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PERCEPTION OF LEARNING ESL IN STUDENTS OF MINING ENGINEERING PROFESSIONAL SCHOOLS IN PERU

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ABSTRACT:
English proficiency in the training of Peruvian Mining Engineering students is essential for access to specialized technical information, academic mobility, and competitiveness in the labor market. This is key to success and opens the door to professional development. However, its teaching and learning face structural and socioeconomic barriers that limit its integration into the university curriculum and equitable access to its teaching. Objective: To analyze the perceptions of Mining Engineering professors regarding the teaching and learning of English as a second language and its impact on professional training. Methodology: A qualitative design with reflective thematic analysis was based on semi-structured interviews with five professors from two public universities in Peru. Sampling was conducted by theoretical saturation, and ATLAS.ti v.23 software was used to organize the data. Results: Three emerging categories were identified: English as a key competence, barriers to teaching and learning, and pedagogical facilitators. English is considered to operate as cultural capital, providing academic and professional advantages, but its acquisition is conditioned by economic capital. The limited presence of English in the curriculum and the lack of access to complementary programs could reinforce inequality. However, strategies such as incorporating materials in English and the motivating role of teachers can enhance learning. Conclusion: English language teaching in Mining Engineering must be strengthened to reduce educational inequalities and optimize student training for a globalized labor market.

KEYWORDS: English (second language) learning, Higher Education, Mining Engineering, Cultural Capital, Educational barriers, Occupational Mobility.

1) Introduction:

One of the commitments of Higher University Education is Quality. Therefore, learning and mastering a second language contributes to developing new approaches, strategies, techniques, and methods to make the process of professional labor agile and dynamic, a requirement of a globalizing and competitive world of work. It also allows for professional and academic mobility across different countries, where high levels of technology exist and knowledge is constantly internationalized (Sosa et al., 2018). Students must meet the demands of a scientific and technological trend, moving from a post-industrial society to a knowledge-based society (Batista, Judith et al., 2007). In many countries, university students study almost all subjects in English. Most websites on the Internet are in English. Many websites in other languages can be translated into English. Because English is the predominant language of international communication, it is the primary language used

in newspapers and books (Peña, 2019). According to the English Proficiency Index conducted by EF Education First (2022), Peru has maintained a medium level of proficiency in this language since 2021 (in previous years, it was at a low level of proficiency), ranking 51st out of 111 countries (EF Education First, 2022). The study also reveals that the three regions of the country where its inhabitants have the highest command of English are Lima with a score of 539 (rated as "medium"); Cusco, 518 ("medium"); and Arequipa 508 ("medium"). Regarding its location within South America, Peru is in tenth place, behind El Salvador (519), Uruguay (521), Honduras (522), and Chile (524). Below it is the Dominican Republic (514), Brazil (505), and Guatemala (505) (EF Education First, 2022).

In the last twenty years, 21.9% of emigrants abroad were students, and 9.7% were professionals, scientists, and intellectuals. Furthermore, 13.8% of professionals who emigrated abroad were engineers of various specialties (INEI, 2020).

According to Marín & Librado (2021), students needed to evaluate a technical English course for engineers. They designed a satisfaction survey: a) a survey aimed at students with a technical profile who were taking intermediate and advanced English at the Language Center; b) interviews with human resources personnel from leading engineering companies in the region; and c) interviews with professors from the Faculty of Engineering with experience in the petrochemical industry. Based on the results of the instruments, the curriculum for the English for Engineers course was created, in which students would practice B1-level vocabulary and language structures related to the technical field.

García et al. (2022) state that all the changes in the professional training of engineers, driven by societal demands, imply the need for the English language to complement the development of the curriculum from a socio-epistemological, didactic, and pedagogical perspective. It is essential for the scientific integration of developed countries, publications primarily in English and in a globalized context, international standards, and constant exchange with foreign language professionals.

For Fiol et al. (2021), by the objectives they had set for conducting Mining Engineering curriculum courses in English with direct links to students, they established interdisciplinary relationships with subjects within the curriculum. These assessments were stimulating and formative, as long as they enabled students to understand their difficulties and know how to overcome them. The selected topics focused on professional practice: History of mining, Surveying, Basic concepts and mining terminology, Surface mining, Underground mining, Mining, and the environment. The need to be at the forefront of technology in an innovative world in the assessment of new mining workers, according to Karabasevic et al. (2015), requires mining engineering students to adapt to changes. Teaching and strengthening students' language skills, such as English, is the foundation for a successful education (Olivero & Acosta, 2021). Knowledge, skills, and attitudes are now part of the job requirements in the mining industry (NSW, 2020).

To this end, English proficiency is essential, even for the purpose of learning about mining projects. Access to training programs, international conferences, and professional capacity development opportunities, including participating in a technological publication and a conference, and gaining insight into a global mining industry (IUCN/PACO, 2012) (Limited, 2023).

For this reason, English-speaking students and professionals have a competitive advantage in participating in these events and learning about recent events, trends, advancements, and progress in the sector (Karabasevic et al., 2015).

In the mining industry, academic training and advanced training are the foundation for development and innovation for continuous improvement. Therefore, speaking and mastering English is a non-negotiable requirement. In this article, we will analyze the perceptions of Mining Engineering professors regarding teaching and learning English as a second language and its impact on professional development as they prepare to become future mining engineers who need to continue learning new technical and scientific knowledge in the mining world.

2) Methods and Methodology

2.1 Design.

A qualitative approach was adopted by Creswell (2017), with a reflexive thematic analysis design (Braun & Clarke, 2006) based on a reflexive engagement with the analytical process to identify and structure thematic categories based on the perceptions of English language teachers from two public universities located in Moquegua and Arequipa, Peru.

2.2 Participants

Five male and female teachers from the School of Mining Engineering participated. The inclusion criteria were teachers of both sexes, appointed or contracted, with 10 or more years of experience. Exclusion criteria: teachers with experience teaching English in other professional programs. Theoretical saturation sampling was used (Glaser & Strauss, 2017).

Table 1. Distribution and characterization of the unit of analysis.

	Pseudonym	Age	Years of teaching experience	University
1	Atenea	65	38	Universidad Nacional de Moquegua
2	Perseo	47	23	Universidad San Agustín de Arequipa
3	Aquilino	57	22	Universidad Nacional de Moquegua
4	Minerva	55	20	Universidad San Agustín de Arequipa
5	Pablinio	40	22	Universidad Nacional de Moquegua

2.3 Instruments.

A semi-structured interview was used with open-ended questions formulated face-to-face, allowing for privacy and flexibility to capture emerging findings (Pope & Mays, 2013). A matrix of categories was developed according to the research objective. The topics considered were the relevance of English in vocational training and barriers and facilitators in the teaching and learning of the English language. The instrument was validated by seven experts (pedagogues, English language teachers with university work experience and links to engineering programs, and experience in qualitative studies). Before beginning the fieldwork, a pilot test was conducted to validate the comprehension of the questions.

Table 2. Main topics and guiding questions

Topic	Guiding questions
English proficiency	Based on your experience: What is your opinion of English language teaching and learning? Why should English be part of the mining engineering curriculum? What do you think about English proficiency for opportunities to access international scholarships in English-speaking countries?
Barriers in English as a Secondary Education	What do you think about English being part of the curriculum for mining engineering?
Facilitators in English E-A	Do you believe that an English language course/program should be included in all professional career cycles as part of a comprehensive education?

2.4. Procedure.

Before conducting the interviews, the participating teachers were contacted in advance to explain the purpose of the research and the relevance of their contribution. They were informed in detail about the scope of the study and the use of the information. Their informed consent to participate in the interviews was obtained. They were allowed to choose the time and place appropriate to their preferences for the interview, ensuring a

comfortable environment conducive to uninterrupted conversation. Each participant chose the day and time of the interview.
Cultural sensitivity and potential interests as part of the faculty were taken into account. Therefore, the interviews were conducted by the principal researcher, who was not affiliated with the universities and had experience in teaching English. Another researcher constantly supervised the data collection, which followed a script with intermittent probes or interventions to clarify responses. A pseudonym was used in all interviews to protect the identity of the interviewees. Data collection took place between June and December 2024. The average duration was 30 to 60 minutes. The interviews were transcribed and processed using ATLAS.ti.v.23 software.

2.5 Ethical and quality criteria.
The study was approved by the Ethics Committee of the Hipólito Unanue Hospital in Tacna (Code 45- CIEI-2024). The ethical principles of the Declaration of Helsinki (World Medical Association, 2020) were strictly adhered to regarding confidentiality, anonymity, and the right of participants to withdraw their consent at any time during the study.

Methodological quality and rigor were ensured by applying the criteria of credibility, confirmability, and transferability (Lincoln & Guba, 1985). Credibility was ensured through methodological triangulation across different sources, including interviews with teachers from two different universities to contrast their perspectives and enrich the interpretation of the data. Furthermore, a detailed description of the educational context was provided, and the results were validated with the participating teachers, ensuring the fidelity of the analysis to their experiences. Confirmability was guaranteed through an analytical audit to document the decisions made in the analysis, minimizing interpretive bias. Transferability was ensured through a detailed contextualization of the conditions under which the teaching and learning of English as a second language takes place.

3.7 Qualitative data analysis.
For data analysis, an inductive, reflexive thematic analysis approach (Braun & Clarke, 2022) was adopted to identify patterns in the data (Braun & Clarke, 2006). All members of the research team have training and experience in qualitative methodologies and reviewed and verified the accuracy of the transcripts. The analysis began with reading and familiarizing themselves with the interview content. Thematic analysis was applied as a qualitative method due to its ability to identify, analyze, and report recurring patterns within the data set, creating categories and semantic maps. An iterative data analysis (Creswell & Creswell, 2017) was performed for data organization and coding.

This approach was based on a realist epistemological perspective, as the participants' narratives were considered direct representations of their lived experiences. The research team participated in the line-by-line coding process and reached a consensus to resolve discrepancies in code designations. The meaning-making strategy (Carrasco & Gavilán, 2014) was used to formulate the final report.

3) Results

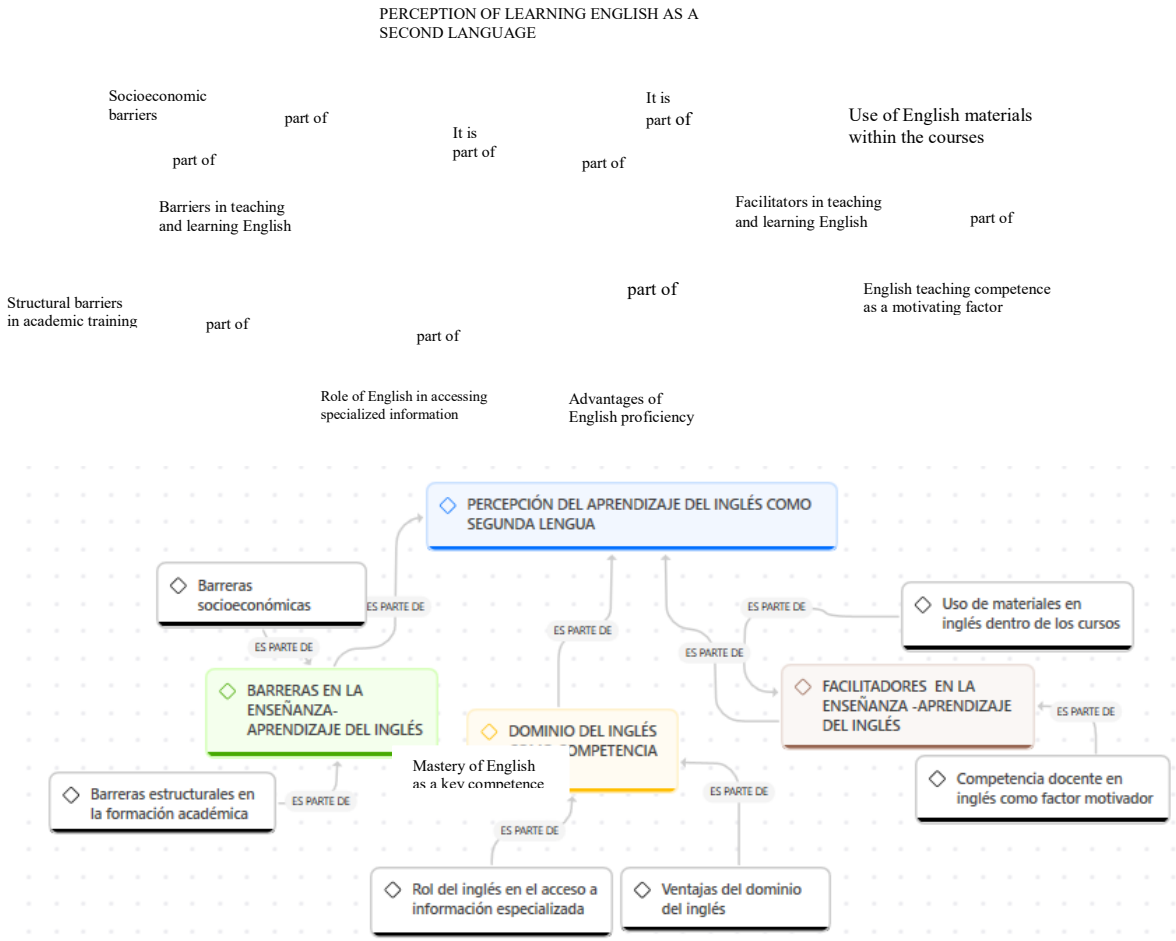

Figure 1 Semantic map of categories

Teaching and learning English as a second language in the training of Mining Engineering students is not only an academic element but has also become a key factor for entering the globalized labor market. From a theoretical perspective, proficiency in a foreign language is related to the symbolic and social capital that enables access to better professional opportunities (Bourdieu, 1986). In this study, three categories emerged: English proficiency as a key competence, and barriers and facilitators in the teaching and learning of English.

- English proficiency as a key competence

In the mining engineering career, English is seen as a cultural capital that provides competitive advantages in the labor market (Bourdieu, 2018). The findings reveal that English proficiency plays a vital role in accessing specialized information, as scientific literature and technical information related to engineering knowledge are preferably published in English. The lack of access to these sources limits students' training and updating of specialized knowledge in their field. One teacher stated, "Modern mining uses English terms, and those who don't master it are left behind" (Minerva, 55).

Likewise, those interviewed perceived advantages in having proficiency in English as a second language since job mobility and opportunities to pursue advanced specialized studies abroad are related to the applicant's

English level. English proficiency could be a differentiating factor in career paths. One interviewee stated, "Graduates who master English get better-paying jobs and can apply for scholarships abroad" (Pablinio, 40).
- Barriers to the teaching and learning of English
The findings reveal two types of barriers to the teaching and learning of English. Structural barriers in academic training, since English courses in engineering training, have little presence in the curriculum. As a result, a gap in student preparation may arise, as students face difficulties mastering the language for communication and job opportunities upon entering the labor market. One teacher stated, "There isn't enough space in the curriculum for English because technical subjects take priority" (Aquilino, 57). Socioeconomic barriers were also found, as the purchasing power of students' families could influence their ability to access specialized English courses. One teacher explains, "Students from rural or low-income areas can't afford English language institutes, so they rely exclusively on what they learn at university" (Atenea, 65). These barriers could reinforce inequality in access to key skills in the training of mining engineers. - Facilitators in the Teaching and Learning of English
However, facilitating elements in the teaching and learning of English also emerged, despite the perceived limitations, such as pedagogical strategies that can enhance English learning in the training of engineering students. Two key aspects emerged from the testimonies: on the one hand, the use of English-language materials in teaching, through readings, manuals, and assessments, which permanently connect students to studying and familiarizing themselves with English. In this regard, one teacher stated that in addition to these strategies, "English papers should be included in all technical subjects so that students become accustomed to the technical language" (Perseo, 47 years old). On the other hand, it was found that teacher proficiency in English was perceived as a motivating factor since teachers who are fluent in English are considered to be able to positively influence students' perceptions of the language. A teacher stated, “If the teacher uses English in class and applies it to mining, students see it as a tool and not as an isolated subject” (Aquilino, 57 years old).

2) Discussion (both qualitative and quantitative results should converge here) red (draft)

- The results of the study on the teaching and learning of English among Mining Engineering students can be analyzed from the perspective of Pierre Bourdieu (1986), specifically in relation to his theory on the forms of capital: cultural, social, and economic. This theoretical framework allows us to understand how English proficiency operates as a differential resource within the academic and professional field of mining engineering.
- - English proficiency as cultural capital
- According to Bourdieu (2018), cultural capital manifests itself in three forms: embodied (acquired knowledge and skills), objectified (books, technologies, access to materials in English), and institutionalized (degrees and certifications in the language). In this study, English appears as a key cultural capital in the training of mining engineers, as its mastery allows access to specialized information, technical reports, and scientific literature. The exclusion of English from the curriculum reinforces inequalities in student education, as those who possess this cultural capital have greater employment and specialization opportunities.
- Cultural capital, in its three forms, is the result of a "cultural investment" strategy consistently developed by previous generations; this means that the most privileged students contribute customs, patterns of behavior, and attitudes from their social environment of origin that are extremely beneficial to their academic work. But not only that; they also acquire knowledge and a "savoir-faire," preferences, and "good taste," whose academic benefits, although indirect, are no less evident (...) Cultural privilege becomes evident when we try to determine the level of familiarity with works of art or literature or the learning of one or more languages, which can only be obtained through constant attendance at the theater, museums, concerts, or language institutes (Astete, 2017).
- It is understood that some students possess limited cultural capital when accessing university higher education due to their low social status, that is, the level of English learned at each educational level, which enriches them culturally. What has not been acquired at the lower levels of education must be

acquired at the higher education level; in some way, it is compensated for in university education. Other areas must also be addressed, specifically the inclusion of a linguistic repertoire: with the languages of the formal codes of sociolinguistics, it is relevant since it allows students to achieve positive results in academic work. This circumstance worsens as the situation decreases, and progresses, and degrees are passed in the program (Brito, 2018).

- Structural and socioeconomic barriers as constraints on cultural capital

Unequal access to English language learning is a response to the availability of economic capital, which influences the ability to acquire cultural capital. Low-income students face barriers to accessing additional English courses, which limits their academic and professional mobility. The unequal distribution of economic capital perpetuates stratification in access to knowledge, consolidating social reproduction within the mining professional field.

To understand Bourdieu's ideas about education, especially about higher education, and about the distinction between social classes, it is determined not only by the role they play in the relations of production but also by the ownership or appropriation of the means of production. They refer not only to the tangible dimension, but also to the "cultural means of production": the generation of signals, symbolic power, and prestige distinctions. The "social means of production": cooperation, collaboration, exploitation, bureaucracy of the productive system, labor relations, proximity or distance from social actors, among others.

Economic capital (indicators: income, assets, fortune), is expressed in the educational field as a cultural investment tactic that often replicates its material status in the social environment (Astete, 2017).

- Social capital as a facilitator of learning

Bourdieu argues that social capital is based on networks of relationships that provide access to resources and opportunities. In this study, English-speaking teachers function as agents of cultural capital transmission, facilitating language internalization in the mining context. This is reflected in pedagogical strategies such as the use of technical literature in English and the incorporation of specialized terminology in teaching.

Social capital is relevant, especially when students emerge and enter the workforce. Given that our society is classist and segregating, discrimination occurs based on social class, race, physical appearance, and age, among others; For this reason, learning a language is beneficial for greater opportunities in work environments (Brito, 2018).

Learning English in Mining Engineering training not only represents a linguistic competence but also a resource structurally conditioned by the forms of capital described by Bourdieu. Its mastery becomes a differentiating factor that can perpetuate inequalities or function as a mechanism for social mobility for those who manage to acquire it. In this sense, a review of university curricula is recommended to reduce gaps in access to this cultural capital and ensure more equitable training aligned with the demands of the globalized labor market.

4) Conclusion

The perspective that a mining engineering professional has when guiding students regarding English proficiency as a key competency is valid because it seeks to meet standards for proper academic and intellectual development and to be at the forefront of labor market demands. Learning English becomes a valuable symbolic and social asset, considering that it will contribute to access to better job positions in the areas of science and technology. Another aspect of the engineering field is ongoing training on equipment with software developed in English-speaking countries, tailored to the technology and needs of the mining sector.

English proficiency allows professionals professional mobility and the opportunity for training abroad with scholarships that can facilitate the completion and development of these degrees, as well as competitive salaries that will improve their quality of life.

This study identified three types of barriers: barriers to teaching and learning, structural barriers in academic training, and socioeconomic barriers. This means that it is essential to include an English course within the curriculum due to its importance and the development it will provide for students' job placement. It is also relevant to consider the schedules and the demands of a course included in the curriculum as part of vocational training and equal opportunities.

In our research, we have detailed the important role of teachers trained in English. They can use teaching materials that can reinforce technical English vocabulary embedded in career courses. Teaching competence contributes to language familiarization, which could significantly contribute to demonstrating learning not as an isolated subject but as an indispensable tool for growth and making language acquisition more realistic and meaningful.

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