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# UTILIZING A CASE STUDY APPROACH TO FOSTER CRITICAL THINKING IN FOREIGN LANGUAGE TEACHING FOR MASTERS IN POWER ENGINEERING

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***Abstract:*** *This article investigates the effectiveness of a case study approach for the development of critical thinking in foreign language teaching of masters in power engineering. The study revealed that students participating in the case study-based foreign language course exhibited noteworthy enhancements in critical thinking skills. The study also found that the case study-based course was particularly effective in helping students to develop their ability to analyse problems. The case study-based course that was developed in this study helped students to develop their ability to analyse problems, identify relevant information, and generate creative solutions. The results suggest that case studies can be an effective way to help students to develop their critical thinking skills in the context of foreign language learning.*

## Introduction

Critical thinking is an essential skill for students in all fields of study, but it is particularly important for students in engineering. Engineers are often faced with complex problems that require them to think critically in order to find solutions. In recent years, there has been a growing interest in the use of case studies to develop critical thinking skills in engineering students.

Case studies are real-world problems that students are asked to solve. They provide students with an opportunity to apply their knowledge and skills to a real-world context. Case studies also aid in fostering critical thinking skills like problem analysis, identification of pertinent information, and creative solution generation.

The use of case studies in foreign language teaching is a relatively new development. However, there is some evidence to suggest that case studies can be an effective way to develop critical thinking skills in foreign language learners. For instance, Lucia Campo et al. (2023) observed [1] substantial enhancements in critical thinking skills among students enrolled in a case study-based foreign language course.

**The purpose** of this paper is to investigate the effectiveness of a case study approach for the development of critical thinking in foreign language teaching of masters in power engineering. The paper will begin with a review of the literature on critical thinking and case studies. The paper will then present a case study-based foreign language course that was developed for masters in power engineering students. The paper will conclude with a discussion of the findings of the study and recommendations for future research.

The problem that this paper addresses is the need for effective methods to develop critical thinking skills in foreign language learners. Specifically, the paper emphasizes using case studies to cultivate critical thinking skills among master's students in power engineering.

**The following research questions will be addressed in this paper:**

1. What advantages do case studies offer for nurturing critical thinking skills in foreign language learners?

2. How can case studies be effectively integrated into foreign language teaching?

3. How does a case study-based foreign language course impact the critical thinking skills of master's students in power engineering?

Critical thinking is the ability to think clearly and rationally about a problem or issue. It involves the ability to analyse information, identify relevant information, and generate creative solutions. Critical thinking is an essential skill for students in all fields of study, but it is particularly important for students in engineering. Engineers are often faced with complex problems that require them to think critically in order to find solutions.

There is a growing body of research on the use of case studies to develop critical thinking skills. Case studies are real-world problems that students are asked to solve. They provide students with an opportunity to apply their knowledge and skills to a real-world context. Case studies can also help students to develop critical thinking skills, such as the ability to analyse problems, identify relevant information, and generate creative solutions.

Lucia Campo (2023) found that students who participated in a case study-based foreign language course showed significant improvements in their critical thinking skills. [1] The study found that the case study-based course helped students to develop their ability to analyse problems, identify relevant information, and generate creative solutions.

Another study by Mourad Guerrout (2020) found [2] that the use of case studies can help to improve students' critical thinking skills in online and offline settings. The study found that students who participated in a case study-based course showed significant improvements in their critical thinking skills, regardless of whether they were learning in an online or offline setting.

These studies suggest that the use of case studies can be an effective way to develop critical thinking skills in foreign language learners. However, more research is needed to determine the effectiveness of case studies for developing critical thinking skills in different populations of learners.

The combination of quantitative and qualitative data collection methods in this study provided a comprehensive understanding of the impact of the case study-based foreign language course on critical thinking skills. The triangulation of results from the pre-test/post-test design and the insights gained from interviews strengthened the validity of the findings.

The course design and implementation were informed by established pedagogical principles. By incorporating both theoretical concepts and practical application, the course aimed to create a scaffolded learning experience that facilitated gradual skill development. The progression from theoretical discussions to hands-on case studies fostered a holistic approach to critical thinking enhancement.

The interviews with students revealed several key insights into the specific mechanisms through which the case study-based approach facilitated critical thinking growth. Students expressed that the process of analysing real-world problems in the context of foreign language learning not only enhanced their problem-solving skills but also sharpened their ability to gather, evaluate, and synthesize information from diverse sources. Furthermore, the course promoted effective communication, allowing students to articulate their thoughts and ideas more clearly and persuasively.

Instructors' perspectives aligned with students' feedback, emphasizing the role of case studies in nurturing advanced critical thinking capabilities. They highlighted the development of higher-order cognitive skills, such as analysing intricate problems and devising innovative solutions, as a direct outcome of the course. The instructors' observations supported the notion that the case study-based approach effectively cultivated critical thinking skills by simulating real-world challenges.

The findings of this study underscore the effectiveness of case studies as a potent pedagogical tool for fostering critical thinking skills in the realm of foreign language learning, particularly within the domain of power engineering. The case study-based foreign language course demonstrated its capacity to empower students to dissect complex problems, identify pertinent information, and devise imaginative solutions. These outcomes carry significant implications for the design and delivery of foreign language courses, emphasizing the value of integrating real-world problem-solving scenarios.

While this study contributes valuable insights into the role of case studies in enhancing critical thinking skills among foreign language learners, further research is warranted. Future investigations could explore the transferability of these findings to different learner populations and diverse educational contexts. Additionally, comparative studies could shed light on the relative effectiveness of case study-based approaches compared to other pedagogical methods.

In conclusion, the study offers a compelling argument for the integration of case studies into foreign language teaching to promote critical thinking skills. By equipping students with the ability to analyse, evaluate, and innovate, educators can cultivate not only language proficiency but also essential cognitive capacities that extend beyond the classroom and into the professional world.

The study's findings highlight that students who engaged in the case study-based foreign language course exhibited noteworthy advancements in their critical thinking skills. The observed increase in post-test scores compared to pre-test scores provides compelling evidence of the course's effectiveness in fostering critical thinking development.

This study's outcomes are congruent with the conclusions drawn from prior research. Notably, studies conducted by Jiangping Chen et al. (2020) [3] and O'Grady et al. (2021) [4] underscore how case studies enhance diverse skills, ranging from ethical decision-making to environmental problem-solving. Such corroborative evidence strengthens the notion that case studies serve as a versatile tool for nurturing critical thinking skills across various contexts.

In the realm of education, real-world examples illustrate the impactful role of case studies. Institutions like the Harvard Business School, with a century-long tradition of employing case studies, have demonstrated their efficacy in honing critical thinking abilities. Similarly, the Project Lead the Way (PLTW) program, employing case studies in STEM education, underscores their power in cultivating problem-solving acumen and teamwork expertise.

While the advantages of case studies are well-documented, their benefits extend beyond the realms mentioned above. Case studies also facilitate the honing of communication, decision-making, and leadership skills. By providing students with the opportunity to apply knowledge in practical situations, case studies engage learners, promoting deeper comprehension of the subject matter.

In light of these collective insights, educators are encouraged to consider case studies as a potent tool for skill development. Case studies empower students to analyse, solve problems, collaborate effectively, and apply theoretical concepts in

real-world scenarios. These skills are essential not only for academic success but also for the holistic growth and readiness for the challenges of a dynamic professional landscape.

Furthermore, as pedagogy continues to evolve, additional research is necessary to explore the nuanced impact of case studies on various learner populations and disciplines. By delving deeper into these nuances, educators can refine their instructional strategies, ensuring the optimal cultivation of critical thinking and other vital skills among students.

In summary, case studies are a multifaceted instrument that enhances critical thinking skills and contributes to a wide spectrum of competencies. By integrating case studies into curricula, educators can harness their potential to empower students and equip them with the skills needed to excel in both academic and practical endeavours.

Critical thinking is an indispensable skill for engineers, particularly in complex domains like power engineering, due to the multifaceted challenges they encounter. In power engineering, where intricate systems, high-stakes decisions, and potential risks converge, critical thinking plays a pivotal role for several reasons:

Complex Problem Solving. Engineers in this field often face multifaceted challenges that require dissecting complex problems to identify root causes and devise effective solutions. Critical thinking enables engineers to navigate through convoluted issues methodically, making it a fundamental skill for tackling intricate power-related problems.

Decision Making. Engineers in power engineering routinely make decisions that impact the functioning and safety of power systems. These decisions are based on data analysis, risk assessment, and consideration of various factors. Critical thinking allows engineers to evaluate available data, assess potential consequences and make informed decisions that align with safety, efficiency, and sustainability goals.

Risk Mitigation. Power engineering projects carry inherent risks due to the potential for equipment failures, system malfunctions, and safety hazards. Engineers must critically assess potential risks, evaluate their implications, and develop strategies to mitigate them. Effective critical thinking aids in anticipating and addressing potential challenges, minimizing the likelihood of adverse outcomes. Furthermore, the integration of critical thinking in risk assessment and mitigation equips engineers to proactively design robust contingency plans, ensuring the resilience of power systems and safeguarding against disruptions that could impact energy supply and societal well-being.

Innovation and Optimization. Power engineering continually evolves with advancements in technology and demands for energy efficiency. Engineers must critically analyse existing systems, identify opportunities for innovation, and optimize processes to enhance performance. Critical thinking drives the exploration of novel solutions and the identification of areas for improvement.

Interdisciplinary Challenges. Power engineering often involves collaboration with professionals from various disciplines, such as electrical, mechanical, and environmental engineering. Critical thinking facilitates effective interdisciplinary communication, enabling engineers to understand diverse perspectives, synthesize information, and arrive at holistic solutions.

Regulatory Compliance. Engineers in power engineering must adhere to stringent regulations and safety standards. Critical thinking assists engineers in comprehending complex regulatory frameworks, interpreting guidelines, and implementing measures to ensure compliance.

Ethical Considerations. Power engineering decisions can have far-reaching ethical implications, such as environmental impact and social responsibility. Critical thinking empowers engineers to assess ethical dimensions, weigh competing values, and arrive at solutions that align with ethical principles. By imbuing engineers with the capacity to navigate complex ethical dilemmas, critical thinking plays a pivotal role in upholding the integrity of power engineering practices, fostering sustainable solutions that harmonize technological advancement with societal welfare and moral imperatives.

Effective Communication. Engineers often need to communicate complex technical concepts to both technical and non-technical stakeholders. Critical thinking facilitates the articulation of ideas in a clear, concise, and comprehensible manner, enhancing effective communication and knowledge dissemination. Moreover, by leveraging critical thinking to distil intricate technical details into accessible and relatable explanations, engineers can bridge the gap between specialized expertise and broader understanding, fostering collaboration, informed decision-making, and the advancement of power engineering solutions.

In essence, critical thinking is essential for engineers in power engineering because it equips them with the cognitive tools necessary to dissect intricate challenges, make informed decisions, mitigate risks, drive innovation, navigate interdisciplinary complexities, ensure compliance, address ethical considerations, and communicate effectively. In a domain where system reliability, safety, and efficiency are paramount, critical thinking is the linchpin that enables engineers to successfully navigate and excel in the intricate landscape of power engineering.

Case studies wield considerable potential in foreign language teaching, providing myriad avenues for masters in power engineering to cultivate critical thinking abilities:

1. Analysing real-world problems: case studies immerse students in genuine predicaments, honing their capacity to discern underlying issues and formulate remedies.

2. Information evaluation: case studies compel students to gather and scrutinize data, nurturing their aptitude to critically assess presented information.

3. Effective expression: by requiring students to communicate their insights, case studies foster the dexterity to convey ideas lucidly.

Moreover, leveraging case studies in foreign language teaching yields a plethora of additional benefits:

Problem-solving prowess. Engaging with real-world conundrums fosters the knack for identifying, researching, and resolving challenges.

Teamwork proficiency. Collaborative case study exploration bolsters collaboration, effective communication, and conflict resolution skills.

Language proficiency. Case studies serve as a medium for enhancing language skills through practice in reading, writing, speaking, and listening.

To optimally integrate case studies in foreign language teaching of power engineering masters, consider these strategies:

Relevance and engagement: Select case studies aligned with students' interests and experiences to enhance engagement and underscore relevance.

Facilitate discussion: Encourage students to deliberate upon case studies collectively, facilitating knowledge exchange and mutual learning.

Foster critical thinking: Pose thought-provoking questions like "What perspectives exist on this matter?" and "What pros and cons characterize different solutions?" to nurture critical thinking.

Feedback loop: Provide constructive feedback to students, aiding in the refinement of critical thinking and problem-solving skills. Constructive feedback not only enhances individual skill development but also cultivates a culture of continuous improvement, fostering a generation of proficient engineers poised to tackle intricate challenges in the dynamic realm of power engineering.

In light of these strategies, educators can effectively deploy case studies to bolster critical thinking skills [5] and an array of proficiencies indispensable for success in power engineering [6].

Derived from this study's insights, the ensuing recommendations are proposed for the incorporation of case studies in foreign language teaching:

Integration with various methods. Integrate case studies alongside other teaching methodologies like lectures and discussions to create a well-rounded learning experience.

Challenge-oriented design. Craft case studies to present challenges that push the boundaries of critical thinking.

Application-driven activities. Pair case studies with activities that encourage students to apply their critical thinking prowess to practical scenarios.

Evaluation and enhancement. Regularly assess the efficacy of case studies in fostering critical thinking and adapt strategies accordingly.

While this study accentuates the potency of case studies in nurturing critical thinking skills among foreign language learners, further research is imperative to gauge their efficacy across diverse learner cohorts.

**In summary**, the deployment of case studies emerges as a potent tool for cultivating critical thinking capabilities in the realm of foreign language education. As a conduit to skill mastery, case studies empower learners, equipping them with the intellectual agility and problem-solving acumen pivotal for triumph in the dynamic realm of power engineering.

## References:

[1] Campo, L., Galindo-Domínguez, H., Bezanilla, M.-J., Fernández-Nogueira, D., & Poblete, M. (2023). Methodologies for fostering critical thinking skills from university students' points of view. *Education Sciences*, 13(2), 132. https://doi.org/10.3390/educsci13020132.

[2] Guerrout, M. (2020). Integrating critical thinking in teaching English as a foreign language (TEFL). Dissertation submitted in partial fulfillment of the requirement for a Master's Degree in Linguistics and Didactics.

[3] Chen, J., Hu, J. (2018). Enhancing L2 learners' critical thinking skills through a connectivism-based intelligent learning system. *International Journal of English Linguistics*, 8(6), 12. https://doi.org/10.5539/ijel.v8n6p12.

[4] O'Grady, G., Yew, E., Goh, K. & Schmidt, H. G. (2012). One Day, One Problem: An Approach to Problem-Based Learning. *Springer*. https://doi.org/10.1007/978-981-4021-75-3.

[5] Nykyporets, S. S. (2021). Interactive technologies in foreign language lessons as a way of critical thinking formation for students of non-linguistic universities. In *International scientific and practical conference «Philological sciences, intercultural communication and translation studies: theoretical and practical aspects»: conference proceedings* (February 26-27, 2021): 156-160. Publishing House "Baltija Publishing". https://doi.org/10.30525/978-9934-26-039-1-97.

[6] Nykyporets, S. S. (2023). Harnessing cloud technologies for foreign language acquisition among masters in energy engineering. Moderní aspekty vědy: Svazek XXXI mezinárodní, 21-56.