

## CULTURAL COMPETENCE IN ENGINEERING ENGLISH EDUCATION

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**ABSTRACT.** Cultural understanding in English language education for engineering is crucial in today's globalized world. Engineers need to not only be knowledgeable in their field but also understand different cultures to communicate and work effectively. Proficiency in English is essential for engineers as it is a common language in the industry. Cultural competence involves being able to interact well with people from diverse backgrounds. Research shows that those with high cultural competence can manage conflicts and collaborate better. The aim of this study is to explore how cultural understanding impacts English language learning in engineering and how it can be improved in the curriculum. Teaching strategies that promote cultural competence are important for students to succeed in multicultural work environments. Incorporating cultural elements into the curriculum can help students understand how culture influences communication and collaboration. Social learning and constructivist theories can aid in teaching cultural competence in English education for engineering. A descriptive qualitative approach is used to study cultural competence in English education for engineering, with participants from engineering student of Sekolah Tinggi Teknik Atlas Nusantara. The research involves analyzing qualitative data to gain a comprehensive understanding of cultural competence in education. Findings suggest that cultural competence positively influences English language proficiency in engineering students. Recommendations include integrating cultural competence into the curriculum and adopting interactive teaching methods to enhance cross-cultural understanding for students in the engineering field.

**Keywords:** *cultural competence, engineering, english education*

**ABSTRAK.** Pemahaman budaya dalam pendidikan bahasa Inggris untuk bidang teknik sangat penting di dunia global saat ini. Insinyur tidak hanya perlu memiliki pengetahuan di bidangnya tetapi juga memahami budaya yang berbeda untuk berkomunikasi dan bekerja secara efektif. Kemahiran berbahasa Inggris sangat penting bagi para insinyur karena merupakan bahasa umum di industri. Kompetensi budaya melibatkan kemampuan berinteraksi dengan baik dengan orang-orang dari berbagai latar belakang. Penelitian menunjukkan bahwa mereka yang memiliki kompetensi budaya tinggi dapat mengelola konflik dan berkolaborasi dengan lebih baik. Tujuan dari penelitian ini adalah untuk mengeksplorasi bagaimana pemahaman budaya berdampak pada pembelajaran bahasa Inggris di bidang teknik dan bagaimana hal tersebut dapat ditingkatkan dalam kurikulum. Strategi pengajaran yang mempromosikan kompetensi budaya penting bagi siswa untuk berhasil dalam lingkungan kerja multikultural. Memasukkan unsur budaya ke dalam kurikulum dapat membantu siswa memahami bagaimana budaya memengaruhi komunikasi dan kolaborasi. Pembelajaran sosial dan teori konstruktivis dapat membantu dalam mengajarkan kompetensi budaya dalam pendidikan bahasa Inggris untuk teknik. Pendekatan deskriptif kualitatif digunakan untuk mempelajari kompetensi budaya dalam pendidikan bahasa Inggris untuk teknik, dengan peserta dari mahasiswa teknik Sekolah Tinggi Teknik Atlas Nusantara. Penelitian ini melibatkan analisis data kualitatif untuk mendapatkan pemahaman komprehensif tentang kompetensi budaya dalam pendidikan. Temuan menunjukkan bahwa kompetensi budaya berpengaruh positif terhadap kemahiran bahasa Inggris pada mahasiswa teknik. Rekomendasinya mencakup mengintegrasikan kompetensi budaya ke dalam kurikulum dan mengadopsi metode pengajaran interaktif untuk meningkatkan pemahaman lintas budaya bagi siswa di bidang teknik.

**Kata Kunci:** kompetensi budaya, teknik, pendidikan bahasa inggris

### BACKGROUND

In today's globalized world, cultural competence has become an essential component of technical education. As engineers are increasingly required to work in international settings and collaborate with

colleagues from diverse backgrounds, it is crucial for them to not only excel in technical skills but also possess a deep understanding of different cultures. According to Hofstede (2011), cultural differences can significantly impact communication, collaboration, and problem-solving. In the field of technical

education, cultural competence plays a vital role in helping students adapt to multicultural work environments and improve their communication skills with colleagues from various cultural backgrounds. English, being the predominant language in engineering, is of paramount importance. The British Council (2020) reports that over 1.5 billion people worldwide use English, either as a first or second language. Proficiency in English is indispensable for understanding technical literature and effectively communicating with clients and coworkers from different countries. Therefore, integrating cultural competence into English language education for engineering is essential in preparing students to tackle global challenges.

A key question that arises in this context is: What does cultural competence entail? Cultural competence is defined as an individual's ability to interact successfully with people from diverse cultural backgrounds (Spitzberg & Changnon, 2009). This encompasses an understanding of various cultural norms, values, and practices, as well as the capability to adjust behavior and communication to suit relevant cultural contexts. Another crucial inquiry is: Why is cultural competence critical in English language education for engineering? In the interconnected world of engineering, professionals often work in multicultural teams. Research by Chen and Starosta (2000) demonstrates that individuals with high cultural competence are better equipped to resolve conflicts and foster positive relationships with their colleagues. This highlights the importance of cultural competence not only in communication but also in effective collaboration on engineering projects.

The primary objective of this study is to examine the impact of cultural competence on English language learning in the engineering field. The research seeks to investigate how an understanding of culture can influence students' proficiency in English and how this can contribute to their success in the

workplace. By elucidating this relationship, potential ways to enhance cultural competence in the engineering education curriculum are anticipated to be identified. Additionally, the study aims to pinpoint teaching strategies that promote cultural competence. In the realm of English language education for engineering, effective teaching methods can aid students in mastering the language while also comprehending the cultural context that underpins it. For instance, incorporating case studies from diverse cultures in teaching can provide deeper insights into how culture shapes communication and collaboration in professional settings.

## LITERATURE REVIEW

Cultural competence is a multifaceted concept that encompasses various interconnected elements. Deardorff (2006) defines cultural competence as the knowledge, skills, and attitudes required to effectively interact with individuals from diverse cultural backgrounds. This includes a deep understanding of cultural values, the ability to adapt to different situations, and proficient communication skills. In the field of education, cultural competence can be cultivated through methods such as project-based learning, group discussions, and case studies. The correlation between cultural competence and language learning is significant, as research indicates that individuals with strong cultural competence typically exhibit superior language abilities (Bennett, 1993). Understanding other cultures can enhance one's comprehension of language nuances and contexts. In the context of English language education for engineering, integrating elements of cultural competence into the curriculum is vital for enhancing students' communication skills in international settings.

Within the engineering sector, engineers require a diverse set of language skills. According to a report by the World Economic

Forum (2020), effective communication in English is among the most sought-after skills by companies in the engineering industry. Engineers must not only grasp technical terminology but also be capable of articulating complex ideas in a manner comprehensible to individuals from various backgrounds. Therefore, the English language education curriculum for engineering programs should be tailored to meet these demands. Some universities have started incorporating cultural competence elements into their curriculum to equip students with the skills needed to tackle global challenges. For instance, programs that combine language learning with international collaborative projects offer valuable practical experience to students. Research by Lee and Kuo (2019) demonstrates that students engaged in multicultural projects experience significant enhancements in language skills and cultural understanding.

Bandura's social learning theory (1977) underscores the significance of social interaction in the learning process. In the realm of English language education for engineering, this theory can be applied through collaborative learning, where students engage with peers from diverse cultural backgrounds. This approach not only enhances cultural competence but also improves language skills. Additionally, constructivism theory posits that learning is an active process involving the construction of knowledge based on experiences and interactions with the environment (Piaget, 1976). In English language education for engineering, a constructivist approach can be implemented through project-based learning activities that explore culture and cross-cultural communication. This methodology aids students in mastering the language while gaining insights into broader cultural contexts.

## RESEARCH METHODOLOGY

This research adopts a descriptive qualitative approach, in order to obtain a comprehensive understanding of cultural competence in English education within the engineering field. The qualitative approach offers in-depth insights into the perceptions of students and teachers regarding the importance of cultural competence. Data will be collected through surveys, interviews and observations. Surveys will gather quantitative data from participant descriptively analyzed of cultural competence levels among engineering students. In-depth interviews with select teachers and students will delve deeper into their experiences with English education incorporating cultural aspects. Classroom observations will offer insights into the application of cultural competence in daily learning interactions. This methodological combination is expected to yield a comprehensive understanding of the subject.

The participant selection criteria encompass students and lectures in engineering programs at Sekolah Tinggi Teknik Atlas Nusantara Ternate. Additionally, participants will be chosen based on diverse cultural and ethnic backgrounds to provide a rich perspective on cultural competence in education. Demographic information such as age, gender, educational background, and English learning experience will be collected through questionnaires and initial surveys. This data will enable the examination of gender disparities in English learning approaches and how prior experiences influence students' cultural competence.

The methodology employed in this research involves a descriptive analysis approaches to ensure a comprehensive analysis of the data. To obtain the data, the participant will be interviewed based on the previous experience of English competence. This analysis will provide information to summarize respondent characteristics to draw broader conclusions. For example, examining the relationship between cultural

competence and academic performance in English language courses can reveal important insights, as evidenced by previous research conducted by Chen and Starosta (2016). On the other hand, qualitative data from interviews and observations will undergo thematic analysis to identify key themes emerging from participant experiences. This coding process will help uncover important narratives, such as the impact of cultural understanding on technical communication, as expressed by instructors during interviews. Triangulation of data from different methods will be employed to ensure the reliability and validity of the findings, following the recommendations of Yin (2018). The ultimate goal of this research is to shed light on how cultural competence can be integrated into English language education within technical fields. The study aims to provide recommendations for creating more inclusive and culturally sensitive curricula and teaching practices to meet the demands of a globalized world. The results indicate that students with a strong understanding of culture, both local and international, tend to excel in learning English. By incorporating elements of cultural competence into technical education, students can enhance their language skills and prepare for success in diverse work environments. Future research should explore the practical implementation of cultural competence in technical education, including longitudinal studies to evaluate the long-term impact on students' careers and abilities in global settings. By continuing to investigate these areas, educators can develop more effective curricula and teaching strategies to cultivate a culturally competent generation of technical professionals.

## RESULT AND DISCUSSIONS

### A. The influence of students' cultural competence in english education engineering

Cultural competence is recognized as a crucial element in the education of engineering students, particularly in relation to their English language skills. Recent research highlights the significant impact of cultural competence on students' ability to excel in a globalized professional environment. Byram (1997) defines cultural competence as comprising knowledge, skills, and attitudes necessary for effective interaction with individuals from diverse cultural backgrounds. In the field of engineering education, where collaboration is common, fostering cultural competence is essential. Participation in cross-cultural activities, such as international seminars or collaborative projects, where English as the main communication tool can enhance students' understanding of different cultures and improve their English language skills. Studies have shown that students actively engaged in such initiatives experience marked improvements in their language proficiency. For instance, students who participate in English debate programs gain valuable insights into both technical aspects of engineering and cultural nuances that influence professional communication. These experiences enrich their understanding of language within specific cultural contexts, ultimately enhancing their ability to communicate effectively on a global scale. Cultural competence is not only important in academic settings but also in the professional realm. As engineering projects increasingly involve international teams, the ability to communicate effectively with individuals from diverse backgrounds becomes crucial. Students with strong cultural competence can navigate cultural differences and promote collaboration, leading to more effective teamwork and project advancement. Integrating cultural competence into English

language instruction can enhance the learning experience for engineering students. By incorporating cultural elements into language teaching, educators provide a richer context for language use, making the learning process more relevant and motivating for students. Contextualizing language learning within the framework of cultural competence creates a dynamic and impactful educational environment. In conclusion, cultural competence plays a significant role in enhancing the English language skills of engineering students. From active participation in cross-cultural activities to its application in professional contexts, cultural competence serves as a vital link between language learning and practical experience. Educational institutions should prioritize integrating cultural competence into their curricula to prepare students for success in a diverse and interconnected professional environment. By fostering cultural competence, we equip students to thrive in a globalized world.

### **B. Perceptions of students and lectures regarding the significance of cultural competence in English education for engineering**

Perceptions of students and lectures regarding the significance of cultural competence in English education for engineering have become increasingly important in the era of globalization. Research conducted by Galloway (2013) indicates that while most teachers acknowledge the importance of cultural competence, many struggle to effectively incorporate it into their teaching practices. This discrepancy between theoretical knowledge and practical application has a direct impact on the ability of students to effectively engage in cross-cultural interactions. Interviews with students reveal a common sentiment of feeling underprepared to navigate international contexts due to limited understanding of other cultures. This lack of cultural

knowledge often leads to feelings of alienation and discomfort when communicating with native English speakers. For instance, an English debate program student in engineering shared difficulties faced while interacting with peers from different cultural background despite possessing proficient English language skills. This highlights the necessity of cultural understanding in addition to language proficiency for successful communication. Conversely, students who have had exposure to courses incorporating cultural competence elements report more positive learning experiences. They express increased confidence in using English in cross-cultural scenarios and a better ability to adapt to diverse social and cultural settings. By integrating cultural studies into language courses, students not only enhance their linguistic abilities but also develop critical skills for navigating global work environments. It is imperative for educators to recognize that cultural competence should be an integral part of the curriculum rather than an optional addition. To address the gap between theory and practice, lectures can implement interactive teaching methods such as real-life simulations, case studies, and collaborative projects involving students from diverse cultural backgrounds. These approaches provide students with firsthand experience on how cultural differences impact communication and collaboration, fostering a deeper understanding of cross-cultural interactions. In conclusion, the perceptions of students and teachers underscore the importance of addressing the challenges in integrating cultural competence into English education for engineering. By adopting a more holistic and interactive teaching approach, students can not only improve their language proficiency but also cultivate the necessary skills to thrive in a globalized workforce.

### **C. Implications of Research Results on the English Language Education Curriculum for Engineering**

This research is also highlights the importance of integrating cultural competencies into the English language education curriculum for engineering students. In an increasingly global context, engineering students are not only expected to master English as a means of communication, but also to understand and appreciate the various cultures that surround them. Kramsch (1993) emphasizes that language and culture are two sides of the same coin; therefore, language teaching should be rooted in relevant social and cultural contexts. This indicates that the current curriculum needs to be revised to better reflect the global dynamics faced by students. One way to implement a more integrated curriculum is by incorporating relevant material, such as international case studies in engineering. For example, when discussing infrastructure projects in developing countries, instructors can use real-life examples of projects involving international collaboration, such as bridge construction or transportation systems. In this way, students not only learn technical terms in English, but also understand how local culture influences engineering decisions and project management.

The use of media that reflects cultural diversity, such as videos or articles from international sources, can also help students gain a broader perspective on how language is used in various contexts. The importance of curriculum development that integrates language and culture can also be seen in the need for students to adapt to multicultural work environments. In many international engineering companies, project teams often consist of individuals with diverse cultural backgrounds. Therefore, having a deep understanding of other cultures not only enhances communication skills, but also builds better collaboration skills. In this

regard, English language teaching that includes cultural elements can provide students with a significant competitive advantage as they enter the workforce.

### **D. Effective Teaching Strategies to Enhance Cultural Competence**

To enhance cultural competence in English language education for engineering, effective teaching strategies are crucial. One proven method is the use of active and collaborative learning. Research by Dörnyei (2001) shows that interaction among students from different cultural backgrounds can enrich their learning experiences. For example, group projects involving students from various countries working together to solve engineering problems not only enhance their English language skills, but also encourage them to share perspectives and experiences. For example, in a project designing a renewable energy system, students from Indonesia and Germany may have different approaches based on their cultural contexts and available technologies. Discussing these differences can open up new insights for all group members and help them understand how culture influences engineering practices. Furthermore, project-based teaching involving real case studies from international engineering industries can also be a highly effective strategy. In this context, students can be invited to analyze engineering projects carried out in other countries, such as infrastructure development in Southeast Asia or green technology development in Europe. Through this analysis, they can understand the challenges and solutions faced in different cultural contexts. For example, when discussing waste management projects in Japan, students can see how Japanese cultural values, such as environmental respect and community collaboration, influence the engineering approaches taken. This not only enhances their English language skills, but also enriches their understanding of global engineering practices. In conclusion, this

research emphasizes that the English language education curriculum for engineering requires significant changes to integrate cultural competency elements. By integrating language and culture teaching, students will be better prepared to face complex global challenges. Through the use of active and collaborative learning methods, and project-based teaching involving international case studies, students will not only improve their English language skills, but also broaden their understanding of cultural diversity. Therefore, they will become engineering professionals who are not only technically competent, but also able to adapt and collaborate in multicultural work environments.

## CONCLUSION

In the realm of technical education within an increasingly interconnected global landscape, the integration of cultural competencies into the curriculum is of paramount importance. This studies have shown that cultural competence positively influences English language proficiency in engineering students. Research indicates that students' proficiency in the English language is not solely influenced by their command of grammar and vocabulary, but also by their comprehension of the cultural nuances inherent in language usage. This underscores the critical necessity of infusing cultural competencies into technical education to furnish students with more effective and pertinent communication skills for multicultural work environments. Effective communication transcends mere linguistic accuracy and entails an understanding of cultural contexts. For example, in international projects, an engineer proficient in English but lacking insight into the cultural backgrounds of their colleagues may encounter obstacles in collaboration. Misinterpretations of social norms or divergent thought processes can give rise to conflicts or project setbacks. By cultivating

cultural awareness, students not only develop their English abilities, but also learn to listen and respond appropriately, fostering a more cohesive work atmosphere. Recommendations for curriculum enhancement and teaching methodologies are imperative. One approach is to integrate cultural competency components into every English language course for engineering. For example, educators can incorporate case studies featuring multinational enterprises grappling with challenges related to cross-cultural communication. This approach facilitates language acquisition alongside critical discussions on how culture influences professional interactions. Employing interactive and project-based teaching techniques, such as simulations and role-playing exercises, can also heighten student engagement. Through simulations, students can assume roles of team members from diverse cultural backgrounds, enabling firsthand exploration of cross-cultural communication dynamics. Further avenues of research should explore the implementation of cultural competencies in technical education in greater depth. This entails examining diverse strategies employed by educational institutions and analyzing their efficacy. For instance, investigating how student exchange initiatives or international partnerships offer direct experiential learning opportunities about different cultures. With a comprehensive understanding of how to embed cultural competencies, educational institutions can design programs that align with industry requirements. Additionally, longitudinal studies are indispensable for assessing the enduring impact of integrating cultural competencies into English language education for engineering. By monitoring students' progression over time, researchers can assess whether enhancements in cultural competencies influence their professional trajectories and aptitude in global work settings. For instance, research findings may reveal that graduates adept in cultural

understanding are more likely to secure advancements or excel in international projects. Such insights will inform future curriculum development and instructional strategies, enabling educational institutions to meet evolving job market demands. Consequently, integrating cultural competencies into technical education is not merely an adjunct in the curriculum, but an indispensable element that molds students' future trajectories. Equipped with proficient communication skills and cross-cultural acumen, students will be better equipped to confront challenges in an increasingly intricate and diverse work environment. Ongoing research and proactive curriculum refinement will ensure that technical education cultivates graduates who are not only technically proficient, but also adept at adapting and collaborating in a perpetually evolving global milieu.

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