (5). Agree = A + SA, with the percentage of the 20 students in parentheses. Means were calculated from the individual responses on the five-point scale.

Students showed a clear preference for practical and interactive learning. Sixteen students (80%) preferred hands-on activities and simulations (M = 4.10, the highest mean in the questionnaire), 15 (75%) enjoyed hands-on practice, 15 (75%) understood the material better with real examples, and 14 (70%) expected their lecturer to use interactive teaching methods. Fifteen (75%) often used videos, applications or the internet to learn English, which shows familiarity with technology-based learning. Discussion and group work and reviewing lessons outside class were each supported by 11 students (55%), with eight and nine students (40–45%) neutral.

Table 6 presents students' expectations of the ESP course.

Table 6. Expectations of the ESP course

No.	Statement	SD	D	N	A	SA	Agree	Mean
32	I expect this course to help me communicate effectively in my field.	0	0	7	9	4	13 (65%)	3.85
33	I want this course to focus on skills relevant to my studies or future work.	0	0	9	8	3	11 (55%)	3.70
34	I want the course content to be practical and aligned with workplace needs.	0	0	6	12	2	14 (70%)	3.80
35	I want course topics that reflect real situations in my field.	0	1	7	10	2	12 (60%)	3.65
36	I believe this ESP course will support my future career development.	0	0	7	8	5	13 (65%)	3.90

Note. Values are numbers of students (N = 20). SD = strongly disagree (1); D = disagree (2); N = neutral (3); A = agree (4); SA = strongly agree (5). Agree = A + SA, with the percentage of the 20 students in parentheses. Means were calculated from the individual responses on the five-point scale.

Students' expectations of the ESP course were positive. Fourteen students (70%) wanted practical content aligned with workplace needs, 13 (65%) expected the course to help them communicate effectively in their field, 13 (65%) believed that it would support their future career, and 12 (60%) wanted topics that reflect real situations in their field. A focus on skills relevant to their studies or work received the lowest agreement (11, 55%), with nine students (45%) neutral.

Table 7 presents students' learning background and motivation.

Table 7. Learning background and motivation

No.	Statement	SD	D	N	A	SA	Agree	Mean
5	I have had positive experiences in learning English before.	0	1	2	14	3	17 (85%)	3.95
6	My cultural background influences the way I learn English.	0	2	8	7	3	10 (50%)	3.55
7	I take this course to improve my English skills for my field of study or future career.	0	0	4	13	3	16 (80%)	3.95
8	I feel confident when using English in learning situations.	0	0	8	10	2	12 (60%)	3.70

Note. Values are numbers of students (N = 20). SD = strongly disagree (1); D = disagree (2); N = neutral (3); A = agree (4); SA = strongly agree (5). Agree = A + SA, with the percentage of the 20 students in parentheses. Means were calculated from the individual responses on the five-point scale.

Most students entered the course with positive attitudes. Seventeen students (85%) reported positive previous experiences of learning English, and 16 (80%) agreed that they were taking the course to improve their English for their field of study or future career. Twelve (60%) felt confident when using English in learning situations, while eight (40%) were neutral. Opinions on the influence of cultural background were divided: half of the students (10) agreed, eight (40%) were neutral and two (10%) disagreed.

Table 8 presents students' views of the learning environment.

Table 8. Learning environment

No.	Statement	SD	D	N	A	SA	Agree	Mean
37	The classroom environment supports my English learning process.	2	2	7	8	1	9 (45%)	3.20
38	Learning facilities (LCD, internet access, books) are adequate.	0	0	6	11	3	14 (70%)	3.85
39	The English course schedule suits my study time.	0	0	10	9	1	10 (50%)	3.55
40	The duration of each class meeting is sufficient.	0	0	9	11	0	11 (55%)	3.55
41	I have sufficient opportunities to practice English outside the classroom.	0	2	8	7	3	10 (50%)	3.55

Note. Values are numbers of students (N = 20). SD = strongly disagree (1); D = disagree (2); N = neutral (3); A = agree (4); SA = strongly agree (5). Agree = A + SA, with the percentage of the 20 students in parentheses. Means were calculated from the individual responses on the five-point scale.

Learning facilities were viewed most positively (14 students, 70%). Views on the class schedule (10, 50%), the duration of meetings (11, 55%) and opportunities to practise English outside class (10, 50%) were more moderate, with eight to ten students (40–50%) neutral. The classroom environment received the lowest agreement (9, 45%) and the most disagreement (4, 20%), so opinions on this item were divided. Because the questionnaire

contained no open-ended items, the reasons for this division cannot be determined from the data.

Discussion

Because the data are the self-reports of one cohort, the findings describe students' perceived, or subjective, needs (Basturkmen, 2010) rather than independently established requirements of the target situation. Within this limit, the results indicate that students see English mainly as a means of reading academic literature in physics and of mastering its terminology. This agrees with Dahlan et al. (2026), who found that reading (82%) and technical vocabulary (78%) were rated most important by Physics Education students at the same university, and with Azahra et al. (2025), who found that reading was the most needed skill for physics laboratory work. The priority of reading reflects the dense, terminology-rich language of physics texts (Halliday & Martin, 1993; Lemke, 1990) and is consistent with the principle that ESP instruction should be aligned with learners' disciplines (Basturkmen, 2010; Hutchinson & Waters, 1987).

Technical vocabulary was both a necessity and the most frequently reported lack (15 students, 75%), which matches the finding of Azahra et al. (2025) that limited scientific vocabulary was the main barrier for physics students, and similar findings in engineering fields (Amarta et al., 2026; Nurhasanah & Kurniawan, 2023). Speaking appears in this study mainly as a lack: 13 students (65%) reported difficulty speaking fluently in academic settings, although speaking was not rated among the most important needs. This is closer to the conclusion of Rahman and Rukmana (2022), who identified speaking as a need for Physics Education students, and to studies of engineering students that found low confidence in speaking (Putri et al., 2026; Sbastian & Yuniarto, 2025), than to Dahlan et al. (2026), who found that speaking was rated only as moderately important. One possible explanation is that students rate the importance of a skill according to their current studies, which are dominated by reading, while they feel their lack of speaking more strongly; for future physics teachers, who will need to explain concepts orally, this lack is relevant even if it is not yet perceived as a priority. The difference between receptive and productive skills in this study is small, however, and the gap between students' abilities and the demands of their field was supported by only eight students (40%), with half neutral, so these interpretations remain tentative.

Regarding learning preferences, students show a clear tendency toward interactive, practical and technology-based learning. Their preference for multimedia and digital resources agrees with Dahlan et al. (2026), where more than 75% of the students preferred

multimedia materials, and with Putri et al. (2026), whose students wanted more interactive and self-directed learning through media. The preference for hands-on activities, simulations and real examples suggests that lecture-centred teaching alone may not meet their learning needs, and that content-based and task-based activities that integrate physics-related materials would be more appropriate. Arslan and Saka (2010) found that theme-based content instruction motivated science students and supported their academic language, which supports this recommendation.

The high proportion of neutral responses deserves attention: eight or more of the 20 students chose the neutral option on 12 of the 41 items, including the frequency of English use (12 students), the gap between ability and requirements (10) and the course schedule (10). Several explanations are possible. Students may have had little experience of using English in their physics courses, some items may have been too general, or students may have been reluctant to commit to a position. Because all items were positively worded, some agreement may also reflect acquiescence (Dörnyei & Taguchi, 2010), which may partly explain why no student disagreed with any professional communication item.

Based on these findings, the needs of this group can be summarized in order of the strength of the evidence. First, academic reading of physics texts (item 2, 16 students) and technical vocabulary (items 4 and 18, 15 students each) are the clearest needs. Second, academic speaking is the clearest perceived lack (item 15, 13 students). Third, writing reports or formal documents is a probable need (item 28, 15 students), although the lower agreement on item 3 (10 students) makes it less certain. Fourth, students want practical, example-based and media-supported learning (items 21, 22, 25 and 26, 15–16 students). Professional communication, including polite and formal English, received moderate support (items 27–31, 13–15 students).

CONCLUSION

This study examined the English for STEM needs of Physics Education students in one cohort at UIN Alauddin Makassar. In answer to RQ1, the students perceived their main necessities as reading academic texts in English and mastering physics terminology, with writing reports and professional communication as further, less certain needs. In answer to RQ2, they assessed their abilities as moderate and reported technical vocabulary and fluent academic speaking as their main lacks. In answer to RQ3, they wanted practical, interactive and example-based learning supported by digital media, and they viewed learning facilities positively but were divided about the classroom environment.

These findings suggest that the compulsory English course for this group could be organized around physics topics, beginning with the reading of short physics texts and the systematic learning of technical vocabulary, and adding structured practice in explaining physics concepts orally and in writing short laboratory reports. Hands-on tasks, real examples and digital media, such as simulations and short science videos, could be used to deliver this content. These suggestions should be tested and refined before they are used to redesign the course.

The study has several limitations. It involved one cohort of 20 students in one study program, relied on self-reported questionnaire data, used an instrument whose validity and reliability should be further examined, and did not include the perspectives of lecturers or practising physics teachers. All items were worded positively, and neutral responses were frequent. Future research should involve larger and more varied groups, revise the instrument to include reverse-worded, ranking and open-ended items, and combine questionnaires with interviews, proficiency tests and analyses of the English used in physics teaching, so that students' perceived needs can be compared with objective needs (Long, 2005; Mao & Zhou, 2024).

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